



Purchasing Division

Invitation for Bid

IFB-4547-18-DH
Las Colonias Business Park Phase 2

Responses Due:

August 1, 2018 prior to 3:00 pm

Accepting Electronic Responses Only

Responses Only Submitted Through the Rocky Mountain E-Purchasing System (RMEPS)

<https://www.rockymountainbidsystem.com/default.asp>

(Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. 800-835-4603)

Purchasing Representative:

Duane Hoff Jr., Senior Buyer

duaneh@gjcity.org

970-244-1545

This document has been developed specifically to solicit competitive responses for this solicitation, and may not be the same as previous City of Grand Junction solicitations. All vendors are urged to thoroughly review this solicitation prior to responding. Submittal by **FAX, EMAIL or HARD COPY IS NOT ACCEPTABLE** for this solicitation.

Invitation for Bids

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1. Instructions to Bidders

- 1.1. **Purpose:** The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required to construct Phase 2 of the Las Colonias Business Park. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

IFB Questions:

Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org

- 1.2. **Mandatory Pre-Bid Meeting:** **Prospective bidders are required to attend a mandatory pre-bid meeting on July 12, 2018 at 10:00 am.** Meeting location shall be in the City Hall Auditorium, located at 250 N. 5th Street, Grand Junction, CO. The purpose of this visit will be to inspect and to clarify the contents of this Invitation for Bids (IFB).
- 1.3. **The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout this Solicitation. The term Owner means the Owner or his authorized representative.
- 1.4. **Submission:** **Each bid shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (<https://www.rockymountainbidsystem.com/default.asp>).** *This site offers both “free” and “paying” registration options that allow for full access of the Owner’s documents and for electronic submission of proposals. (Note: “free” registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our “**Electronic Vendor Registration Guide**” at <http://www.gjcity.org/business-and-economic-development/bids/> for details. (Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. **800-835-4603**)
- 1.5. **Modification and Withdrawal of Bids Before Opening.** Bids may be modified or withdrawn by an appropriate document stating such, duly executed and submitted to the place where Bids are to be submitted at any time prior to Bid Opening.
- 1.6. **Printed Form for Price Bid:** All Price Bids must be made upon the Price Bid Schedule attached, and should give the amounts both in words and in figures, and must be signed and acknowledged by the bidder.

The Offeror shall specify a unit price in figures for each pay item for which a quantity is given and shall provide the products (in numbers) of the respective unit prices and quantities in the Extended Amount column. The total Bid price shall be equal to the sum of all extended amount prices. When an item in the Price Bid Schedule provides a choice to be made by the Offeror, Offeror's choice shall be indicated in accordance with the specifications for that particular item and thereafter no further choice shall be permitted.

Where the unit of a pay item is lump sum, the lump sum amount shall be shown in the "extended amount" column and included in the summation of the total Bid.

All blank spaces in the Price Bid Schedule must be properly filled out.

Bids by corporations must be executed in the corporate name by the president or vice president or other corporate office accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.

All names must be typed or printed below the signature.

The Offeror's Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Contractor's Bid Form.

The contact information to which communications regarding the Bid are to be directed must be shown.

- 1.7. **Exclusions:** No oral, telephonic, emailed, or facsimile bid will be considered
- 1.8. **Contract Documents:** The complete IFB and bidder's response compose the Contract Documents. Copies of bid documents can be obtained from the City Purchasing website, <http://www.gjcity.org/business-and-economic-development/bids/> .
- 1.9. **Additional Documents:** The July 2010 edition of the "City Standard Contract Documents for Capital Improvements Construction", Plans, Specifications and other Bid Documents are available for review or download on the Public Works & Planning/Engineering page at www.gjcity.org. Electronic copies may be obtained on a CD format at the Department of Public Works and Planning at City Hall.
- 1.10. **Definitions and Terms:** See Article I, Section 3 of the General Contract Conditions in the *Standard Contract Documents for Capital Improvements Construction*.
- 1.11. **Examination of Specifications:** Bidders shall thoroughly examine and be familiar with the project Statement of Work. The failure or omission of any Offeror to receive or examine any form, addendum, or other document shall in no way relieve any Offeror from any obligation with respect to his bid. The submission of a bid shall be taken as evidence of compliance with this section. Prior to submitting a bid, each Offeror shall, at a minimum:
 - a. Examine the *Contract Documents* thoroughly;
 - b. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the Work;
 - c. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work;

- d. Study and carefully correlate Bidder's observations with the *Contract Documents*, and;
- e. Notify the Engineer of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents*

On request, the Owner will provide each Offeror access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of a Bid. It shall be the Offeror's responsibility to make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (including without limitation, surface, subsurface and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress or performance of the work and which the Offeror deems necessary to determine its Bid for performing the work in accordance with the time, price and other terms and conditions of the *Contract Documents*. Location of any excavation or boring made by Offeror shall be subject to prior approval of Owner and applicable agencies. Offeror shall fill all holes, restore all pavements to match the existing structural section and shall clean up and restore the site to its former condition upon completion of such exploration. The Owner reserves the right to require the Offeror to execute an access agreement with the Owner prior to accessing the site.

The lands upon which the Work is to be performed, rights of way, and access thereto, and other lands designated for use by Contractor in performing the Work, are identified on the Drawings.

Information and data reflected in the *Contract Documents* with respect to underground utilities at or contiguous to the site are based upon information and data furnished to the Owner and the Engineer by the owners of such underground utilities or others, and the Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the *Contract Documents*.

By submission of a Bid, the Offeror shall be conclusively presumed to represent that the Offeror has complied with every requirement of these Instructions to Bidders, that the *Contract Documents* are not ambiguous and are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

- 1.12. Questions Regarding Statement of Work:** Any information relative to interpretation of Scope of Work or specifications shall be requested of the Purchasing Representative, in writing, in ample time prior to the response time.
- 1.13. Addenda & Interpretations:** If it becomes necessary to revise any part of this solicitation, a written addendum will be posted electronically on the City's website at <http://www.gjcity.org/business-and-economic-development/bids/> . The Owner is not bound by any oral representations, clarifications, or changes made in the written specifications by Owner, unless such clarification or change is provided in written addendum form from the City Purchasing Representative.

- 1.14. Taxes:** The Owner is exempt from State retail and Federal tax. The bid price must be net, exclusive of taxes.
- 1.15. Sales and Use Taxes:** The Contractor and all Subcontractors are required to obtain exemption certificates from the Colorado Department of Revenue for sales and use taxes in accordance with the provisions of the General Contract Conditions. Bids shall reflect this method of accounting for sales and use taxes on materials, fixtures and equipment.
- 1.16. Offers Binding 60 Days:** Unless additional time is required by the Owner, or otherwise specified, all formal offers submitted shall be binding for sixty (60) calendar days following opening date, unless the Bidder, upon request of the Purchasing Representative, agrees to an extension.
- 1.17. Collusion Clause:** Each bidder by submitting a bid certifies that it is not party to any collusive action or any action that may be in violation of the Sherman Antitrust Act. Any and all bids shall be rejected if there is evidence or reason for believing that collusion exists among bidders. The Owner may, or may not, accept future bids for the same services or commodities from participants in such collusion.
- 1.18. Disqualification of Bidders:** A Bid will not be accepted from, nor shall a Contract be awarded to, any person, firm, or corporation that is in arrears to the Owner, upon debt or contract, or that has defaulted, as surety or otherwise, upon any obligation to the Owner, or that is deemed irresponsible or unreliable.

Bidders may be required to submit satisfactory evidence that they are responsible, have a practical knowledge of the project bid upon and that they have the necessary financial and other resources to complete the proposed Work.

Either of the following reasons, without limitation, shall be considered sufficient to disqualify a Bidder and Bid:

- a. More than one Bid is submitted for the same Work from an individual, firm, or corporation under the same or different name; and
 - b. Evidence of collusion among Bidders. Any participant in such collusion shall not receive recognition as a Bidder for any future work of the Owner until such participant has been reinstated as a qualified bidder.
- 1.19. Public Disclosure Record:** If the bidder has knowledge of their employee(s) or sub-contractors having an immediate family relationship with a City/County employee or elected official, the bidder must provide the Purchasing Representative with the name(s) of these individuals. These individuals are required to file an acceptable "Public Disclosure Record", a statement of financial interest, before conducting business with the City/County.

2. General Contract Conditions for Construction Projects

- 2.1. The Contract:** This Invitation for Bid, submitted documents, and any negotiations, when properly accepted by the City/County, shall constitute a contract equally binding between the City/County and Contractor. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The contract may be amended or modified with Change Orders, Field Orders, or Addendums.
- 2.2. The Work:** The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.
- 2.3. Execution, Correlation, Intent, and Interpretations:** The Contract Documents shall be signed in not less than triplicate by the Owner (City/County) and Contractor. City/County will provide the contract. By executing the contract, the Contractor represents that he/she has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment and other items necessary for the proper execution and completion of the scope of work as defined in the technical specifications and drawings contained herein. All drawings, specifications and copies furnished by the City/County are, and shall remain, City/County property. They are not to be used on any other project, and with the exception of one contract set for each party to the contract, are to be returned to the owner on request at the completion of the work.
- 2.4. The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout the Contract Documents. The term Owner means the Owner or his authorized representative. The Owner shall, at all times, have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access. The Owner will make periodic visits to the site to familiarize himself generally with the progress and quality of work and to determine, in general, if the work is proceeding in accordance with the contract documents. Based on such observations and the Contractor's Application for Payment, the Owner will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in the contract. The Owner will have authority to reject work which does not conform to the Contract documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, he will have authority to require the Contractor to stop the work or any portion, or to require special inspection or testing of the work, whether or not such work can be then be fabricated, installed, or completed. The Owner will not be responsible for the acts or omissions of the Contractor, and sub-Contractor, or any of their agents or employees, or any other persons performing any of the work.
- 2.5. Contractor:** The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Work, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be

liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence work without clarifying Drawings, Specifications, or Interpretations.

- 2.6. Sub-Contractors:** A sub-contractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.
- 2.7. Award of Sub-Contractors & Other Contracts for Portions of the Work:** Contractor shall submit with their bid response to the Owner, in writing for acceptance, a list of the names of the sub-contractors or other persons or organizations proposed for such portions of the work as may be designated in the proposal requirements, or, if none is so designated, the names of the sub-contractors proposed for the principal portions of the work. Prior to the award of the contract, the Owner shall notify the successful Contractor in writing if, after due investigation, has reasonable objection to any person or organization on such list. If, prior to the award of the contract, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful Contractor may, prior to the award, withdraw their proposal without forfeiture of proposal security. If the successful Contractor submits an acceptable substitute with an increase in the proposed price to cover the difference in cost occasioned by the substitution, the Owner may, at their discretion, accept the increased proposal or may disqualify the Contractor. If, after the award, the Owner refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the contract sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued. However, no increase in the contract sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.
- 2.8. Quantities of Work and Unit Price:** Materials or quantities stated as unit price items in the Bid are supplied only to give an indication of the general scope of the Work, and are as such, estimates only. The Owner does not expressly or by implication agree that the actual amount of Work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit item of the Work without a change in the unit price except as set forth in Article VIII, Section 70 of the *General Contract Conditions*. The City also reserves the right to make changes in the Work (including the right to delete any bid item in its entirety or add additional bid items) as set forth in Article VIII, Sections 69 through 71 of the *General Contract Conditions*.
- 2.9. Substitutions:** The materials, products and equipment described in the *Solicitation Documents* shall be regarded as establishing a standard of required performance, function, dimension, appearance, or quality to be met by any proposed substitution. No substitution will be considered prior to receipt of Bids unless the Offeror submits a written request for approval to the City Purchasing Division at least ten (10) days prior to the date for receipt of Bids. Such requests for approval shall include the name of the material or equipment for which substitution is sought and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for evaluation, including samples if requested. The Offeror shall set forth

changes in other materials, equipment, or other portions of the Work including changes of the work of other contracts, which incorporation of the proposed substitution would require to be included. The Owner's decision of approval or disapproval of a proposed substitution shall be final. If the Owner approves a proposed substitution before receipt of Bids, such approval will be set forth in an Addendum. Offeors shall not rely upon approvals made in any other manner.

- 2.10. Supervision and Construction Procedures:** The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.
- 2.11. Warranty:** The Contractor warrants to the Owner that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required by Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If within ten (10) days after written notice to the Contractor requesting such repairs or replacement, the Contractor should neglect to make or undertake with due diligence to the same, the City may make such repairs or replacements. All indirect and direct costs of such correction or removal or replacement shall be at the Contractor's expense. The Contractor will also bear the expenses of making good all work of others destroyed or damaged by the correction, removal or replacement of his defective work.
- 2.12. Permits, Fees, & Notices:** The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the work. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.
- 2.13. Responsibility for Those Performing the Work:** The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under a contract with the Contractor.
- 2.14. Use of the Site:** The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.
- 2.15. Cleanup:** The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of work he shall remove all his waste materials and rubbish from and about the project, as well as all his tools, construction equipment, machinery and surplus materials.

2.16. Insurance: The Contractor shall secure and maintain such insurance policies as will provide the coverage and contain other provisions specified in the General Contract Conditions, or as modified in the Special Contract Conditions.

The Contractor shall file a copy of the policies or Certificates of Insurance acceptable to the City with the Engineer within ten (10) Calendar Days after issuance of the Notice of Award. These Certificates of Insurance shall contain a provision that coverage afforded under the policies shall not be canceled unless at least thirty (30) Calendar Days prior written notice has been given to the City.

2.17. Indemnification: The Contractor shall defend, indemnify and save harmless the Owner, and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Contractor, or of any Contractor's agent, employee, sub-contractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Contractor shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

2.18. Miscellaneous Conditions: Material Availability: Contractors must accept responsibility for verification of material availability, production schedules, and other pertinent data prior to submission of bid. It is the responsibility of the bidder to notify the Owner immediately if materials specified are discontinued, replaced, or not available for an extended period of time. OSHA Standards: All bidders agree and warrant that services performed in response to this invitation shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970 (OSHA). In the event the services do not conform to OSHA standards, the Owner may require the services to be redone at no additional expense to the Owner.

2.19. Time: Time is of the essence with respect to the time of completion of the Project and any other milestones or deadline which are part of the Contract. It will be necessary for each Bidder to satisfy the City of its ability to complete the Work within the Contract Time set forth in the Contract Documents. The Contract Time is the period of time allotted in the Contract Documents for completion of the work. The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein, or as established as entered on the Bid Form. The Date of Substantial Completion of the work or designated portions thereof is the date certified by the Owner when construction is sufficiently complete, in accordance with the Contract Documents.

2.20. Progress & Completion: The Contractor shall begin work on the date of commencement as defined in the Contract, and shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

2.21. Payment & Completion: The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents. Upon receipt of written notice that the work is ready for final

inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when he finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents.

- 2.22. Bid Bond:** Each Bid shall as a guaranty of good faith on the part of the Bidder be accompanied by a Bid Guaranty consisting of: a certified or cashier's check drawn on an approved national bank or trust company in the state of Colorado, and made payable without condition to the City; or a **Bid Bond** written by an approved corporate surety in favor of the City. The amount of the Bid Guaranty shall not be less than 5% of the total Bid amount. Once a Bid is accepted and a Contract is awarded, the apparent successful bidder has ten calendar days to enter into a contractor in the form prescribed and to furnish the bonds with a legally responsible and approved surety. Failure to do so will result in forfeiture of the Bid Guaranty to the City as Liquidated Damages.

Each bidder shall guaranty its total bid price for a period of sixty (60) Calendar Days from the date of the bid opening.

- 2.23. Performance & Payment Bonds:** Contractor shall furnish a Performance and a Payment Bond, each in an amount at least equal to that specified for the contract amount as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These bonds shall remain in effect for the duration of the Warranty Period (as specified in the Special Conditions). Contractor shall also furnish other bonds that may be required by the Special Conditions. All bonds shall be in the forms prescribed by the Contract Documents and be executed by such sureties as (1) are licensed to conduct business in the State of Colorado and (2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of the Authority Act. If the surety on any bond furnished by the Contractor is declared bankrupt, or becomes insolvent, or its rights to do business in Colorado are terminated, or it ceases to meet the requirements of clauses (1) and (2) of this section, Contractor shall within five (5) days thereafter substitute another bond and surety, both of which shall be acceptable to the City.

- 2.24. Retention:** The Owner will deduct money from the partial payments in amounts considered necessary to protect the interest of the Owner and will retain this money until after completion of the entire contract. The amount to be retained from partial payments will be five (5) percent of the value of the completed work, and not greater than five (5) percent of the amount of the Contract. When the retainage has reached five (5) percent of the amount of the Contract no further retainage will be made and this amount will be retained until such time as final payment is made.

- 2.25. Liquidated Damages for Failure to Enter Into Contract: CITY ONLY** Should the Successful Bidder fail or refuse to enter into the Contract within ten Calendar Days from the issuance of the Notice of Award, the City shall be entitled to collect the amount of such Bidder's Bid Guaranty as Liquidated Damages, not as a penalty but in consideration of the mutual release by the City and the Successful Bidder of all claims arising from the

City's issuance of the Notice of Award and the Successful Bidder's failure to enter into the Contract and the costs to award the Contract to any other Bidder, to readvertise, or otherwise dispose of the Work as the City may determine best serves its interest.

2.26. Liquidated Damages for Failure to Meet Project Completion Schedule: CITY ONLY

If the Contractor does not achieve Final Completion by the required date, whether by neglect, refusal or any other reason, the parties agree and stipulate that the Contractor shall pay liquidated damages to the City for each such day that final completion is late. As provided elsewhere, this provision does not apply for delays caused by the City. The date for Final Completion may be extended in writing by the Owner.

The Contractor agrees that as a part of the consideration for the City's awarding of this Contract liquidated damages in the daily amount of **\$800.00** is reasonable and necessary to pay for the actual damages resulting from such delay. The parties agree that the real costs and injury to the City for such delay include hard to quantify items such as: additional engineering, inspection and oversight by the City and its agents; additional contract administration; inability to apply the efforts of those employees to the other work of the City; perceived inefficiency of the City; citizens having to deal with the construction and the Work, rather than having the benefit of a completed Work, on time; inconvenience to the public; loss of reputation and community standing for the City during times when such things are very important and very difficult to maintain.

The Contractor must complete the Work and achieve final completion included under the Bid Schedule in the number of consecutive calendar days after the City gives is written Notice to Proceed. When the Contractor considers the entire Work ready for its intended use, Contractor shall certify in writing that the Work is substantially complete. In addition to the Work being substantially complete, Final Completion date is the date by which the Contractor shall have fully completed all clean-up, and all items that were identified by the City in the inspection for final completion. Unless otherwise stated in the Special Conditions, for purposes of this liquidated damages clause, the Work shall not be finished and the Contract time shall continue to accrue until the City gives its written Final Acceptance.

If the Contractor shall fail to pay said liquidated damages promptly upon demand thereof after having failed to achieve Final Completion on time, the City shall first look to any retainage or other funds from which to pay said liquidated damages; if retainage or other liquid funds are not available to pay said liquidated damages amounts, the Surety on the Contractor's Performance Bond and Payment Bond shall pay such liquidated damages. In addition, the City may withhold all, or any part of, such liquidated damages from any payment otherwise due the Contractor.

Liquidated damages as provided do not include any sums to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the Contractor agrees to pay these costs that the City incurs because of the Contractor's delay, and these payments are separate from and in addition to any liquidated damages.

The Contractor agrees that the City may use its own forces or hire other parties to obtain Substantial or Final Completion of the work if the time of completion has elapsed and the Contractor is not diligently pursuing completion. In addition to the Liquidated Damages provided for, the Contractor agrees to reimburse the City for all expenses thus incurred.

- 2.27. Contingency/Force Account:** Contingency/Force Account work will be authorized by the Owner's Project Manager and is defined as minor expenses to cover miscellaneous or unforeseen expenses related to the project. The expenses are not included in the Drawings, Specifications, or Scope of Work and are necessary to accomplish the scope of this contract. Contingency/Force Account Authorization will be directed by the Owner through an approved form. Contingency/Force Account funds are the property of the Owner and any Contingency/Force Account funds, not required for project completion, shall remain the property of the Owner. Contractor is not entitled to any Contingency/Force Account funds, that are not authorized by Owner or Owner's Project Manager.
- 2.28. Protection of Persons & Property:** The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.
- 2.29. Changes in the Work:** The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be executed under the applicable conditions of the contract documents. A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.
- 2.30. Claims for Additional Cost or Time:** If the Contractor wishes to make a claim for an increase in the contract sum or an extension in the contract time, he shall give the Owner written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall precede in accordance with the regulations on safety. No such claim shall be valid unless so made. Any change in the contract sum or contract time resulting from such claim shall be authorized by Change Order.

- 2.31. Minor Changes in the Work:** The Owner shall have authority to order minor changes in the work not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.
- 2.32. Field Orders:** The Owner may issue written Field Orders which interpret the Contract Documents in accordance with the specifications, or which order minor changes in the work in accordance with the agreement, without change in the contract sum or time. The Contractor shall carry out such Field Orders promptly.
- 2.33. Uncovering & Correction of Work:** The Contractor shall promptly correct all work rejected by the Owner as defective or as failing to conform to the contract documents whether observed before or after substantial completion and whether or not fabricated installed or completed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. If within one (1) year after the date of completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any of the work found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner. The Contractor shall bear the cost of making good all work of separate Contractors destroyed or damaged by such removal or correction. If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the payment or contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.
- 2.30. Amendment:** No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.
- 2.31. Assignment:** The Contractor shall not sell, assign, transfer or convey any contract resulting from this IFB, in whole or in part, without the prior written approval from the Owner.
- 2.32. Compliance with Laws:** Bids must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements.
- 2.33. Confidentiality:** All information disclosed by the Owner to the Contractor for the purpose of the work to be done or information that comes to the attention of the Contractor during the course of performing such work is to be kept strictly confidential.
- 2.34. Conflict of Interest:** No public official and/or City/County employee shall have interest in any contract resulting from this IFB.

- 2.35. Contract Termination:** This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation.
- 2.36. Employment Discrimination:** During the performance of any services per agreement with the Owner, the Contractor, by submitting a Bid, agrees to the following conditions:
- 2.36.1.** The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Contractor. The Contractor agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- 2.36.2.** The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, shall state that such Contractor is an Equal Opportunity Employer.
- 2.36.3.** Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
- 2.37. Affirmative Action:** In executing a Contract with the City, the Contractor agrees to comply with Affirmative Action and Equal Employment Opportunity regulations presented in the General Contract Conditions.
- 2.38. Immigration Reform and Control Act of 1986 and Immigration Compliance:** The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).
- 2.39. Ethics:** The Contractor shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.
- 2.40. Failure to Deliver:** In the event of failure of the Contractor to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Contractor responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.
- 2.41. Failure to Enforce:** Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.

- 2.42. Force Majeure:** The Contractor shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Contractor, unless otherwise specified in the contract.
- 2.43. Independent Contractor:** The Contractor shall be legally considered an Independent Contractor and neither the Contractor nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Contractor, its servants, or agents. The Owner shall not withhold from the contract payments to the Contractor any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Contractor. Further, the Owner shall not provide to the Contractor any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.
- 2.44. Nonconforming Terms and Conditions:** A bid that includes terms and conditions that do not conform to the terms and conditions of this Invitation for Bid is subject to rejection as non-responsive. The Owner reserves the right to permit the Contractor to withdraw nonconforming terms and conditions from its bid prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

Items for non-responsiveness may include, but not be limited to:

- a. Submission of the Bid on forms other than those supplied by the City;
- b. Alteration, interlineation, erasure, or partial detachment of any part of the forms which are supplied herein;
- c. Inclusion of unauthorized additions conditional or alternate Bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning;
- d. Failure to acknowledge receipt of any or all issued Addenda;
- e. Failure to provide a unit price or a lump sum price, as appropriate, for each pay item listed except in the case of authorized alternative pay items;
- f. Failure to list the names of Subcontractors used in the Bid preparation as may be required in the Solicitation Documents;
- g. Submission of a Bid that, in the opinion of the Owner, is unbalanced so that each item does not reasonably carry its own proportion of cost or which contains inadequate or unreasonable prices for any item;
- h. Tying of the Bid with any other bid or contract; and
- i. Failure to calculate Bid prices as described herein.

- 2.45. Evaluation of Bids and Offers:** The Owner reserves the right to:

- reject any and all Bids,
- waive any and all informalities,
- negotiate final terms with the Successful Bidder, and
- disregard any and all nonconforming, nonresponsive or conditional Bids.

Discrepancies between words and figures will be resolved in favor of words. Discrepancies between Unit Prices and Extended Prices will be resolved in favor of the Unit Prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. The corrected extensions and totals will be shown in the tabulation of Bids.

The Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must be submitted. Operating costs, maintenance considerations performance data, and guarantees of materials and equipment may also be considered by the Owner.

The Owner will conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Offeror, proposed Subcontractors and other persons and organizations to do the Work in accordance with the *Contract Documents* to the City's satisfaction within the Contract Time.

The Offeror shall furnish the Owner all information and data requested by the Owner to determine the ability of the Offeror to perform the Work. The Owner reserves the right to reject the Bid if the evidence submitted by, or investigation of such Offeror fails to satisfy the Owner that such Offeror is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

By submitting a Bid, each Offeror authorizes the Owner to perform such investigation of the Offeror as the Owner deems necessary to establish the responsibility, qualifications and financial ability of the Offeror and, by its signature thereon, authorizes the Owner to obtain reference information concerning the Offeror and releases the party providing such information and the Owner from any and all liability to the Offeror as a result of such reference information so provided.

The Owner reserves the right to reject the Bid of any Offeror who does not pass any evaluation to the Owner's satisfaction.

If the Contract is to be awarded, it will be awarded to the Offeror who, by evaluation, the Owner determines will best meet the Owner's interests.

The Owner reserves the right to accept or reject the Work contained in any of the Price Bid Schedules or alternates, either in whole or in part.

2.46. Award of Contract: Unless otherwise indicated, a single award will be made for all the bid items in an individual bid schedule. In the event that the Work is contained in more than one Bid Schedule, the City may award Schedules individually or in combination. In

the case of two Bid Schedules which are alternative to each other, only one of such alternative Schedules will be awarded. Within forty-five (45) Calendar Days of Bid Opening, the City will issue a Notice of Award to the Successful Bidder which will be accompanied by four (4) unsigned copies of the Contract and the Performance and Payment Bond forms. Within ten (10) Calendar Days thereafter, the Successful Bidder shall sign and deliver four (4) copies of the Contract, Performance Bond, Payment Bond and Certificates of Insurance to the City. Within ten (10) Calendar Days thereafter, the City will deliver two (2) fully executed counterparts of the Contract to the Contractor. No contract shall exist between the Successful Bidder and the City and the Successful Bidder shall have no rights at law or in equity until the Contract has been duly executed by the City.

The Successful Bidder's failure to sign and submit a Contract and other documents set forth in this Paragraph within the prescribed time shall be just cause of annulment of the award, and forfeiture of the Bid Guaranty. The award of Contract may then be made to the next qualified Bidder in the same manner as previously prescribed.

- 2.47. Ownership:** All plans, prints, designs, concepts, etc., shall become the property of the Owner.
- 2.48. Oral Statements:** No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.
- 2.49. Patents/Copyrights:** The Contractor agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Contractor for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this IFB.
- 2.50. Remedies:** The Contractor and Owner agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.
- 2.51. Venue:** Any agreement as a result of responding to this IFB shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.
- 2.52. Expenses:** Expenses incurred in preparation, submission and presentation of this IFB are the responsibility of the company and cannot be charged to the Owner.
- 2.53. Sovereign Immunity:** The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.
- 2.54. Non-Appropriation of Funds:** The contractual obligation of the Owner under this contract is contingent upon the availability of appropriated funds from this fiscal year budget as approved by the City Council or Board of County Commissioners from this fiscal year only. State of Colorado Statutes prohibit obligation of public funds beyond the

fiscal year for which the budget was approved. Anticipated expenditures/obligations beyond the end of the current Owner's fiscal year budget shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.55. Cooperative Purchasing: Purchases as a result of this solicitation are primarily for the City/County. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Bid. The quantities furnished in this bid document are for only the City/County. It does not include quantities for any other jurisdiction. The City or County will be responsible only for the award for its jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The City/County accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

2.56. Keep Jobs in Colorado Act: Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a). If Contractor claims it is entitled to a waiver pursuant to C.R.S. §8-17-101(1), Contractor shall state that there is insufficient Colorado labor to perform the work such that compliance with Article 17 would create an undue burden that would substantially prevent a project from proceeding to completion, and shall include evidence demonstrating the insufficiency and undue burden in its response.

Unless expressly granted a waiver by the Owner pursuant to C.R.S. §8-17-101(1), Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a).

2.56.1. "Public project" is defined as:

- (a) any construction, alteration, repair, demolition, or improvement of any land, building, structure, facility, road, highway, bridge, or other public improvement suitable for and intended for use in the promotion of the public health, welfare, or safety and any maintenance programs for the upkeep of such projects
- (b) for which appropriate or expenditure of moneys may be reasonably expected to be \$500,000.00 or more in the aggregate for any fiscal year
- (c) except any project that receives federal moneys.

3. Statement of Work

3.1. GENERAL: The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required to perform concrete, asphalt, utility installation and all other work associated with the Las Colonias Business Park Phase 2 Project. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

***Site electrical plan set, specifications and bid schedule will be issued in Addendum No. 1. This work shall include, but may not be limited to approximately 87 pedestrian and 25 street light poles and bases, vendor power supply, park holiday lighting supply and all appurtenances associated to complete said work. The plan set shall also include joint trench detail consisting of Xcel, Century Link, Charter and City Fiber Conduit mainline and laterals, pull boxes and appurtenances.**

NOTE: The descriptions of the pay items listed in the Price Bid Schedule for this Project may not agree with those listed in the Standard Specifications. Payment for all Work performed, as required in the Contract Documents, will be in accordance with the items and units listed in the Price Bid Schedule.

The performance of the Work for this Project shall conform to the General Contract conditions presented in the City of Grand Junction's Standard Contract Documents for Capital Improvements Construction, revised July 2010, except as specifically modified or supplemented herein or on the Construction Drawings.

3.2. PROJECT DESCRIPTION: (Refer to Plan Set)

3.3. SPECIAL CONDITIONS & PROVISIONS:

3.3.1 Mandatory Pre-Bid Meeting: Prospective bidders are required to attend a mandatory pre-bid meeting on Thursday, July 12th, 2018 at 10:00 am. Meeting location shall be in the City Hall Auditorium, located at 250 North 5th Street. The purpose of this visit will be to inspect and to clarify the contents of this Invitation for Bids (IFB).

3.3.2 QUESTIONS REGARDING SOLICIATION PROCESS/SCOPE OF WORK:

Duane Hoff Jr., Senior Buyer
City of Grand Junction
(970) 244-1545
duaneh@gjcity.org

3.3.3 Project Manager: Jerod Timothy, Project Manager, who can be reached at (970)244-1565. During Construction, all notices, letters, submittals, and other communications directed to the City shall be addressed and mailed or delivered to:

City of Grand Junction
Department of Public Works and Planning
Attn: Jerod Timothy, Project Manager

333 W. Avenue, Building C
Grand Junction, CO 81501

3.3.4 Affirmative Action: The Contractor is not required to submit a written Affirmative Action Program for the Project.

3.3.5 Pricing: Pricing shall be all inclusive to include but not be limited to: all labor, equipment, supplies, materials, freight (F.O.B. Destination – Freight Pre-paid and Allowed to each site), travel, mobilization costs, fuel, set-up and take down costs, and full-time inspection costs, and all other costs related to the successful completion of the project.

The Owner shall not pay nor be liable for any other additional costs including but not limited to: taxes, shipping charges, insurance, interest, penalties, termination payments, attorney fees, liquidated damages, etc.

3.3.6 Freight/Shipping: All freight/shipping shall be F.O.B. Destination – Freight Pre-Paid and Allowed to the project site(s), Grand Junction, CO.

Contractor must meet all federal, state, and local rules, regulations, and requirements for providing such services.

3.3.7 Contract: A binding contract shall consist of: (1) the IFB and any amendments thereto, (2) the bidder's response (bid) to the IFB, (3) clarification of the bid, if any, and (4) the City's Purchasing Department's acceptance of the bid by "Notice of Award" or by "Purchase Order". All Exhibits and Attachments included In the IFB shall be incorporated into the contract by reference.

A. The contract expresses the complete agreement of the parties and, performance shall be governed solely by the specifications and requirements contained therein.

B. Any change to the contract, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the bidder and the City Purchasing Division or by a modified Purchase Order prior to the effective date of such modification. The bidder expressly and explicitly understands and agrees that no other method and/or no other document, including acts and oral communications by or from any person, shall be used or construed as an amendment or modification to the contract.

3.3.8 Time of Completion: The scheduled time of Completion for the Project is 306 Calendar Days from the starting date specified in the Notice to Proceed.

Completion is achieved when site cleanup and all punch list items (resulting from the final inspection) have been completed. Completion shall have the meaning set forth in Article I, Section 3 (Definitions and Terms) of the General Contract Conditions.

3.3.9 Working Days and Hours: The working days and hours shall be as stated in the

General Contract Conditions or as mutually agreed upon in the preconstruction meeting with the following exception:

All work shall be performed between the hours of 7:00 AM to 5:00 PM.

3.3.10 Licenses and Permits: Contractor is responsible for obtaining all necessary licenses and permits required for Construction, at Contractors expense. See Section 2.10. Contractor shall supply to Owner all copies of finalized permits.

3.3.11 Permits: The following permits is required for the Project and will be obtained by the City at no cost to the Contractor. Permit will be transfer to the contractor once construction has commenced.

- CDPHE Construction Storm Water Permit

The following permits are required for the Project and shall be obtained and paid for by the Contractor, with the costs included in the total bid price for the Project.

- 521 Drainage Authority Construction Storm Water Permit

3.3.12 Project Sign: Project signs, if any, will be furnished and installed by the City.

3.3.13 Authorized Representatives of the City: Those authorized to represent the City shall include Purchasing Agent, Engineers, and Inspectors employed by the City and may include an independent 3rd party testing firm.

3.3.14 Stockpiling Materials and Equipment: N/A

3.3.15 Traffic Control: The Contractor shall provide and maintain traffic control in accordance with the approved Traffic Control Plan and the Manual on Uniform Traffic Control Devices. A Traffic Control Plan shall be prepared by the Contractor and reviewed by the City two days prior to the pre-construction meeting.

3.3.16 Clean-Up: The Contractor is responsible for cleaning up all loose materials that have been deposited or swept into gutters, and onto sidewalks and driveways as a result of sidewalk operations. The costs for all clean-up work shall be considered incidental and will not be paid for separately.

3.3.17 Schedule of Submittals: Contractor shall deliver these submittals at least two days prior to the pre-construction meeting:

- See Appendix A

3.3.18 Fugitive Petroleum or Other Contamination: It is anticipated that soil contamination from fugitive petroleum or other contaminants will not be encountered with the Project.

3.3.19 Existing Utilities and Structures: Utilities were not potholed during design of this project. The location of existing utilities and structures shown on the Plans is approximate with the information gathered during design. It is the responsibility of the Contractor to pothole/locate and protect all structures and utilities in accordance with General Contract Condition Section 37.

- 3.3.20 Incidental Items:** Any item of work not specifically identified or paid for directly, but which is necessary for the satisfactory completion of any paid items of work, will be considered as incidental to those items, and will be included in the cost of those items.
- 3.3.21 Existing Concrete Sidewalks, Pans, Fillets, Curbs and Gutters:** The existing sidewalks, pans, fillets, curb and gutter are in good serviceable condition. In most instances the installation of new sidewalk and pavement will be adjacent to existing concrete. The Contractor will need to protect all concrete adjacent to construction. If the concrete is damaged during construction the Contractor will be responsible for its replacement at no cost to the City. The Contractor, the City Project Inspector, and/or the City Project Manager will walk and record any concrete that is deemed to be damaged before construction has started.
- 3.3.22 ACI Concrete and Flatwork Finisher and Technician:** Hand finishing concrete will be permitted only when performed under the direct supervision of a craftsman holding the following certificate: ACI Concrete Flatwork Finisher and Technician (ACICFFT) or other Flatwork Finisher certification program approved by the City Engineering Manager.
- 3.2.23 Discrepancy between Bid Schedule and Construction Notes:** In the event of a discrepancy between a Pay Item description in the Bid Schedule and the description for the same Pay Item in the drawings/construction notes; the language in the Bid Schedule shall govern or supersede that found elsewhere.
- 3.2.24 Quality Control Testing:** The Contractor, at their own discretion, may elect to forgo the soils Quality Control (QC) field testing (in-place soils density) for placement of Overlot, Embankment, and Trench backfill. Quality Assurance (QA) testing for these items will be performed by the City, and laboratory testing results for submittal purposes will be provided by the contractor. However, if a sufficient number of failed test results are observed by the City and/or its QA testing representatives, written notification will be provided to the contractor, and back payment to the City for failed location re-tests will be required.
- 3.3.28 Amphitheater Events:** Access to the east parking lot at the easterly entrance to the amphitheater shall remain open during events. Phasing for work adjacent to this location shall accommodate events to allow a for a passible route. The contractor can find the current list of events at <http://gjciry.org/residents /parks-recreation/las-colonias-park-amphitheater/upcoming-events-list/>.
- 3.3.29 Work by Others:** Xcel Energy and Charter will be providing and placing conduit and installing utilities in Joint Trench. The trench is to be excavated by the Contractor per plans and specifications. Along with said work the Contractor will also be responsible for providing and installing conduit in the trench for Century Link. Coordination with Xcel, Charter and Century Link will be required by the Contractor. The Contractor will be responsible for bedding, haunching and backfill of the trench. See Special Provisions 8 (SP – 8) for more information.

City Traffic Department to supply and install street/stop signs and double yellow striping.

3.3.30 Uranium Mill Tailings: Radioactive mill tailings are not anticipated to be encountered on this Project but in accordance with deed restrictions and the history of the site the Contractor shall adhere to the Uranium Mill Tailings Management Plan throughout all phases of construction supplied in Appendix F.

3.4. SCOPE OF WORK:

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION:

The *City of Grand Junction Standard Specifications for Road and Bridge Construction* are hereby modified or supplemented for this Project by the following modifications to *The Standard Specifications for Road and Bridge Construction*, State Department of Highways, Division of Highways, State of Colorado:

SP-1 SECTION 103.13 – DEWATERING TRENCHES

Section 103.13 of the Standard Specifications is hereby revised for this project as follows:

Per exemption under section 9, temporary discharge to impoundment for any necessary dewatering of utility trench or excavated area (found in Appendix E) the Contractor shall construct percolation ponds (Impoundments) adjacent to the sewer trench or site pond(s) into which the groundwater is to be discharged. The water is to be allowed to percolate through soil and back into the shallow groundwater. The ponds shall be located near the area of excavation itself and approved by Project Engineer or Inspection Staff.

The planned percolation ponds (Impoundments) will be constructed as needed along the utility corridor or adjacent to site pond in proposed green space. Within 30 days of construction of the dewatering pond(s) it shall be backfilled to comply with an exemption from the Authority of Solid Waste, Section 9, Temporary Discharge to Impoundment. A pond log will be maintained for each percolation pond and the City will document the days that waste water is visible. The City will contact SW if 30 days is exceeded for any pond to determine a path forward for proper permitting.

103.13 Method of Measurement.

Dewatering is to be measured by lump sum and shall include all appurtenances necessary to complete work.

Payment will be made under:

Pay Item
Dewatering

Pay Unit
Lump Sum

SP- 2 SECTION 103 – REMOVALS, EXCAVATION, BACKFILL AND RESTORATION:

Add the following:

103.4 Bracing and Sheeting of Trenches

Add the following:

Trench wall support will be required when installing all new pipeline included in this project. The Contractor shall provide trench boxes, sheet piles and bracing, or other approved method of supporting trench walls that will limit the top width of any trench to a maximum of six (6) feet. Payment for trench bracing by the Contractors chosen method shall be included in the lineal foot pipe price for all pipe installed in this contract. Bracing required for manhole installation shall be included in the price of the manhole.

103.10 Cutoff Walls.

Add the following:

The cost of installing cutoff walls shall be incidental to the cost of pipe installation.

103.16 Earth Backfill Material (Imported Trench Backfill).

Add the following:

Material excavated on site shall not be used in the trench backfill if determined to be unsuitable by the Engineer or his representative. The excavated material shall **NOT** be hauled off, rather stockpiled on site in designated location approved by the Project Engineer. Imported Trench Backfill shall be pitrun or other approved material meeting the requirements of Section 103.16. During placement of imported backfill over the initial backfill material (Type A) that extends to 6 inches above the top of the pipe, the Contractor shall not place any rocks over 4 inches in diameter within the first 12 inches above the initial backfill material to protect the pipe from damage.

SP-3 SECTION 202- REMOVAL OF STRUCTURES AND OBSTRUCTIONS:

Section 202 of the Standard Specifications for Road and Bridge Construction is hereby revised for this Project as follows:

Subsection 202.07, shall include the following:

Excess Material. Excavated material generated on site shall remain on site and is to be stockpiled in designated area(s). Materials may only leave the site when directed by the City of Grand Junction. Prior from being removed from the site, materials must first undergo testing for radioactivity. Any/all materials over or under radioactivity limits that are directed to be removed from the site shall be delivered to a licensed disposal facility or to the interim storage facility to be defined by the City of Grand Junction and as described in the Uranium Mill Tailings Management Plan (UMTMP) provided in Appendix B. A log of these actions must be kept.

The current Uranium Mill Tailings Management Plan shall be adhered to during all construction activities. The most current version can be found at the State of Colorado's website https://www.colorado.gov/pacific/sites/default/files/HM_umilltail-

[mgt-plan.pdf](#). All contractors and trades working on this project shall become familiar with this and related documents.

SP-4 SECTION 203 – EXCAVATION AND EMBANKMENT

Section 203 of the Standard Specifications is hereby revised for this project as follows:

Subsections 203.1 General, shall include the following:

Excavated material generated during construction phases such as, but not limited to roadway construction, utility installation, pond excavation, construction of the water quality pond and any other work that is deemed suitable for embankment shall be placed per plan at building foot print(s) and identified fill areas. Stockpiled material on site shall be included as part of said work. Material shall be screened onsite as necessary to ensure a maximum partial dimension no greater than 8” and all embankment material be free of trash and organic materials. Aggregate generated from screening processes from said work shall be stockpiled and is to be placed in pond 1 and 2 over engineer approved fill and pond liner.

The material that classify as cohesive materials per ASTM shall be placed in maximum 9-Inch loose lifts, moisture conditioned, and compacted at a minimum of 95% of the standard Proctor maximum dry density, within +/-2% of optimum moisture content as determined by ASTM D-698 or 95% of the modified Proctor ASTM D-1557 for materials that classify non-cohesive.

203.14 Basis of Payment.

Add the following:

Payment for work shall be made under Excavation and Embankment and will be measured by cubic yard of placed and compacted material per plan. Unsuitable material generated from utility construction will not be measured or paid for separately and shall be stockpiled on site in designated area. Material placed and compacted is be quantified by survey following completion of work.

Pay Item	Pay Unit
Excavation and Embankment	CY
Pond Aggregate (Generated on Site)	SY

SP-5 SECTION 207- TOPSOIL

Areas identified per plan shall receive a minimum of 6” of clean import material that meets specifications or is to be amended on site.

Soil Amendment
Materials

50% Ground well-aged cow, chicken, sheep or horse manure, 50% finely ground and aged wood chip, with a proven analysis to verify organic content, PH, electro-

conductivity, nitrogen, potassium, and phosphorus content. **A sample of the material will be supplied to the Landscape Architect with an analysis.** Material to be composted a minimum of 3 months.

Execution

Soil Amendment is to be incorporated with fertilizer by tilling at the rate of 6 cu. yds per 1000 square feet. over all planted areas., discing or rototilling, the soil to a depth of 6". After this has been done, all rocks bigger than 1" shall be picked up and removed from the site. Soil amendment is to be used in planting procedures as detailed.

Pay Item

Topsoil (6" Thick)

Pay Unit

SY

SP-6 SECTION 601 – STRUCTURAL CONCRETE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Subsection 601.02, Classification:

CONCRETE SHALL MEET THE FOLLOWING REQUIREMENTS:

- 4,500 PSI Compressive at 28 Days
- 6% air \pm 1.5%
- Slump 4", Loads exceeding 4 1/2" shall be rejected
- Maximum Water Cement Ratio no greater than 0.45.

Subsection 601.06, Batching:

This CDOT Specification has been added to this Project:

The Contractor shall furnish a batch ticket (delivery ticket) with each load for all concrete. Concrete delivered without a batch ticket containing complete information as specified shall be rejected. The Contractor shall collect and complete the batch ticket at the placement site and deliver all batch tickets to the Engineer or his representative at the end of each day. The Engineer or his representative shall have access to the batch tickets at any time during the placement. The following information shall be provided on each ticket:

1. Suppliers name and date
2. Truck number
3. Project name and location
4. Concrete class and designation number
5. Cubic yards batched
6. Type brand and amount of each admixture
7. Type, brand, and amount of cement and fly ash
8. Weights of fine and course aggregates
9. Moisture of fine and course aggregates
10. Gallons of batch water

The contractor shall add the following information to the batch ticket at time of placement:

1. Gallons of water added by the truck operator.
2. Number of revolutions of the drum for mixing
3. Discharge time

SP-7 SECTION 608 – CURBS, GUTTERS, SIDEWALKS, AND TRAILS

Section 608 of the Standard Specifications is hereby revised for this project as follows:

Subsections 608.06, Basis of Payment shall include the following:

The Contract Unit Price for the various concrete items shall be full compensation for all equipment, labor, materials, and incidentals required for the complete installation. Incidental items include excavation, subgrade compaction, cutting and removal of asphalt and concrete in areas where new concrete will be installed; disposal of excavated and removed materials; furnishing, placement and compaction of Aggregate Base Course; forming, furnishing and placement, finishing, curing and protection of the concrete; reinforcing steel, jointing (tool or saw cut) and joint filler.

Concrete walk greater than 7' in width shall be saw cut longitudinally at w/2.

SP-8 SECTION 613 – CONDUIT

ELECTRICAL CONDUIT AND PULL BOXES

Section 613 of the Colorado Department of Transportation Standard Specifications is hereby revised for this project as follows:

MATERIALS

Subsection 613.02 shall include the following:

All materials furnished, assembled, fabricated, or installed under this item shall be new, corrosion resistant and in strict accordance with the Plans and these Special Provisions.

CONDUIT

Conduit shall be Schedule 80 OR C-900, as called out for in the Plans, with a nominal diameter of 2" and 6". The conduit shall be constructed out of either RNC (i.e., PVC) or HDPE. The coefficient of friction and cut-through rating of the conduit shall meet or exceed the requirements stated in Bellcore/Telcordia GR-356-CORE *Generic Requirements for Optical Cable Innerduct and Accessories*.

All empty conduit runs shall have a pull rope (8KN) installed in each conduit after installation. Broad Band conduit shall include 10 AWG tracer wire. Pull boxes for City Fiber shall have fiber called out on the lid. Pull rope, tracer wire and tape will not be measured and paid separately, but shall be included in the unit price for conduit.

Conduit shall always enter a pull box, hand-hole, or any other type structure from the direction of the run only.

PVC conduit shall be listed as approved for use by the RUS. PVC conduit shall be manufactured in accordance with the following industry standards:

- NEMA TC-2 *Electrical Polyvinyl Chloride (PVC) Conduit*
- UL 651 *Schedule 40 and 80 Rigid PVC Conduit and Fittings*

PVC fittings shall be manufactured in accordance with the following industry standards:

- NEMA TC-3 *PVC Fittings for Use with Rigid PVC Conduit and Tubing*
- UL 514B *Conduit, Tubing, and Cable Fittings*

HDPE conduit shall be listed as approved for use by the RUS. HDPE conduit shall be manufactured in accordance with the following industry standards:

- ASTM D-2447 *Standard Specification for PE Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter*
- ASTM F-2160 *Standard Specification for Solid Wall HDPE Conduit Based on Controlled Outside Diameter*
- NEMA TC-7 *Smooth-Wall Coilable Electrical PE Conduit*
- EPEC-80 for Schedule 80 HDPE

HDPE conduit shall be capable of being coiled or placed on reels in continuous lengths, transported, stored outdoors and subsequently uncoiled for installation without affecting its properties or performance.

The Contractor shall utilize either all PVC or HDPE conduit for underground installations on this Contract. The mixing of PVC and HDPE conduit types for underground installations shall not occur without prior written approval from the Engineer.

All underground-to-aboveground and aboveground conduit installations shall utilize RMC as indicated on the Plans.

Where RMC is used, the uncoupled end shall be covered by industry color-coded thread protectors to aid in trade size recognition and protect the threads. Since 2", 4" and 6" diameter conduit are called out throughout the entire project, the thread protectors should be color-coded blue. Threads shall conform to ANSI B1.20.1 *Pipe Threads, General Purpose (inch)*. RMC, including factory manufactured threads, shall be hot-dipped galvanized inside and out. It shall also be top-coated with a compatible organic layer to inhibit white rust and increase corrosion resistance. RMC shall meet UL safety standard UL 6 *Electrical Rigid Metal Conduit - Steel* and be manufactured to ANSI C80.1 *Electrical Rigid Steel Conduit (ERSC)*.

All conduit transitions shall be constructed in a smooth and gradual manner as directed by the Engineer. Conduit sweeps into pull boxes and splice vaults shall be installed to facilitate pulling fiber optic cable directly through the pull box or splice vault. PVC conduits shall utilize

45° elbows with a minimum radius of 36". Similarly, HDPE conduits shall be installed with a 45° bend with a minimum radius of 36". The sum of the individual conduit bends, both horizontal and vertical, on a single conduit run between two pull boxes or a pull box and splice vault shall not exceed 270°. No individual bend shall be greater than 45°, unless indicated on the Plans for building access and pole-mounted cabinets where conduits transition from underground to above ground installations.

When conduits are coupled, the coupling technology shall allow the conduit to plug together without the need for special tools, and shall form both an airtight and watertight seal. Breaking force between segments shall exceed 250 lbs. The couplings shall be specifically designed for use with the size and type of conduits to be joined. Where toneable conduits are to be joined, the couplings shall be specifically designed for that purpose to ensure continuous conduit run detectability. If the Contractor intends to employ air-assisted fiber optic cable installation techniques, the couplings shall be pressure tight to internal conduit pressures not less than 200 psi when unrestrained.

The Contractor shall use conduit plugs and sealing plugs for sealing all empty conduits and conduits occupied with cabling, respectively, installed under this Contract. Conduit plugs shall be utilized in conduit ends (for all empty conduits shown on the Plans) as soon as the conduit is installed. End caps, appropriately sized for the installed conduit, shall be utilized on conduit ends (for all conduits to be occupied with cabling as shown on the Plans) as soon as the conduit is installed and sealed with electrical tape. The end caps shall be replaced with the appropriate sealing plugs as soon as cabling is installed within the conduit. Conduits shall be plugged or capped at all termination points such as pull boxes, splice vaults, junction boxes and building entries.

- Conduit plugs shall be manufactured from high-impact plastic components, combined with durable elastic gaskets. They shall be corrosion proof and appropriate for use as either a long-term or temporary seal. Conduit plugs shall be removable and reusable. They shall be both watertight and airtight to prevent the flow of water and buildup of sedimentation within the conduit. Each conduit plug shall be equipped with a rope tie device to allow the securing of pull rope to the plug's back compression plate. The Contractor shall attach the pull rope to the back compression plate of the plug and store excess slack pull rope behind the plug within the conduit for future use.
- Sealing plugs shall be simplex, bplex or triplex depending on the number of cables within a single conduit. They shall be removable and reusable. All sealing plugs shall be of the split type design, manufactured without metallic parts and easily removable and reinstallable around in-place cables without damaging the outer cable jacket. Sealing plugs shall provide a minimum watertight and airtight seal of 20 psi. They shall be installable by hand without using special tools and have no sharp corners that could damage the outer cable jacket.

Pull rope shall be a prelubricated, woven polyester tape made from low friction, high abrasion resistant yarns providing a low coefficient of friction. It shall be printed with sequential footage markings. The pull rope shall not be less than ½" with a minimum tensile strength of 1,250 lbs.

Warning tape shall be of the non-detectable variety. It shall be fabricated using a pigmented polyolefin film that has been specially treated so as not to degrade when exposed to acids or other destructive chemicals. The warning tape thickness shall be at least 4 mil and have a width not less than 3". The color of the warning tape shall be an APWA-approved orange color with black letters of approximately 3/4" printed on one side with the wording "CAUTION FIBER OPTIC CABLE BURIED BELOW". The wording shall be repeated at approximately 3' intervals. Fiber optic warning tape shall be installed above the conduit in all open trenches for short conduit runs where directional boring methods are not feasible. A 1/2" diameter by 8' long ground rod shall be installed in each vault. The cost of the ground rod shall be included in the price of the vault or manhole.

Prior to installation, the specifications for all conduit types, couplings, fittings, elbows, L-bends, mounting hardware, conduit plugs, sealing plugs, pull tape, warning tape and curb markers shall be submitted to the Engineer for written approval.

BASIS OF PAYMENT

Subsection 613.11 shall include the following:

Accepted quantities of electrical conduit will be paid as measured above which price includes all items as listed above including full compensation for trenching, furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing electrical conduit as shown on the Plans, as specified in the Standard Plans and Standard Specifications, as specified in these Special Provisions, and as directed by the Engineer.

Accepted quantities of pull boxes and junction boxes will be paid as measured above which price includes all items as listed above including full compensation for excavation, furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing each pull box and junction box as shown on the Plans, as specified in the Standard Plans and Standard Specifications, as specified in these Special Provisions, and as directed by the Engineer.

The Contractor shall coordinate work with Utility Companies as the trench work may be multiphase.

Joint Utility Trench: At any time the joint utility trench may consist of the following conduits. Plans, specifications and bid schedule for site electrical and dry utilities will be included in **Addendum No. 1**.

- Site Lighting (Pedestrian, Street and Holiday)
 - 2" SCHED. 80 PVC – Contractor Provide and Place
- Electrical Conduit (Extra)
 - 2" SCHED. 80 PVC – Contractor Provide and Place
- Broadband Infrastructure
 - 6" SCHED. 80 PVC – Contractor Provide and Place
- Gas Main (Xcel)

- 2" P.E. – Xcel Provide and Place
- Single Phase Power (Xcel)
 - 2" SCHED. 80 PVC – Xcel Provide and Place
- CATV (Charter)
 - 2" SCHED. 80 PVC – Charter Provide and Place
- Communications Cable (Century Link)
 - 2" SCHED. 80 PVC – Contractor Provide and Place
 - Vault(s) – Century Link Provides, Contractor Installs.

3/8" chips or #10 CHAT (rock crusher reject) is to be utilized as bedding and haunching for both the Street and Property Side Joint Utility Trench. Cost of materials shall be included in the linear foot contract price in the bid schedule and we considered incidental.

Payment will be made under:

Pay Item	Pay Unit
Joint Trench (30" W x 42" D)	LF
6" SCHED 80 PVC	LF
2" SCHED 80PVC	LF

Pay Item	Pay Unit
Vault (Century Link)	EA
Vault (City Fiber)	EA

SP-9 SECTION 712 – MISCELLANEOUS

Section 712 of the Standard Specifications is hereby revised for this project as follows:

Subsections 712.07(a) Geomembrane, shall include the following:

Geomembrane shall be manufactured for stopping seepage loss. The lining shall consist of virgin polyvinyl chloride (PVC) resins, plasticizers, stabilizers and other materials such as polypropylene that meet or exceed industry standard. Individual widths of PVC materials shall be fabricated into large sections by dielectric sealing into a single piece, or into a minimum number of panels, up to 100 feet wide, as required to fit the facility. Lap joints with a minimum joint width of 1/2 inch shall be used. After fabrication, the lining shall be accordion style folded and packaged for minimum handling in the field. Geomembrane shall be a minimum of 1.02 mm (40 mil) thick.

712.08 Method of Measurement.

Geomembrane is to be measured by the square yard and shall include all appurtenances necessary to complete installation.

Payment will be made under:

Pay Item	Pay Unit
Geomembrane 1.02 mm (40 Mil)	SY

SP-10 SECTION 712 – MISCELLANEOUS

Section 712 of the Standard Specifications is hereby revised for this project as follows:

Subsections 712.07(a) Batten Bar, shall include the following:

Batten Bar utilized to attach the pond liner to the concrete wall shall be 1/4" x 2" Aluminum with slotted holes punched 6" o.c. This work shall include 3/8" dia. X 3 3/4" expansion (wedge) anchor with nuts and washers set at 6" o.c., a continuous 1/4" x 2" live rubber gasket, 1/4" x 2" sealant tape and a bead of Sikaflex 1A caulk.

712.08 Method of Measurement.

Batten Bar is to be measured by the lineal foot and shall include all appurtenances necessary to complete installation.

Payment will be made under:

Pay Item	Pay Unit
Batten Bar	LF

3.5. Attachments:

- Appendix A: Project Submittal Form
- Appendix B: Landscape and Irrigation Specifications
- Appendix C: Las Colonias Park Shoreline Amenities
- Appendix D: Geotechnical Report
- Appendix E: CDPHE Section 9 Exemption
- Appendix F: Uranium Mill Tailings Management Plan

3.6. Contractor Bid Documents: For Contractor's convenience, the following is a list of forms/items to be submitted with the Contractor's bid response. However, should a form/item not be listed in this section, but required in the solicitation documents, it is the Contractor's responsibility to ensure all forms/items are submitted.

- **Contractor's Bid Form**
- **Price Bid Schedule**
- **References**
- **Manufacturer's Certificate of Authorizing for Contractor**

3.7. IFB TENTATIVE TIME SCHEDULE:

Invitation for Bids available	July 3, 2018
Mandatory Pre-Bid Meeting	July 12, 2018
Inquiry deadline, no questions after this date	July 24, 2018
Addendum Posted	July 25, 2018
Submittal deadline for proposals	August 1, 2018
City Council or Board of Commissioners Approval	August 15, 2018
Notice of Award & Contract execution	August 16, 2018
Bonding & Insurance Cert due	August 23, 2018
Preconstruction meeting	August 23, 2018
Work begins no later than	September 4, 2018

Final Completion
Holidays:

June 28, 2019
November 12, 2018
November 22-23, 2018
December 25, 2018
January 1, 2019
January 21, 2019
February 18, 2019
May 27, 2019

4. Contractor's Bid Form

Bid Date: _____

Project: IFB-4547-18-DH "Las Colonias Business Park Phase 2 Project"

Bidding Company: _____

Name of Authorized Agent: _____

Email _____

Telephone _____ Address _____

City _____ State _____ Zip _____

The undersigned Bidder, in compliance with the Invitation for Bids, having examined the Instruction to Bidders, General Contract Conditions, Statement of Work, Specifications, and any and all Addenda thereto, having investigated the location of, and conditions affecting the proposed work, hereby proposes to furnish all labor, materials and supplies, and to perform all work for the Project in accordance with Contract Documents, within the time set forth and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Contractor's Bid Form is a part.

The undersigned Contractor does hereby declare and stipulate that this offer is made in good faith without collusion or connection to any person(s) providing an offer for the same work, and that it is made in pursuance of, and subject to, all terms and conditions of the Instructions to Bidders, the Specifications, and all other Solicitation Documents, all of which have been examined by the undersigned.

The Contractor also agrees that if awarded the Contract, to provide insurance certificates within ten (10) working days of the date of Notification of Award. Submittal of this offer will be taken by the Owner as a binding covenant that the Contractor will be prepared to complete the project in its entirety.

The Owner reserves the right to make the award on the basis of the offer deemed most favorable, to waive any formalities or technicalities and to reject any or all offers. It is further agreed that this offer may not be withdrawn for a period of sixty (60) calendar days after closing time. Submission of clarifications and revised offers automatically establish a new thirty day (30) period.

Prices in the bid proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this bid proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a bid proposal for the purpose of restricting competition.
- The individual signing this bid proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of _____ percent of the net dollar will be offered to the Owner if the invoice is paid within _____ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents.

State number of Addenda received: _____.

It is the responsibility of the Bidder to ensure all Addenda have been received and acknowledged.

By signing below, the Undersigned agree to comply with all terms and conditions contained herein.

Company: _____

Authorized Signature: _____

Title: _____

The undersigned Bidder proposes to subcontract the following portion of Work:

<u>Name & address of Sub-Contractor</u>	<u>Description of work to be performed</u>	<u>% of Contract</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The undersigned Bidder acknowledges the right of the City to reject any and all Bids submitted and to waive informalities and irregularities therein in the City's sole discretion.

By submission of the Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without collusion, consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	104.4	Cap top half of sewer in concrete per City Standard Detail GU-04	4.	EA	\$ _____	\$ _____
2	108.2	6" Water Pipe (C-900 PVC)	500.	LF	\$ _____	\$ _____
3	108.2	6" Storm Drain (C-900 PVC)	450.	LF	\$ _____	\$ _____
4	108.2	8" Water Pipe (C-900 PVC)	2,900.	LF	\$ _____	\$ _____
5	108.2	12" Water Pipe (C-900 PVC)	600.	LF	\$ _____	\$ _____
6	108.2	4" Sewer Service Pipe (SDR 35)	220.	LF	\$ _____	\$ _____
7	108.2	6" Sewer Service Pipe (SDR 35)	600.	LF	\$ _____	\$ _____
8	108.2	8" Gravity Sewer Pipe (SDR 35)	1,300.	LF	\$ _____	\$ _____
9	108.2	12" Storm Drain Pipe	650.	LF	\$ _____	\$ _____
10	108.2	12" Storm Drain Pipe (C-900 PVC)	63.	LF	\$ _____	\$ _____
11	108.2	18" Storm Drain Pipe (C-900 PVC)	21.	LF	\$ _____	\$ _____
12	108.2	18" Storm Drain Pipe	1,300.	LF	\$ _____	\$ _____
13	108.2	21" Storm Drain Pipe	415.	LF	\$ _____	\$ _____
14	108.2	24" Storm Drain Pipe	300.	LF	\$ _____	\$ _____
15	108.2	36" Storm Drain Pipe	675.	LF	\$ _____	\$ _____
16	108.3	1' Water Pipe (Schedule 40 PVC)	600.	LF	\$ _____	\$ _____
17	108.3	1" Water Yard Hydrant	10.	EA	\$ _____	\$ _____
18	108.2	Import Trench Backfill	550.	CY	\$ _____	\$ _____
19	108.3	6" Gate Valve	18.	EA	\$ _____	\$ _____
20	108.3	8" Gate Valve	3.	EA	\$ _____	\$ _____
21	108.3	12" Gate Valve	2.	EA	\$ _____	\$ _____
22	108.3	8" x 6" Tee	12.	EA	\$ _____	\$ _____
23	108.3	12" x 6" Tee	4.	EA	\$ _____	\$ _____
24	108.3	12" x 8" Tee	1.	EA	\$ _____	\$ _____
25	108.3	8", 90° Elbow	1.	EA	\$ _____	\$ _____
26	108.3	8", 22.5° Elbow	4.	EA	\$ _____	\$ _____
27	108.3	8", 45° Elbow	6.	EA	\$ _____	\$ _____
28	108.3	12", 22.5° Elbow	3.	EA	\$ _____	\$ _____
29	108.3	12", 45° Elbow	2.	EA	\$ _____	\$ _____
30	108.3	8" x 6" Reducer	2.	EA	\$ _____	\$ _____
31	108.3	8" End Cap/Plug	8.	EA	\$ _____	\$ _____
32	108.3	8" x 8" Tee	2.	EA	\$ _____	\$ _____
33	108.3	Fire Hydrant	10.	EA	\$ _____	\$ _____
34	108.3	12" x 8" Reducer	1.	EA	\$ _____	\$ _____
35	108.3	4" Sewer Service Tap	8.	EA	\$ _____	\$ _____
36	108.3	Sanitary Sewer Cleanout (2-way) to include appurtenances per City Standard Detail SS - 07.	8.	EA	\$ _____	\$ _____
37	108.3	1" Tapping Saddle	2.	EA	\$ _____	\$ _____
38	108.3	1" Corporation Stop	2.	EA	\$ _____	\$ _____
39	108.3	1" Tee	10.	EA	\$ _____	\$ _____
40	108.3	1" Backflow Prevention Device	2.	EA	\$ _____	\$ _____
41	108.4	2" Water Service Line (HDPE)	300.	LF	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
42	108.4	2" Water Service Assembly	9.	EA	\$ _____	\$ _____
43	108.5	Sanitary Sewer Basic Manhole (48" I.D.)	10.	EA	\$ _____	\$ _____
44	108.5	Manhole Barrel Section (D>5')(48" I.D.)	30.	VLF	\$ _____	\$ _____
45	108.5	Storm Sewer Basic Manhole (48" I.D.)	4.	EA	\$ _____	\$ _____
46	108.5	Connect to Existing Manhole (8" Pipe)	1.	EA	\$ _____	\$ _____
47	108.5	Storm Sewer Flared End Section (36" I.D.)	3.	EA	\$ _____	\$ _____
48	108.5	Pour in Place Storm Drain Box. Box L2 on the plan set.	1.	EA	\$ _____	\$ _____
49	108.5	ADS Inlets or engineer approved equal	25.	EA	\$ _____	\$ _____
50	108.5	Storm Sewer Flared End Section (24" I.D.) (Directly in front of outlets structure pond 3)	1.	EA	\$ _____	\$ _____
51	108.6	Double Storm Drain Inlet (Vertical Curb)	3.	EA	\$ _____	\$ _____
52	108.6	Triple Large Storm Drain Area Inlet	1.	EA	\$ _____	\$ _____
53	108.6	Storm Sewer Basic Manhole (72" ID)	4.	EA	\$ _____	\$ _____
54	108.6	Special Small Storm Drain Area Inlet (see plan details)	10.	EA	\$ _____	\$ _____
55	108.6	Outlet Structure - See "Water Quality Outlet Structure Pond 3" to include all appurtenances (complete in place).	1.	EA	\$ _____	\$ _____
56	108.6	Single Storm Drain Inlet (Vertical Curb)	10.	EA	\$ _____	\$ _____
57	108.6	Large Area Inlet	7.	EA	\$ _____	\$ _____
58	108.7	Granular Stabilization Material (Type B)	1,500.	TON	\$ _____	\$ _____
59	203	Excavation and Embankment - See SP - 4.	47,800.	CY	\$ _____	\$ _____
60	207	Topsoil (6" Thick) (all areas subject to plantings)	60,500.	SY	\$ _____	\$ _____
61	207	Import Fill Material - Clean fill 12" Thick at all areas with ground cover not paved	60,500.	SY	\$ _____	\$ _____
62	208	Erosion Control (Complete in Place)	Lump	SUM	---	\$ _____
63	208	Stabilized Construction Entrance	2.	EA	\$ _____	\$ _____
64	209	Dust Abatement	270.	DAYS	\$ _____	\$ _____
65	304	Aggregate - River Cobble 1" -3" (6" Thick) to include approved fill below. (Butterfly Lake)	7,800.	SY	\$ _____	\$ _____
66	304	Subgrade Stabilization - Aggregate Base Course (Class 3) (12" Thick)	4,000.	SY	\$ _____	\$ _____
67	304	Aggregate Base Course (Class 6) (13" Thick)	12,250.	SY	\$ _____	\$ _____
68	306	Reconditioning (12" Deep)	16,000.	SY	\$ _____	\$ _____
69	304	Pond Aggregate (Generated on site) to be placed over engineer approved backfill. See Sp - 4.	4,200.	SY	\$ _____	\$ _____
70	401	Hot Mix Asphalt (5" thick) (Grading SX 75, Binder Grade 64-22)	3,400.	TON	\$ _____	\$ _____
71	420	Geosynthetics - Mirafis RS580i or approved equal	4,000.	SY	\$ _____	\$ _____
72	420	Geotextile Fabric (Non-Woven) Underlayment at Pond Liner.	108,000.	SQ. FT.	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
73	504	Concrete Wall (Class D) per M and S Standard M-601-20 (Wall Design Height 5'). Work shall include approximately 720 lbs. Reinforcing Steel (Epoxy Coated), Structural Concrete Coating (Exterior of wall), 38 cy Structural Backfill (Class 1) and any necessary appurtenances to complete work. Includes water spill adjustment flat bar. Refer to Plan Sheets for detail. (waterfall wall)	20.	CY	\$ _____	\$ _____
74	504	Concrete Wall (Class D) per M and S Standard M-601-20 (Wall Design Height 3'). Work shall include approximately 12,650 lbs. Reinforcing Steel (Epoxy Coated), Structural Concrete Coating (Exterior of wall), 540 cy Structural Backfill (Class 1) and any necessary appurtenances to complete work. Refer to Plan Sheets for detail. (pond perimeter walls, upper/lower waterfall trough walls, and check dam wall)	286.	CY	\$ _____	\$ _____
75	504	Concrete Wall (Class D) per M and S Standard M-601-20 (Wall Design Height 3'). Work shall include approximately 15,100 lbs. Reinforcing Steel (Epoxy Coated), Structural Concrete Coating (Exterior of wall), 640 cy Structural Backfill (Class 1) and any necessary appurtenances to complete work. Refer to Plan Sheets for detail. (lake perimeter wall)	350.	CY	\$ _____	\$ _____
76	506	Riprap (d50=12" to include geogrid)	120.	SY	\$ _____	\$ _____
77	607	Steel Hand Rail (adjacent to HVOHP pole remaining in place)	40.	LF	\$ _____	\$ _____
78	607	6' Black Vinyl Coated Chain Link Fencing to include gates and appurtenances.	1,845.	LF	\$ _____	\$ _____
79	608	Concrete Pavement (Roundabout and in and around Trash enclosure) (10" Thick) to include 6" of Class 6 Aggregate Base Course.	1,800.	SY	\$ _____	\$ _____
80	608	Concrete Curb and Spill Gutter (1.5' Wide) to include 6" of Class 6 Aggregate Base Course.	410.	LF	\$ _____	\$ _____
81	608	Concrete Median Edger (1.5' wide) to include 4" of Class 6 Aggregate Base Course)	410.	LF	\$ _____	\$ _____
82	608	Concrete Truck Apron (Roundabout) (10" Thick) to include 6" of Class 6 Aggregate Base Course.	300.	SY	\$ _____	\$ _____
83	608	Concrete Slope Pave (6" Thick) to include 6" of Class 6 Aggregate Base Course.	25.	SY	\$ _____	\$ _____
84	608	Concrete Terrace Edger to include 6" of Class 6 Aggregate Base Course. See Plan Details at both ends of Butterfly Bridge.	710.	LF	\$ _____	\$ _____
85	608	Concrete Art Pedestals (See Detail)	8.	EA	\$ _____	\$ _____
86	608	Concrete Curb (6" Wide, 14" High) to include 6" of Class 6 Aggregate Base Course.	2,860.	LF	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
87	608	Concrete Curb and Gutter (2' Wide) to include 6" of Class 6 Aggregate Base Course.	3,600.	LF	\$ _____	\$ _____
88	608	Concrete Drive Over Curb and Gutter (2.5' Wide) to include 6" of Class 6 Aggregate	705.	LF	\$ _____	\$ _____
89	608	Concrete Sidewalk (6" Thick) to include 6" of Class 6 Aggregate Base Course.	14,890.	SY	\$ _____	\$ _____
90	608	Concrete Pavement (Parking) (8" Thick) to include 6" of Class 6 Aggregate Base Course.	2,250.	SY	\$ _____	\$ _____
91	608	Concrete Drainage Pan (3' Wide) to include 6" of Class 6 Aggregate Base Course.	270.	LF	\$ _____	\$ _____
92	608	Concrete Drainage Pan (6' Wide) to include 6" of Class 6 Aggregate Base Course.	600.	LF	\$ _____	\$ _____
93	608	Concrete Corner Fillet to include 6" of Class 6 Aggregate Base Course.	42.	SY	\$ _____	\$ _____
94	608	Concrete Curb Ramp to include 6" of Class 6 Aggregate Base Course.	180.	SY	\$ _____	\$ _____
95	608	Detectable Warning (Cast Iron, Wet Set) (2'x2)	50.	EA	\$ _____	\$ _____
96	620	Sanitary Facility	1.	EA	\$ _____	\$ _____
97	625	Construction Surveying	Lump	SUM	---	\$ _____
98	626	Mobilization	Lump	SUM	---	\$ _____
99	627	Preformed Thermoplastic Pavement Marking (Left Turn)	Lump	SUM	---	\$ _____
100	627	Preformed Thermoplastic Pavement Marking (X-walk) (2' x 10' TYP.)	800.	EA	\$ _____	\$ _____
101	627	Preformed Plastic Pavement Marking (8" White Solid)	300.	LF	\$ _____	\$ _____
102	627	Preformed Thermoplastic Pavement Marking (4" White Solid)	20,000.	LF	\$ _____	\$ _____
103	627	Preformed Plastic Pavement Marking (24" White Solid)	100.	LF	\$ _____	\$ _____
104	630	Traffic Control (Complete In Place)	Lump	SUM	---	\$ _____
105	630	Traffic Control Plan	Lump	SUM	---	\$ _____
106	712	Geomembrane (40 Mil) - See SP - 9.	108,000.	SQ. FT.	\$ _____	\$ _____
107	712	Batten Bar (complete in place) (irrigation ponds and butterfly lake) See Sp - 10 for details.	3,000.	LF	\$ _____	\$ _____
108	712	Plaza Area Surface Treatment (pour in place EPDM) (Engineer Approved)	1,250.	SY	\$ _____	\$ _____
109		<u>LANDSCAPE</u>				
110		Lawn, Hydroseeded, Fine Grade	345,620.	SF	\$ _____	\$ _____
111		Native Grass, Hydroseeded, Fine Grade	27,036.	SF	\$ _____	\$ _____
112		Shrub Bed - Wood mulch, No fabric	91,259.	SF	\$ _____	\$ _____
113		Shrub Bed - Decomposed Granite, No fabric	69,651.	SF	\$ _____	\$ _____
114		Pea Gravel	772.	SF	\$ _____	\$ _____
115		Concrete Edger	4,325.	LF	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref. Description	Quantity	Units	Unit Price	Total Price
116	2" Canopy Trees	69.	EA	\$ _____	\$ _____
117	1-1/2" Ornamental Trees	17.	EA	\$ _____	\$ _____
118	6 ft Evergreen Trees	21.	EA	\$ _____	\$ _____
119	5 Gallon Deciduous Shrubs	814.	EA	\$ _____	\$ _____
120	1 Gallon Deciduous Shrubs	112.	EA	\$ _____	\$ _____
121	5 Gallon Evergreen Shrubs	248.	EA	\$ _____	\$ _____
122	1 Gallon Perennials	545.	EA	\$ _____	\$ _____
123	Boulders, 5'X3'	33.	EA	\$ _____	\$ _____
124	Boulders, 3'X2'	17.	EA	\$ _____	\$ _____
125	<u>IRRIGATION</u>				
126	4" Conduit Sleeves, includes trenching, backfill & compaction	920.	LF	\$ _____	\$ _____
127	6" Conduit Sleeves, includes trenching, backfill & compaction	30.	LF	\$ _____	\$ _____
128	2 Wire Irrigation Control Wire	4,560.	LF	\$ _____	\$ _____
129	Rainbird FD-101TURF decoder	71.	EA	\$ _____	\$ _____
130	LSP-1 Surge Protector	17.	EA	\$ _____	\$ _____
131	tap into existing irrigation system	1.	LS	\$ _____	\$ _____
132	6" C900 DR 18 PVC Mainline, including Trenching, Filling, and thrust blocking	4,560.	LF	\$ _____	\$ _____
133	4" Isolation Valve (at tap)	2.	EA	\$ _____	\$ _____
134	Flow Sensor	2.	EA	\$ _____	\$ _____
135	4" Master Valve	2.	EA	\$ _____	\$ _____
136	4" Pressure Reducing Valve	2.	EA	\$ _____	\$ _____
137	6" Isolation Valve	7.	EA	\$ _____	\$ _____
138	Drain Valve, 2" Mueller	1.	EA	\$ _____	\$ _____
139	1-1/2" Automatic Control Valve Assembly	28.	EA	\$ _____	\$ _____
140	2" Automatic Control Valve Assembly	43.	EA	\$ _____	\$ _____
141	Future Valve Location assembly	12.	EA	\$ _____	\$ _____
142	1401 Bubbler Heads, on riser, swing pipe	3,170.	EA	\$ _____	\$ _____
143	1804 Pop-up heads, spray nozzle	248.	LF	\$ _____	\$ _____
144	1804 Pop-up heads, R-VAN nozzle	100.	EA	\$ _____	\$ _____
145	5004 Gear Drive head, swing joint assembly	272.	EA	\$ _____	\$ _____
146	6504 Gear Drive head, swing joint assembly	171.	EA	\$ _____	\$ _____
147	Quick Coupler Valve	18.	EA	\$ _____	\$ _____
148	1" Poly Lateral for bubbler	13,930.	EA	\$ _____	\$ _____
149	1" Class 160 PVC Lateral Piping Including Trenching and Filling	11,360.	LF	\$ _____	\$ _____
150	1-1/2" Class 160 PVC Lateral Piping Including Trenching and Filling	8,310.	LF	\$ _____	\$ _____
151	2" Class 160 PVC Lateral Piping Including Trenching and Filling	3,640.	LF	\$ _____	\$ _____
152	2-1/2" Class 160 PVC Lateral Piping Including Trenching and Filling	810.	LF	\$ _____	\$ _____
153	Rainbird LDI (Large Decoder Interface)	1.	EA	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
154		Irrigation Controller Ground Plate and Grounding Rod Assembly	1.	EA	\$ _____	\$ _____
155		2 HP Otterbine Floating Fountain with anchor block	1.	EA	\$ _____	\$ _____
156		10 HP Recirculation Munro Pump and Slide Rail Assembly	1.	EA	\$ _____	\$ _____
157		60" manhole sump w/ 36" hatch	1.	EA	\$ _____	\$ _____
158		<u>Boat Ramp</u>				
159	A	Preconstruction Services	1.	LS	\$ _____	\$ _____
160	1	Mobilization, General Conditions & Best Management Practices	1.	LS	\$ _____	\$ _____
161	2	Construction Survey/Stake/As-Built		NA		
162	3	Traffic Control	1.	LS	\$ _____	\$ _____
163	B	Erosion Control and Care of Water				
164	4	General Staging Area BMPs				
165		Furnish, Install, and Maintain Silt Fence	1.	LS	\$ _____	\$ _____
166		Install Inlet/Outlet Protection (Straw Wattles or Equivelant BMP)	400.	LF	\$ _____	\$ _____
167	5	Care of Water (COW) Practices	1.	LS	\$ _____	\$ _____
168		Turbidity Curtain	1.	LS	\$ _____	\$ _____
169		Oil Booms	250.	LF	\$ _____	\$ _____
170		Furnish and Intall Work Isolation/Coffer Dam	250.	LF	\$ _____	\$ _____
171		Concrete Laden Water Control	250.	LF	\$ _____	\$ _____
172		Pumping and Filtering	1.	LS	\$ _____	\$ _____
173	C	BOAT RAMP CONSTRUCTION AND SITE IMPROVEMENTS	1.	LS	\$ _____	\$ _____
174	6	Clear and grub site	40,000.	SF	\$ _____	\$ _____
175	7	Unclassified Bank Excavation	2,765.48	CY	\$ _____	\$ _____
176	8	Placement and Rough Grading of Excavated Material On Site	400.	CY	\$ _____	\$ _____
177	9	Stockpile Excavated Alluvium Nearby	2,365.48	CY	\$ _____	\$ _____
178	10	Scarify and Recompact Subgrade (Depicted Parking Area & Under Concrete)	27,000.	SF	\$ _____	\$ _____
179	11	Furnish and Rough Grade Suitable Subgrade Base Course per Geotechnical Specifications	446.57	TONS	\$ _____	\$ _____
180	12	Furnish and Compact 8" min. of CDOT Class-6 Road Base (Depicted Parking Area and Turn Around)	989.63	TONS	\$ _____	\$ _____
181	13	Furnish and Install 6" Concrete Sidewalk, Including Curb and Gutter	37.22	CY	\$ _____	\$ _____
182	14	Furnish and Install Cedar Log Parking Delineation	660.	LF	\$ _____	\$ _____
183	15	Furnish and Install #3 Rebar for Cedar Log Installation	132.	LF	\$ _____	\$ _____
184	16	98% Compaced Subgrade on Undisturbed Alluvium (Boat Ramp)	3,999.84	SF	\$ _____	\$ _____
185	17	Furnish and Compact 6" CDOT Class-6 Road Base (Boat Ramp)	123.7	TONS	\$ _____	\$ _____

Bid Schedule: Las Colonias Business Park Phase 2

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
186	18	Reinforced Concrete Cast in Place and Texture Boat Ramp (8" Thick Slab)	79.01	CY	\$ _____	\$ _____
187	19	Furnish and Install 3" Minus Ramp Shoulder (8" depth)	11.28	CY	\$ _____	\$ _____
188	20	Furnish and Install 12" Minus Ramp Shoulder (18" depth)	25.39	CY	\$ _____	\$ _____
189	21	Furnish and Install Boulder for Ramp Toe and Terraced Landing	251.6	TONS	\$ _____	\$ _____
190	22	Furnish and Install Non-woven Filter Fabric	715.	SY	\$ _____	\$ _____
191	23	Furnish and Install 1-2mm Sand (8" depth)	63.21	CY	\$ _____	\$ _____
192	24	Furnish and Install 5/8" Rounded Gravel (8" depth)	31.6	CY	\$ _____	\$ _____
193	25	Furnish and Install 1" Rounded Gravel (8" depth)	28.05	CY	\$ _____	\$ _____
194	26	Furnish and Install Boat Staging Tie-offs	4.	EA	\$ _____	\$ _____
195	27	Topsoil, Seeding, and Planting	1.	LS	\$ _____	\$ _____
196		Seeding	0.17	AC	\$ _____	\$ _____
197		Topsoil	186.62	CY	\$ _____	\$ _____
198		Planting	1.	LS	\$ _____	\$ _____
198	28	Furnish and Install Erosion Control Blankets	328.47	SY	\$ _____	\$ _____
200	29	Irrigation	1.	LS	\$ _____	\$ _____
MCR		Minor Contract Revisions	---	---	---	\$ 300,000.00

Bid Amount: \$ _____

Bid Amount: _____ **dollars**

Appendix A

Project Submittal Form

PROJECT SUBMITTAL FORM

PROJECT: Las Colonias Business Park Phase 2

CONTRACTOR: _____

PROJECT MANAGER: Jerod Timothy

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
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STREET CONSTRUCTION

Pavement mix design				
Base course gradation, Proctor curve				
Sub-base course gradation, Proctor curve				
Concrete mix design, Class D				
Class 3 Pit Run				

STORM DRAINAGE CONSTRUCTION

Pipe				
Bedding gradation				
Backfill gradation, Proctor curve, plasticity index (PI)				
Manhole				
Ring and cover				
Inlet box				
Grate & frame				
Flared End Section				
Pipe to manhole / inlet connection				
Outlet Structure – Water Quality Pond				
Small Area Inlets				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
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SEWER CONSTRUCTION

Pipe				
Connectors				
Bedding gradation				
Backfill gradation, Proctor curve, plasticity index (PI)				
48" Manhole				
Ring and cover				
Pipe to manhole connection				
Sewer Service Tap (Full Body Wye)				
Clean Out Appurtenances				

WATER CONSTRUCTION

Pipe				
2" HDPE				
Fittings				
Valves				
Tracing Wire				
Tapping Saddle and Corp Stop.				
Ring and Cover				
Bedding Gradation				
Backfill Gradation, Procter Curve, Plasticity Index (PI)				
Valve Box				
Yard Hydrant				
Fire Hydrant				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
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EROSION CONTROL / STORMWATER MANAGEMENT

5-2-1 Storm Water Permit				
Construction Entrance				
Inlet Protection				
Concrete Washout				
Straw Bale				
Erosion Log				

PERMITS, PLANS, OTHER

Traffic Control Plan				
Dewatering Permit				
ACI Flatwork Finisher and Technician				
Geotextile (Pond Liner) (40 mil)				
Batten Bar				
Construction Schedule				
Thermoplastic				
Large Splice Box (Quasite)				
Irrigation Pull Box (Large)				
Detectable Warning				
Geosynthetics – Mirafi or equivalent				
Topsoil				
Import Fill				
Reinforcing Steel (epoxy coated)				
Steel Hand Rail				
6' Black Vinyl Coated Chain Link				
EPDM (Pour In Place)				

Appendix B

Landscape and Irrigation Specifications

Technical Specifications for:
Las Colonias Business Park
323 Site Improvements

1 General

323026.011 Scope of Site Improvements

This item shall consist of furnishing and installing chain link fence, hardware and all other incidental items which are required to construct fencing in accordance with the plans, details and provisions set forth in the specifications.

2 Products

323126.112 Chain Link- 6' vinyl coated

Contractor shall furnish 6' black vinyl coated chain link fence materials and any additional materials as needed to complete all chain link fence work in this contract. Chain link fabric shall be 9 gauge steel, with 6 gauge PVC coating using the extruded bonded process. Fittings, hardware and other appurtenances not specifically covered by the plans and specifications shall be standard commercial grade, and in accord with current standard practice. Pipe material to be full weight pipe, for terminal posts shall be 2-3/8" 3.65 lbs./ft; line posts 1-7/8" O. D., 2.72 lbs/ft, top rail 1-5/8" 2.72 lbs./ft., 21' in length, joined with 1-5/8" sleeve. Tie wire shall be 12 gauge steel.

323126.22 Concrete for Fence Post Footings-Sack Mix

If Contractor so chooses, site mixed concrete may be used for site improvements specified in this section. Site mix concrete to be Screte or equal.

4 Execution

323126.034 Chain Link

Chain link fence shall be constructed in accordance with plans and details provided and in accordance with current standard practice.

323126.24 Concrete for Fence Post Footings-Sack Mix

Mix in clean container with clean water free of solvents, oils or other material harmful to the integrity of the concrete. Follow directions on container, making sure not to add excessive amounts of water. Concrete mixed with excessive amounts of water is to be discarded . Excess concrete is to be removed from site as per laws and codes.

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

1 General

328400.011 Scope of Landscape Irrigation Work

Furnish all labor, equipment, appliances, materials and perform all operations required to complete irrigation system installation and other work as shown on the applicable drawings and as specified herein, guarantee and meet conditions of this Contract.

328400.451 Job Supervision - Irrigation

All work specified herein shall be performed under the direct supervision of a superintendent thoroughly familiar with the work of this Section and who shall be at the Project site for the duration of the work of this Section.

328400.541 Job Conditions and Provisions-Irrigation

No irrigation system construction shall take place during freezing or wet weather or when temperatures are less than 40 degrees Fahrenheit, and no trenches shall be backfilled with frozen material. Installation of the system shall not take place until all earthwork has been substantially completed, compacted. Errors, conflicts or omissions from the Drawings or Specifications, or the misdescription of details of work which are manifestly necessary to carry out the intent of the Drawings or Specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details or work, but they shall be performed as if fully and clearly set forth and described in the Drawings and Specifications.

328400.551 Substitute Products

Requests for substitution of products named in this section must be approved by the Owner's Representative one week prior to bid opening.

328401.021 Layout of Lines & Levels

Before any installation operations are started, the site shall be completely staked out for the work of this Section by the Contractor. Pipes are not to be installed through tree root ball locations. All mains and valve locations shall be staked out for approval before installation by the Owners Representative.

328401.041 Tolerances

Main to be installed at 24" bury. Depths of laterals shall be eighteen inches (18"), and pitch of pipes as specified shall be minimums. Polyethylene bubbler pipe to be at 12" bury. Coverage achieved on site shall be guaranteed according to plan; any unwatered areas due to poor placement of or insufficient heads shall be corrected by the Contractor.

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

2 Products

- 328413.512 Automatic Master Valve
Automatic Master Valve are to be Bermad IR-410-X solenoid controlled normally open control valve, or equal.
- 328413.552 Flow Sensor
Rainbird FS400P Flow Sensor for use with control system.
- 328413.562 Pressure Regulating Valve
Pressure regulating valve to be Bermad IR-420-KXZ pressure reducing valve, including installation hardware and fittings.
- 328418.342 Bubbler Head
Bubbler heads shall be Rainbird 1401 full circle pressure compensating nozzle, mounted on 1/2" swing pipe and SB Series Spiral Barb Fittings, as shown on detail or equal, approved prior to bidding.
Maximum length of swing pipe to be 10', minimum length to be 2'.
- 328423.102 4" Spray Sprinkler Head for Tree Plantings
Pop-up spray heads shall be Rainbird 1804 plastic 4" pop-up heads nozzled with Rainbird Spray Nozzles as shown on drawing, or equal, approved prior to bidding.
- 328423.112 4" Spray Sprinkler Head for Small Lawn Areas
Pop-up spray heads shall be Rainbird 1804 plastic 4" pop-up heads with Rainbird R-VAN Rotary Nozzles as shown on drawing, or equal, approved prior to bidding.
- 328423.412 Gear Drive Rotor Pop-Up Sprinkler Head - Mid-size Lawn areas
Rotor Pop-Up Sprinkler Heads shall be Rainbird 5004 4" Pop-Up with MPR nozzle sized as indicated on drawing.
- 328423.462 Gear Drive Rotor Pop-Up Sprinkler Heads-Large lawn and Native grass areas
Gear Drive Rotor Pop-Up Sprinkler Heads shall be Rainbird 6504, or equal with nozzle sized as indicated on drawing.
- 328424.092 Automatic Control Valves
Automatic Control Valves are to be Rainbird PEB Electric Remote Control Irrigation Valves of size indicated on drawings, or equal.
- 328424.372 Isolation Gate Valve-4" & 6"
Isolation valves are to be Mueller A-2362 Resilient Wedge Gate Valve, sized as shown on drawings, and shall be listed by NSF for use in potable water service.
- 328424.382 Quick Coupler Valves
Quick coupler valves are to be Rainbird #33-D two piece assembly with 3/4" schedule. 80 PVC nipple of length to bring head 1" above finish grade. Marlex Street Ells are to be used for a swing joint assembly to main line.
- 328424.662 Manual Drain Valves
Manual Drain Valves shall be 2" brass gate valve or equal. Valves shall be of bronze construction with threaded connections, cross handle and operating key;

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

328424.702 Valve Boxes

Super Jumbo box (2 valves max), or equal.

328424.722 Manual Drain Valve Boxes

Manual drain valve boxes shall be 10" circular box with lid.

328425.092 Irrigation Pipe - 6" Main Pressure Line, C900 DR

6" Main Pressure Line pipe shall be C900 DR 18 PVC Pipe as detailed. Fittings are to be rated to 235 psi and in accordance with manufacturer's recommendations and requirements.

328425.202 Irrigation Pipe - Lateral Lines

Pipe shall be PVC Class 160 with PVC Schedule 40 fittings, solvent weld, as detailed, sized as shown on the plan.

328425.302 Polyethylene Irrigation Pipe laterals - 1" Bubbler

Pipe shall be Eagle Plastics, Inc. 'Poly-Flex' flexible polyethylene pipe or equal rated at 100 psi. fittings are to be schedule 80 insert fittings w/stainless steel clamps.

328427.142 Irrigation Head Risers- Swing Joint

All irrigation sprinkler heads with greater than 5 gallons per minute flow shall have an adjustable swing joint riser assembly consisting of KBI Flex Risers and two Marlex Street Ells or Spears 5800 Series manufactured swing joint assembly.

328427.342 Irrigation Head Risers- Swing Pipe

All sprinkler heads with less than 5 gallons per minute flow shall have Rainbird SP-100 Swing Pipe, SB Series Spiral Barb Fittings, as shown in detail. Maximum length of swing pipe to be 10', minimum length to be 2'. No Spiral Barbed "T" fittings are to be used without prior approval from Owners Representative.

328428.142 Irrigation Head Risers- Swing Joint

All irrigation sprinkler heads with greater than 5 gallons per minute flow shall have a 3/4" swing joint assembly consisting of KBI Flex Risers and two Marlex Street Ells or a manufactured swing joint assembly.

328428.402 CL 160 PVC Sleeving

PVC sleeving shall be PVC Class 160, solvent weld, sized as shown on drawings

328429.452 Pipe Thread Material

All threaded pipe connections shall be made with Weld-on 87685 thread sealant shall be used, or equal.

328429.462 Solvent Weld Primer & Cement

Solvent Weld Primer & Cement shall be only that which is recommended for use on pipe installed.

328449.882 Irrigation 2 wire Field Decoder

Field decoder shall be Rainbird FD-101TURF. Contractor may use FD-102 for two valves in one location, or FD-104 for 4 valves in one location.

328449.922 Rainbird Sensor Decoder

Rainbird SD-210 Decoder for use with irrigation controller system

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

328452.132 Wire Connectors

Wire connectors at electric control valves and all splices of irrigation controller wire in the field shall be made using "3M DBR-6" only.

328454.132 P7072 Decoder Cable

Communication cable for irrigation system shall be P7072 Shielded Communication Cable. Connections are to be made with waterproof connectors.

328454.512 Surge Protection for 2 wire system

Surge protection for 2 wire system shall be Rainbird LSP-1, or equal.

328455.072 Irrigation Controller- Rainbird LDI

Automatic irrigation controller shall be Rainbird LDI Large Decoder Interface.

328455.092 Irrigation Controller Grounding

Copper components, ground enhancing material and ground rods as required per detail

328496.22 Pond Aeration Fountain

Pond Aeration Fountain is an Otterbine Constellation floating surface spray aerator with a dual spray pattern; jetted geyser type center spray surrounded by a fan shaped pattern. Fountain Motor shall be 2 hp, 230/208 volt, Single phase oil cooled, submersible motor with stainless steel fasteners. Shall include power cable designed for underwater use.

4 Execution

328410.204 Water Service Connection - Raw Water line

The Contractor shall tie into existing raw water line where shown on drawing. Contractor to coordinate with City of Grand Junction (Public Works) for tie-in. See specifications and details for appliances.

328413.514 Automatic Master Valve

Automatic Master Valve is to be installed as shown in the detail. Valve control is to include FD -102Turf decoder connected to the irrigation control system

328413.554 Flow Sensor

Install Flow Sensor in valve box as shown on drawings, with no fittings on the upstream side for 10 diameters of the pipe, and no fittings on the downstream side for 5 pipe diameters, according to manufacturer's recommendations.

328413.564 Pressure Regulating Valve

Pressure regulating valve to be installed per detail and manufacturer's recommendations.

328418.354 Bubbler Head

Install bubbler heads on Rainbird SP-100 Swing Pipe, SB Series Spiral Barb Fittings as shown on the detail. Heads shall be set perpendicular with finished grade, bubbler nozzle 2" above finished grade, at locations shown on drawing. After finished grades are established and the ground has settled, Contractor shall adjust heads within adjacent planting saucer of shrub or perennial.

328423.154 Pop-Up Spray Sprinkler Head

Install spray heads as shown in detail. Spray heads shall be set perpendicular with finished grade at locations shown on drawing. After finished grades are established and the ground has settled, Contractor shall lower heads to finished grade.

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

328423.304 Gear Drive Rotor Pop-Up Sprinkler Head

Install gear drive rotor pop-up heads as shown in detail. Gear Drive Rotor Pop-Up Sprinkler heads shall be set perpendicular with finished grade at locations shown on drawing. Where finish grade has not been established, head shall be installed on temporary risers extending minimum 3" above grade. After finished grades are established and the ground has settled, Contractor shall lower heads to finished grade.

328424.154 Automatic Control Valves

All control valves shall be installed in landscape areas as close as possible to the locations shown on the plan; any variances must be approved by the Owners Representative. Install valves, unions, reducers, pipes, wiring, etc. per detail. Control valves shall be installed in accordance with the manufacturer's recommendations. All valves shall have sufficient clearance from adjacent obstructions to provide accessibility for maintenance, including complete removal without removal of valve box. Valves are not to be located in flow line of swales or drainages.

328424.354 Isolation Gate Valve

Isolation valves are to be installed in mainline at locations shown on drawings. Contractor is to provide extension sleeving from valve box to valve location.

328424.384 Quick Coupler Valves

Quick coupler valves are to be installed on swing pipe swing joint at location and grade as indicated on drawings and as per details. Installation in soft soils may require staking and tying quick coupler to stake. Drive stake to 4" below grade and tie with nylon tie.

328424.664 Manual Drain Valves

Manual drain valve shall be located at low points on irrigation main. A drain sump of not less than 4.0 cu. ft. of 3/4" washed gravel shall be installed surrounding each drain valve.

328424.714 Valve Boxes

Install valve box at locations shown on drawings. Extensions and adjustments shall be made to establish the valve box and cover flush with the final grade level, and provide 4" layer of washed gravel as sump.

328424.724 Manual Drain Valve Boxes

All manual drain valves are to be installed with 6" round valve box and cover and 4" PVC sleeve of length to allow hand access to valve.

328425.094 Irrigation Pipe - 6" Main Pressure Line, C900 DR 18

C900 DR 18 pipe shall be installed true to line and grade, solvent weld connections, using PVC "tees", "ells", and 45's where necessary. Pipe is to be cut square to the axis with a fine toothed saw. Clean pipe end and mating surfaces to remove burrs, foreign material. If solvent weld is to be used, gloss with sand paper, steel wool, and/or clean cloth. Prime pipe to prepare surface for glue, using caution to keep surface clean and dry. Quickly apply glue to mating surfaces and insert pipe until it bottoms on at fitting /bell end shoulder. Turn pipe or fitting 1/4 turn during assembly to evenly distribute cement. Hold until dry. Pipe can be set in trench after 2 hours and snaked to make large radius curves. If rubber gasket fittings are used, lubricate gasket and insure that gasket remains in gasket seat when inserting pipe. Refer to Earthwork Section for backfilling and compaction.

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

328425.304 Polyethylene Irrigation Pipe laterals - 1" Bubbler

Polyethylene pipe shall be installed at 12" depth, in locations as shown on drawings. Swing pipe connection to bubbler to be a minimum of 2' in length, maximum of 4' in length. Bubbler heads are to be installed at 4' on center and at each end of pipe. Maximum of any single length of pipe to be 180' (46 bubblers). Bubblers to be adjusted to water adjacent plantings

328428.414 PVC sleeving

Sleeving shall be installed in locations noted on drawings and at a depth of 24" or as noted on drawings. Where changes in direction are necessary, the sleeve shall be bent to smoothly transition the change of direction. No fittings are to be used for direction changes. Ends are to be taped to prevent filling by backfill. Mark locations with lath and notation indicating "sleeve".

328428.424 CL 160 PVC Sleeving

Sleeving shall be installed in locations noted on drawings and at a depth to accommodate irrigation lines at their required depth. No changes in direction are allowed in sleeves. Ends are to be taped to prevent filling by backfill. Mark locations with lath and notation indicating "sleeve".

328440.44 Automatic Control Valves

All control valves shall be installed as close as possible to the locations shown on the plan; any variances must be approved by the Owners Representative. Install valves, unions, reducers, pipes, wiring, etc. per detail. Control valves shall be installed in accordance with the manufacturer's recommendations. All valves shall have sufficient clearance from adjacent obstructions to provide accessibility for maintenance, including complete removal without removal of valve box. Valves are not to be located in flow line of swales or drainages.

328449.884 Irrigation 2 wire Field Decoder

Field decoder shall be installed in line at valve locations as per manufacturer's directions

328449.934 Maxicom Sensor Decoder

Install Sensor Decoder in valve box as shown on drawings and according to manufacturer's recommendations.

328452.024 Wire Connectors

Wire connectors are to be installed as per manufacturers recommendation.

328454.134 P7072 Decoder Cable

Communication cable for irrigation system is to be installed below irrigation mainline with loops at valve locations allowing connections to be made in valve boxes. Splices are to be made in valve boxes only.

328454.514 Surge Protection for 2 wire system

Surge protection for 2 wire system shall be installed as per manufacturer's instructions at locations shown. Surge protection is provided if FD-401 Field Decoder is used.

328455.104 Irrigation Controller Grounding

All Maxicom components to meet current Rainbird grounding specifications. Grounding resistance shall be tested by a Meggar or Vigna Ground type equipment. Contractor is required to achieve a maximum resistance of 5 ohms.

Technical Specifications for:
Las Colonias Business Park

328 Irrigation

328455.154 Trench Excavation

Trenches shall be cut to true line and grade. Over-excavation of trenches for piping shall require compacted backfill to bring bottom of trench up to grade. Provide for surface drainage during construction. De-water all excavations immediately.

328455.164 Trenching & Backfilling

Comply with earthwork specifications, see Civil spec as required.

328456.044 Piping- general

Manufacturer's specifications covering installation of their material shall be followed. Underground lines up to 2" shall have minimum horizontal clearance of 2" of each other. No sprinkler lines shall be stacked vertically in a common trench. Lines shall have minimum horizontal clearance of 12" from the lines of other trades, and minimum 2" vertical clearance between lines crossing at 45° - 90°. Trenches for irrigation mainline shall be excavated so that the pipe shall drain uniformly toward drain valves deemed necessary to properly drain the system. Minimum grade of piping to drains shall be 3"/100'. When pipe laying is not in progress, or at end of each day, pipe ends shall be closed with tight plug or cap.

328456.44 Main Line Thrust Blocking

Provide Irrigation Main Line thrust blocking for pipe 4" and larger at all changes in size or direction. Bends reducers, plugs and the opposite side of tee branches all require thrust blocks. Size of the thrust block will be determined by working pressure, size and type of fitting, and soil conditions. Contractor shall provide shop drawings to Owner's Representative prior to installation.

328464.44 Irrigation Head Risers

Riser assembly is to be installed to allow free movement of head without interfering with pipe, wire, or other obstructions. Follow manufacturers recommendations.

328470.054 Irrigation Valve Control Wires

Control wires shall be placed carefully alongside and slightly below the water main where it will receive the greatest possible protection. Control wire not protected by the water main shall be laid in a suitable sized PVC conduit unless otherwise noted on the plans. Control wire shall have an eighteen (18") inch expansion loop at each valve and every 200' of wire. Contractor to avoid mid-line splices, but where necessary will adequately note location on the "as-builts".

328496.44 Pond Aeration Fountain

Pond Aeration Fountain is to be installed as shown on drawings and details. See Electrical for connection to power source. anchor is to be placed below fountain location following pond construction. Fountain is to be removable from anchoring cable for repairs or servicing. Provide shop drawing for connection mechanism.

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Las Colonias Business Park

328 Irrigation

5 Warranty

328400.805 As-Built Submittals

Contractor shall submit an as-built or record plan upon completion of work showing precise location of control valves, mains, drain valves, etc., and any changes in location of heads, piping, etc. to the Owner and their representative before final application for payment. Provide one reproducible and three prints. Format shall be an electronic .dwf file

329380.55 Vandalism

Minor vandalism or other damage to the plantings or related work shall be the responsibility of the Contractor until all work receives Final Acceptance. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractors shall be immediately brought to the attention of the Owners Representative who will be the sole judge as to the extent of such damage. Major damage is typically any damage over \$500.00 worth of materials and/or labor required to repair the damage. For the Contractor to be awarded additional monies under the provisions of "extra work" stated in the General Conditions, he shall have fully protected his work as specified herein. Any failure, however slight, of the Contractor to have protected his work shall be grounds to nullify any request for additional remuneration.

Technical Specifications for:
Las Colonias Business Park

329 Planting

1 General

329000.151 Scope of Landscape Work

Include labor, equipment, material, incidentals, for the completion of planting, boulder placement, lawn, native seeding, edging and mulch work shown on the Drawings, stated in the Specifications or otherwise required. Landscape areas have been amended by General Contractor (6 cy/1000s.f.) and mixed with imported soil. Landscape Contractor to provide soil amendment in backfill of Planting Pit. No weed fabric is to be used in this project.

329080.501 Stake Out Location of Landscape Work

The Contractor shall completely stake out the location of all trees, shrubs, and lawn area limits on the site for the approval of the Landscape Architect, making modifications as required.

329301.081 Applicable Standards

U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act, American Association of Nurserymen, current edition of "American Standard for Nursery Stock". Published by the American Association of Nurserymen, Inc., 635-636 Southern Building, Washington D.C. and/or Colorado State Law, whichever is greater.

329301.101 Shipment and Delivery

No plant materials shall be delivered to the site more than 3 days before planting. Plants left unplanted for more than 3 days shall be subject to rejection by the Owners Representative. A suitable method of handling shall be employed to insure the careful, workmanlike delivery of all plants, especially heavy balled trees. The Contractor shall protect the stock in a temporary nursery at the project, protected from sun, drying winds and shaded, kept moist and protected with damp soil, moss or other acceptable material.

329301.151 Notification of Delivery

The Landscape Contractor shall notify the General Contractor and Owners Representative a minimum of 2 days in advance of the delivery of the plant materials. Notification shall include the time and method of delivery.

329301.181 Quality Control Submittals

Certificates of Inspection for Plants: All necessary State, Federal and other inspection certificates shall accompany the invoice for each shipment of plant materials as may be required by law, and showing source of origin. Certificates shall be filed with the Owners Representative prior to his acceptance of the material.

329301.201 Plant Material Labeling

Durable, legible labels stating in weather-resistant ink indicating the correct plant name and size as specified on the plant list shall be securely attached to all plants, bundles or packages of plants of a single species and size, or plant container delivered to the planting site. Plants not properly labeled shall be subject to rejection by the Owners Representative.

329301.211 Plant List

A list of purchased plants to be provided is shown on the Drawings.

Technical Specifications for:
Las Colonias Business Park

329 Planting

329301.221 Plant Material Inspection

The Owners Representative reserves the right to reject at any time or place prior to acceptance, any and all materials which in their opinion fail to meet specifications. Inspection of materials is primarily for quality, size and variety, but other requirements are not waived even though visual inspection results in approval. Plants may be inspected where available, but inspected at the places of supply shall not preclude the right of rejection at the site. Rejected materials shall be promptly removed from the site. No installation shall occur prior to inspection and acceptance of all plant material.

329320.021 Plant Sizes

Requirements for the measurement follow the code for standards currently recommended by the American Association of Nurserymen, Inc. in the American Standard for Nursery Stock

329350.011 Planting Commencement

No planting work shall commence until the adjacent site improvements, drainage improvements, pavements, irrigation installation and finish grading is completed. No heavy trucking or moving of plant materials or equipment shall be permitted on newly completed pavements, sod or seeded areas. Further, the irrigation system shall have been tested in the presence of the Operator's Representative and be in operating order prior to any planting, seeding or sodding, with the exception of drip emitters, which shall be placed following planting.

329350.051 Weather Restrictions

No lawn or planting work shall take place during inclement weather or when the ground conditions are, in the opinion of the Owners Representative, not in a condition to be properly worked.

329350.151 Irrigation & Establishment Restrictions

No sodding or planting operations shall occur prior to April 15 nor later than September 30.

329381.011 Substitute Products

Requests for substitution of products named in this section must be approved by the Owner's Representative one week prior to bid opening.

2 Products

329219.012 Bluegrass Lawn Seed Mix

Bluegrass seed mix shall be Rocky's Ballpark Seed Mixture (or equal) available from Green Fields Seed Company, Grand Junction, Colorado. Contractor shall submit variety and mixture to the Landscape Architect for approval. Quantity of bulk seed required to provide the specified PLS/1000 S.F. shall be calculated from purity and germination (as shown on sack tags) of the lot of seed actually purchased with the following formula:

$$\text{PLS}/1000 \text{ sq. ft.} \times 100 \times 100 = \text{lbs.}/1000 \text{ sq. ft. of bulk seed required purity} \times \text{germination}$$

329219.492 Native Grass Seed Mixture

Seed mix shall be as shown on drawings. Contractor shall submit variety and mixture to the Landscape Architect for approval. Quantity of bulk seed required to provide the specified PLS/1000 S.F. shall be calculated from purity and germination (as shown on sack tags) of the lot of seed actually purchased.

Technical Specifications for:
Las Colonias Business Park

329 Planting

329219.752 Hydromulch-Conwed

"Conwed 2000" or approved equal

329219.802 Fertilizer for Seeded Lawn Areas

A commercial fertilizer of di-ammonium phosphate (18-46-0) shall be supplied, in original manufacturer's containers, with label showing composition intact, free-flowing and dry, in quantity necessary to apply 1 pound/1000 sq. ft. over all areas to be seeded with the lawn mix. Retain all invoices for proof of purchase.

329333.022 Fertilizer for Shrub Areas

A commercial fertilizer providing 2 pounds per 1000 sq. ft. Phosphate, and 1 pound per 1000 sq. ft. Potash, shall be supplied, in original manufacturer's containers, with label showing composition intact, free-flowing and dry, in quantities necessary to apply over all shrub bed areas.

329413.012 Biosol Soil Amendment

Biosol soil amendment shall be "Biosol Planters Kit" as manufactured by Rocky Mountain Bio Products, 10801 E 54th Avenue, Denver, CO 80239 (888)696-8960, (20 lb Biosol, 50 lb humate, and 1 lb all purpose mycorrhizae), or equal if approved by Owner's Representative prior to bidding.

329413.022 Concrete Edging

Concrete Edging for use as shrub bed borders shall be 6" x 4" fiber mesh reinforced extruded Mortar. Mortar shall consist of fine and course sands, 6 sacks Portland Cement per cubic yard, fiber mesh reinforcing as per manufacturers recommendations. Mix at least three minutes and not more than five minutes in mechanical batch mixer, with maximum amount of water to produce workable consistency.

329443.042 Tree Wrapping Material

Tree wrapping material shall be first quality 4" wide, bituminous impregnated tape, corrugated or crepe paper, brown in color, specifically manufactured for tree wrapping and having qualities to resist insect infestation.

329443.062 Protective Nylon Loops

1-1/2" wide (min.) for restraining tree in guying operations. Lengths as required.

329443.072 Guy Wire

10 or 12 gauge, double strand, pliable galvanized steel wire twisted to remove slack to each stake.

Technical Specifications for:
Las Colonias Business Park

329 Planting

3 Materials

329113.013 Soil Amendment

50% Ground well-aged cow or chicken manure, or ground sheep manure, 50% finely ground and aged wood chip, with a proven analysis to verify organic content, PH, electro-conductivity, nitrogen, potassium, and phosphorus content. A sample of the material will be supplied to the Owner's Representative with an analysis.

329301.223 Specifics for the Selection of Shade Trees, Part 1

1. Trees greater than one and one-half inches (1-1/2") caliper shall be able to stand erect without a supporting stake.
2. Trees shall have straight trunks with less than a five percent (5%) bow.
3. Branches shall be less than two-thirds (2/3) the trunk diameter.
4. Trees shall be healthy and have had adequate annual growth the previous two (2) growing seasons for that species. (See fact sheets on growth rates).
5. Trees shall be rooted into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted, but not root bound. The trunk should bend when gently pushed and should not be loose so it pivots at or below the soil line.
6. Trees shall have no roots larger than one-fifth (1/5) the diameter of the trunk protruding from the grow bag or container.

329301.233 Specifics for the Selection of Shade Trees, Part 2

7. Trees shall have one dominant leader for the top of the tree with a viable terminal bud or shoot.
8. Trees shall have no vertical branches except for those cultivars reported to be fastigiated.
9. Trees shall have branches evenly distributed around the trunk and no branches shall be directly above another.
10. The largest branches shall be spaced at least six inches (6") apart except for those cultivars with characteristic multiple tops.
11. The tree canopy shall be mostly symmetrical and free of large voids. Clear trunk should be no more than 40% of tree height unless otherwise specified in the planting specifications.
12. If any of the above conditions are not met, trees may be rejected by the Owner.

329301.243 General Considerations for Plant Quality

Trees and shrubs will be inspected by the Owner prior to planting and rejected if damage or imperfections in development are noted to include: flush cuts or open injuries on the main trunk; trunk cankers; Loose or torn bark in excess of 10% of the circumference of the trunk or branch; Borer holes or boring dust in trunks or main branches; Branch attachments with the included bark; Co-dominate stems - trees only; Trees and Shrubs in violation of Rules and Regulations pertaining to Title 34, Article 26 of the Colorado Nursery Act; Damaged or incomplete graft unions; When in leaf, with more than five percent (5%) chlorotic leaves; When any root is greater than one-tenth (1/10th) the diameter of the trunk, circles more than one-third (1/3) the trunk and is in the top half of the root ball; Plants infested with colonies of other insect pests will be rejected or properly treated at the discretion of the Owner.

329401.053 Granite Fines Rock Mulch

Rock Mulch shall be 100% decomposed granite covering shrub beds. Rock mulch shall be free of trash, sticks or roots, with 95% of the product ranging in size from sand to 3/8" rock, generally found as a byproduct of granite crushing operations. Submit samples of both the granite fines and 1" rock to Owner's Representative prior to construction.

Technical Specifications for:
Las Colonias Business Park

329 Planting

329401.603 Pea Gravel for Dog Water Play area

Surfacing for Dog Water Play area to be washed pea gravel

329403.013 Cedar Wood Chip Mulch

Wood chip mulch shall be "Harvest Brown" Hardwood mulch, free of trash, sticks, rocks.

329460.083 Granite Boulders

Landscape boulders to of minimum dimensions as shown on drawings. Boulders shall be buried such that exposed rock surface depicts natural exposure of outcrop formation. Boulders are to be tan/gold granite. Exposed surface of installed landscape boulders shall not show machine caused scarring or breakage. Typical examples of this type of boulder can be seen at "The Rock Shop, 800 S 15th Street, Grand Junction. Contractor to submit sample to Owner's Representative prior to acquisition.

4 Execution

329113.314 Fine Grading for Landscape areas

Smooth surface, contour to distribute irrigation to root ball. Remove any saucers/dikes in shrub beds at bubblers where there are no plants. Form trench at all landscape edgers or pavements to accommodate mulch at depth specified. See details. All rocks bigger than 1" shall be picked up and removed from the site

329219.014 Hydroseed Bluegrass Lawn

Following approval of the lawn seed bed by the Landscape Architect, seed shall be applied with a hydroseeder at a rate of 6 lbs. /1000 s.f. The hydromulch shall be applied at a rate of 45 pounds per 1000 s.f. (1 ton/acre). Contractor to apply with a dye to allow inspection for proper coverage. Contractor shall be responsible for the masking and or cleaning of all adjacent surfaces, including but not limited to: pavements, fencing, plant materials, buildings, utility appurtenances, and foundations.

329219.504 Hydromulch of Seed Mix

After seeding operations have been completed, the entire seeded area shall be hydromulched with specified hydromulch material. The hydromulch shall be applied by using a mechanical hydromulcher, evenly distributed on a still day. The hydromulch material shall be applied at the rate of one ton per acre (50 lbs/1000 s.f.).

329219.514 Hydroseed of Native Seed Mix

Following approval of the native grass seed bed by the Landscape Architect, seed shall be applied with a hydroseeder at a rate of specified in the seed mix specification in conjunction with 10% of the hydro mulch (as a marker for coverage). The remaining hydromulch shall be applied at a rate of 45 pounds per 1000 s.f. (1 ton/acre). Contractor to apply with a dye to allow inspection for proper coverage. Contractor shall be responsible for the masking and or cleaning of all adjacent surfaces, including but not limited to: pavements, fencing, plant materials, buildings, utility appurtenances, and foundations.

329219.804 Fertilizer for Seeded lawn areas

Fertilizer shall be spread at the rate of 1 pound/1000 sq. ft. The area shall again be disced or rototilled at right angles to the first tillage, seed beds shall be totally free from rock or clay clods over 1" diameter.

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Las Colonias Business Park

329 Planting

329219.814 Irrigation of Lawn Areas

Within 12 hours after planting lawn, the sprinkler system shall be activated to moisten planted areas to a depth of 1". All areas shall be kept moistened by frequent light watering for 3 weeks, or until the Final Acceptance of the Project, and such watering shall be the responsibility of the Contractor until seeded areas are accepted by the Owner.

329301.224 Tree Location conflicts with Underground Lines

The Contractor shall be responsible for damage to any underground utility, irrigation line or other improvements. In the event a pipe or line obstructs a plant location, the Contractor will notify the Owners Representative to receive a new plant location.

329310.024 Layout of Plant Locations

Contractor stake out the location of all trees, shrubs, perennials, and lawn area limits, or place containerized shrubs and perennials for approval by Landscape Architect prior to planting. All planting stake locations shall be observed and approved by the Landscape Architect, prior to planting operations.

329310.034 Layout of Planted Areas

The Contractor shall layout and stake the boundary of all areas to be planted and rough grades. All layout and rough grades to be approved by the Landscape Architect prior to commencing any work.

329312.044 Amended Plant Pit Backfill

Amended planter soil shall be used for backfill after being mixed with 1/3 part specified soil amendment. Gravel shall be replaced with topsoil.

329312.054 Plant Pit Excavation

The plant pit, centered on the location stake, shall be excavated at least twice the spread of ball, spade or container in a cylindrical shape with tapered sides and flat or saucer-shaped bottom. Sides of pit shall be rough and irregular, not smooth. Plant pits shall be excavated below finish grade as required to accommodate the ball.

329312.084 Planting Techniques - Part 1

1. Trees, shrubs and perennial flowers shall be in planting areas separate from turf areas.
 - a. In those instances where the Owner requires trees or shrubs planted in turf areas, the turf will be established prior to installation of trees or shrubs.
 - b. Trees and shrubs shall be planted a minimum of four inches (4") above the finished grade of the turf or mulched area based on their uppermost structural roots.
 - c. If the planting hole is inadvertently dug too deep, soil shall be added and compacted.
 - d. The width of the planting hole shall be a minimum of at least one and one-half times the diameter of the root ball, two times the diameter of the rootball where possible.
2. Trees and shrubs shall be planted with two (2) or more of the upper-most structural roots no more than two inches (2") below the surface of the root ball measured three to four inches (3-4") from the trunk (except as noted below).

Technical Specifications for:
Las Colonias Business Park

329 Planting

329312.094 Planting Techniques - Part 2

Soil shall be removed from the top of the root ball prior to planting to determine the actual depth of the structural roots. a. Hackberry (*Celtis occidentalis*), green ash (*Fraxinus americana*), red maple (*Acer rubrum*), little leaf linden (*Tilia cordata*), crabapples (*Malus spp.*) and poplars (*Populus spp.*) shall be planted with no more than one inch (1") of soil over the uppermost structural roots. b. Adventitious roots above the structural roots shall be removed. c. The presence of encircling roots shall be checked for and treated as in 9. below. d. The planting hole shall be dug two to four inches (2-4") shallower than the depth of the root ball (based on the location of the structural roots.) e. Soil shall be graded from the surrounding soil to near the top of the root ball to cover the exposed sides of the root ball. f. There shall be no landscape soil placed on top of the root ball.

329312.104 Planting Techniques - Part 3

3. The top 12 to 18 inches (two or three levels) of wire basket shall be removed from the root ball. The bottom half of baskets more than about 40 inches in diameter can be left intact.
4. All twine and wire at the base of the trunk shall be removed and disposed of offsite.
5. All synthetic and plastic burlap shall be cut as far down the root ball as possible so soil along the side of the root ball is in direct contact with backfill soil. All synthetic and plastic burlap shall be removed from the site.
6. Natural burlap shall be removed from the top of the ball and at least one-half (1/2) way down the side of the root ball. Burlap shall be removed from the site.
7. Fertilizer shall not be added to the back-fill soil.
8. Containers shall be removed from the root ball prior to planting. Containers shall be removed from the site and properly disposed of.

329312.114 Planting Techniques - Part 4

9. Pot bound (root bound) trees and shrubs shall be avoided.
a. There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around the top half of the root ball. There shall be no kinked roots greater than 1/5 the trunk diameter. Roots in violation can be cut and the tree accepted at the option of the Owner. b. If it is necessary to plant a pot bound tree or shrub, encircling roots shall be cut to prevent them from girdling the plant in the future. Three (3) or four (4) slices one inch (1") or two inches (2") deep shall be made from the bottom to the top of the root ball.
10. Mulch shall be placed on the root ball to within 6 to 8 inches of the trunk or main stem(s), and no closer.

329312.124 Planting Techniques - Part 5

11. The planting of clump aspen and other trees (i.e. two or more stems in one root ball) shall be avoided.
a. If a clump effect is desired, separate trees shall be planted with their root balls touching.
12. Trees and shrubs shall be moved by their root balls, not their trunks, in such a manner that trunk and branch damage shall be avoided.
13. Trees and shrubs planted on slopes shall be set so the to-most root in the ball on the uphill side is even with the soil. The side of the root ball on the downhill side shall be well above the surrounding soil and a basin formed to retain water. Sufficient soil shall be applied to cover the sides of the root ball.

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Las Colonias Business Park

329 Planting

329312.134 Planting Techniques - Part 6

14. A three inch (3") layer of mulch shall be applied around trees and shrubs to within six to eight (6-8") inches of the trunk or stem (s). A mulched area two feet (2') in diameter for each one inch (1") of tree trunk DBH (with a minimum diameter of eight feet (8') for trees), shall be maintained during the establishment period.

15. If staking is necessary it shall be accomplished using one of the following methods:

- a. Two or three wood dowels shall be driven through the edge of the root ball into the underlying soil for three gallon and smaller trees.
- b. One horizontal 2X2 shall be screwed or nailed to two 2X2's driven 12 inches into undisturbed soil on each side of the root ball. Two sets shall be needed for each root ball.
- c. Two or three (2-3) t-posts driven into a minimum of 12 inches of undisturbed soil.

329312.144 Planting Techniques - Part 7

i. When two (2) posts are specified, these shall be placed on either side of the tree parallel to the prevalent wind direction.

ii. When three (3) posts are specified these shall be placed equidistant (120 degrees) around the tree.

iii. Stakes will be kept clear of branches to prevent rub damage.

iv. Guys shall be flagged with a conspicuous material and replaced as required by the Owner.

16. Feather growth on the lower portion of the trunk shall remain in place for one (1) year after planting.

329312.154 Planting Techniques - Part 8

17. Pruning other than to correct structural problems or remove broken branches shall be avoided.

18. The trunks and large branches and foliage of all pines shall be sprayed with a pyrethrum (organic product), pyrethroid or similar insecticide prior to or within a day of planting by a qualified applicator.

a. A wettable powder formulation shall be used if available.

b. Phytotoxicity resulting from this treatment shall be the responsibility of the applicator.

329312.204 Plant Pit Backfill

On-site soil shall be used for backfill (unless excavated soil is gravel) after being mixed with 1/3 part specified soil amendment. Gravel shall be replaced with topsoil.

329333.034 Fertilizer for Shrub Areas

Fertilizer shall be spread at the rates noted in 2.0 Products, this Section. The area shall again be disced or rototilled at right angles to the first tillage, the shrub and seed beds shall be totally free from rock or clay clods over 1" diameter.

329343.054 Layout of Tree Locations

The Contractor shall locate and stake all tree locations. All planting stake locations shall be observed and approved by the Landscape Architect, prior to planting operations.

329343.104 Watering

All trees and shrubs shall be watered-in using a deep-watering device, immediately after planting, staking and guying. All planting shall be watered the same day it is planted.

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Las Colonias Business Park

329 Planting

329401.014 Preparation for Mulch

Perimeter of Shrub Beds shall be graded 2" below top of curbs, walks, edger (see detail), or any other grade level improvements for receiving rock or wood chip mulch. Planted area of shrub bed shall remain at the same grade or higher than adjacent pavements or lawn areas to insure adequate drainage of shrub beds.

329401.014 Installation of Rock Mulch

Place rock in all areas shown to receive mulch on drawings. Spread carefully and evenly to a minimum depth of 3" over Weed Fabric on areas shown on drawing.

329401.604 Installation of Pea Gravel for Dog Water Play Area

Pea gravel shall be placed in Dog Water play area where shown on the Drawings, spread carefully and evenly to a depth of 12" over Filter Fabric in playground and compacted.

329403.024 Installation of Wood Chip Mulch

Wood Chip Mulch shall be placed in all shrub beds and tree wells where shown on the Drawings, spread carefully and evenly to a minimum depth of 3" over topsoil in planted areas.

329413.014 Biosol Soil Amendment

Biosol Planters Mix shall be incorporated at the following rates

- a. 1/2 cup per 1 gal Perennial
- b. 1 cup per 5 gal shrub
- c. 2 cups per 2" caliper of tree size of each tree.

329413.034 Concrete Edging

The Contractor shall lay out and stake the location of all concrete edger defining shrub beds (coordinate with irrigation) to be approved by the Landscape Architect prior to commencing any work. Upon approval, concrete edger shall be installed to match existing top of curb or walk (where adjoining), or 1/2" to 3/4" above finish grade of lawn area. Lines are to be straight, and curbs to be single radius curves with adjoining lines tangent to curve. Curbing installed not in line, grade, or proper curve will be removed and replaced at Contractor expense. Edger to be scored perpendicular to vertical face at intervals not to exceed 4'.

329413.044 Concrete Edging

Concrete Edging shall be extruded into a trench which allows the top of curbing to be 1/2"-1" above adjacent lawn grade. Curbing installed not in line, grade, or proper curve will be removed and replaced at Contractor expense.

329443.044 Tree Wrapping Material

All deciduous tree trunks shall be wrapped after October 1, with wrapping material overlapping one and one-half (1 1/2") inches wound from ground line to the second branch, and securely taped at five places, including the top, middle and bottom. Wrap is to be removed the following spring.

329460.064 Boulders

Boulders are to be placed where indicated on drawings. The nature of the selected rock will require excavation of a pit 1/2 to 2/3 the height of the rock in the position rock is to be placed. Backfill following placement, compact.

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Las Colonias Business Park

329 Planting

5 Warranty

329219.905 Maintenance Period for Lawn Areas (seed)

The maintenance period shall begin immediately after each area is seeded and continue for thirty days or until final acceptance, whichever is longer. During this time the Contractor shall be responsible for watering, mowing, spraying, weeding, repair of areas damaged by erosion, wind, fire or other causes. Such areas shall be repaired to reestablish the condition and grade of the soil prior to application of the netting or mulch and shall be refertilized, reseeded, and remulched as directed. After 30 days or until final acceptance of the entire project (whichever is longer), maintenance shall become the responsibility of Owner. The Landscape Architect will direct the Contractor on what seed areas need to be replaced at the final walk-through.

329219.955 Final Acceptance for Lawn Areas

The seeded area shall be accepted on the basis of having a uniform plant growth over the entire seeded area. Acceptable uniform plant growth shall be defined as when the scattered bare spots, not greater than one (1) sq. ft., do not exceed five (5%) percent of the irrigated seeded area.

329310.015 Protection and Maintenance of Plant Materials

All planting shall be protected and maintained until final acceptance of all work. Maintenance shall include watering, weeding, cultivating, mulching, insect control (through spraying, biological control, or whatever method is recommended by the Tri River Extension Service), tightening and repairs of guys, removal of dead branches, resetting plants to proper grade or upright position, and other necessary operations.

329380.025 Replacement

All replacement planting is to be executed within ten (10) days of notice to replace such plants. Replacement of planting is to be in accordance with the original specifications and its cost considered to be included in the bid price. All areas damaged by tree or shrub planting or replacement operations are to be fully restored to their original condition as specified.

329380.055 Final Inspection and Acceptance

Inspection of the work to determine completion of contract, exclusive of the possible replacement of plants, will be made by the Owners Representative at the conclusion of construction operations. The condition of all planting will be noted and a determination made by the Owners Representative whether maintenance shall continue in any part. Contractor will be notified of acceptance of the work or any deficiencies in the requirements for completion. Plants must be in excellent and vigorous conditions. Excessively pruned trees and shrubs which, in the opinion of the Owners Representative, are no longer excellent representatives of their species shall be replaced prior to Final Acceptance.

LAS COLONIAS BUSINESS PARK PHASE 2 IMPROVEMENTS - BID SET

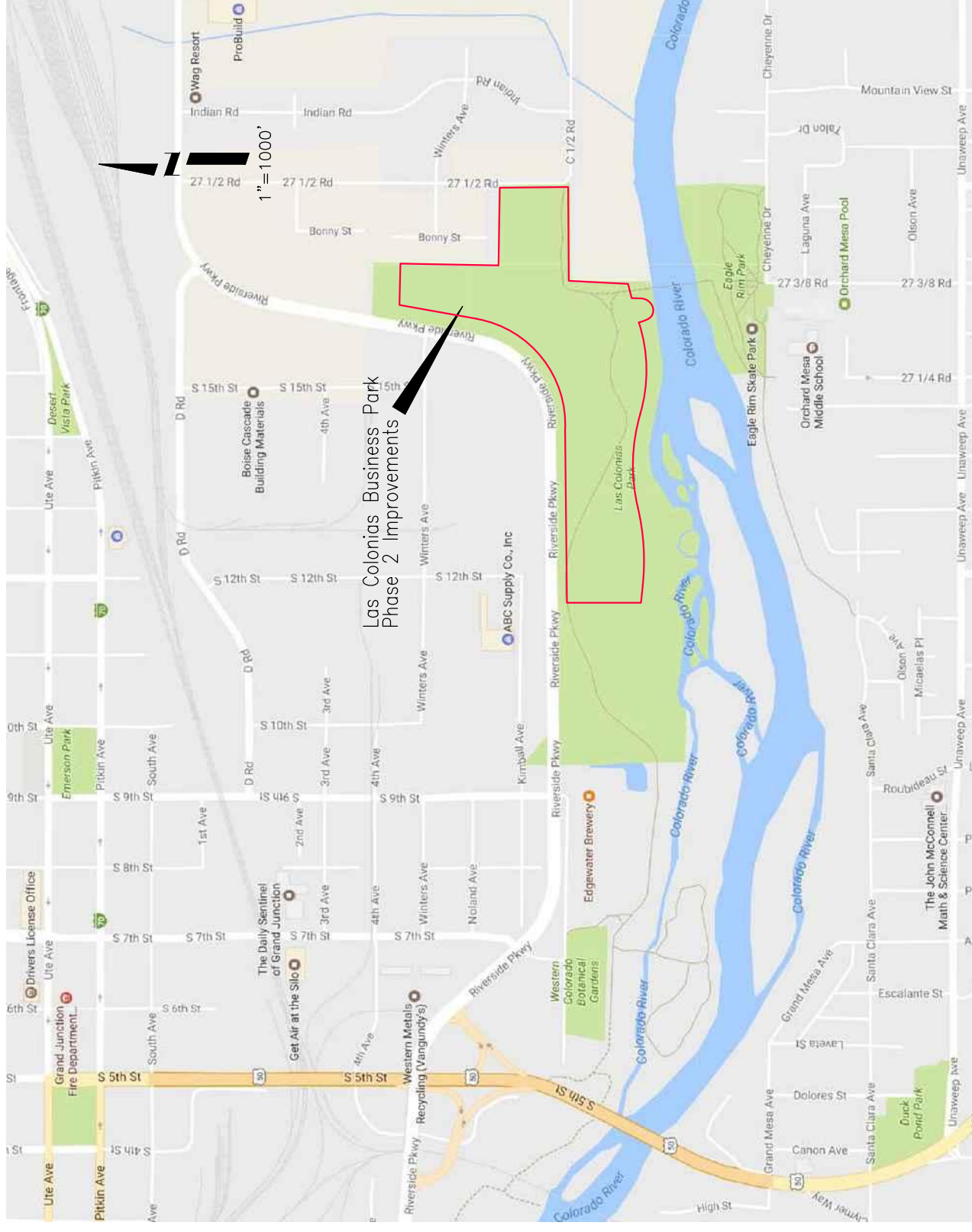
JULY 3, 2018

- 1 Cover Sheet
- 2 Project Overview
- 3 Paving Sections
 - 4-8 Sanitary Sewer Plan and Profile
 - 9-15 Water Line Plan and Profile
 - 16-29 Storm Drain Plan and Profile
 - 30-39 Improvement Plan
 - 40-49 Site Profiles
 - 50-72 Site Cross Sections
 - 73 Tenth Foot Contour Plan Sheet Key
 - 74-105 Tenth Foot Contour Plan
 - 106-112 Signing and Striping Plan
 - 113-116 Storm Water Management Plan
 - 117-138 Project Details (Civil)
- 139-151 Boat Launch Plans
- 152-180 Irrigation and Landscape Plans



Know what's below.
Call before you dig.

NOTE: NOTIFY AFFECTED UTILITY VENDOR 48 HOURS PRIOR TO EXCAVATIONS THAT WILL EXPOSE UTILITY LINES. THE UTILITY PLAN WILL HAVE A LISTING OF UTILITY VENDORS AND TELEPHONE NUMBERS.



REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

PLAN & PROFILE	
SCALE	DATE
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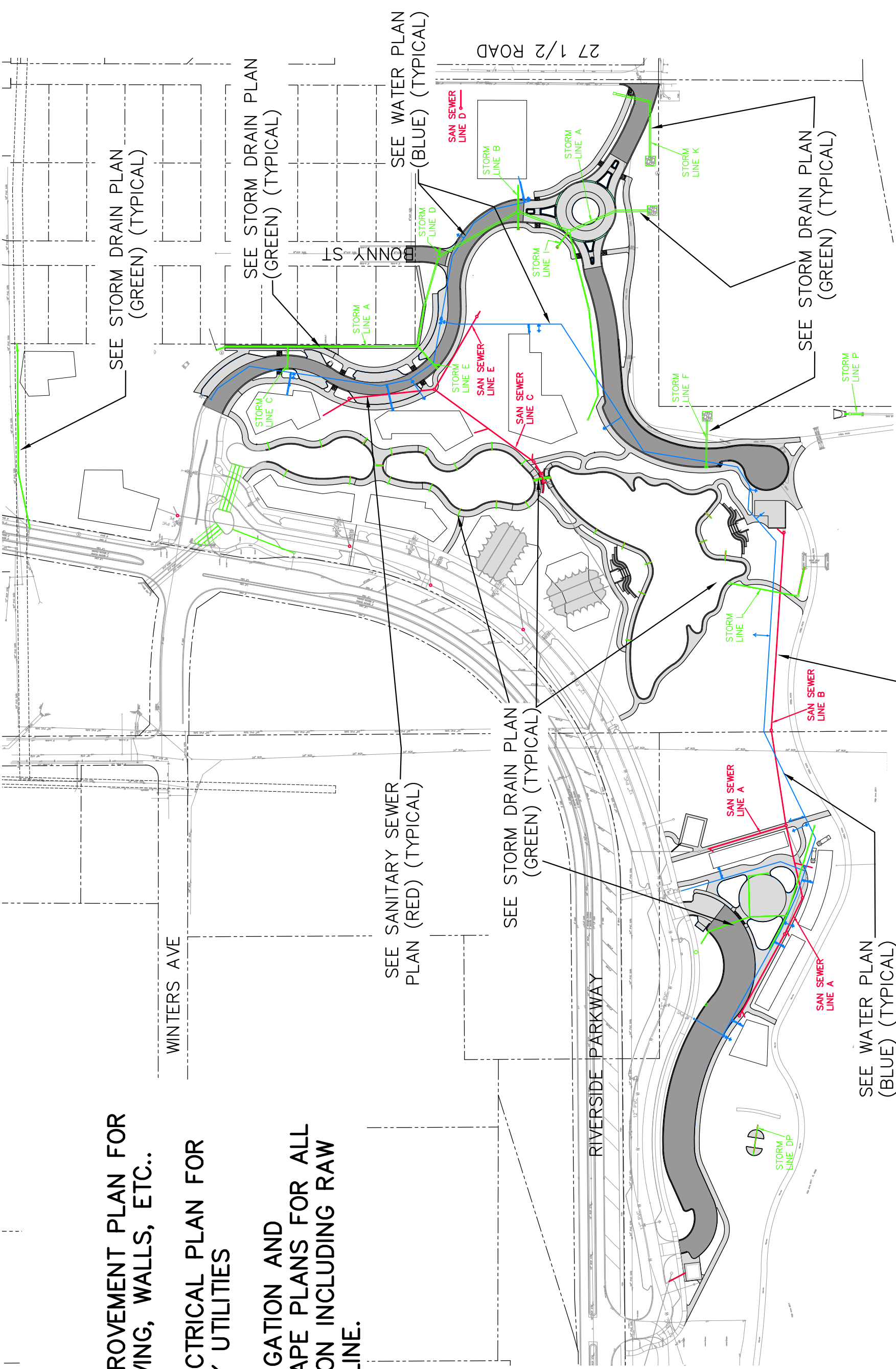
COVER SHEET

NOTE:

SEE IMPROVEMENT PLAN FOR ALL PAVING, WALLS, ETC..

SEE ELECTRICAL PLAN FOR ALL DRY UTILITIES

SEE IRRIGATION AND LANDSCAPE PLANS FOR ALL IRRIGATION INCLUDING RAW WATER LINE.



SEE STORM DRAIN PLAN (GREEN) (TYPICAL)

SEE STORM DRAIN PLAN (GREEN) (TYPICAL)

SEE SANITARY SEWER PLAN (RED) (TYPICAL)

SEE STORM DRAIN PLAN (GREEN) (TYPICAL)

SEE WATER PLAN (BLUE) (TYPICAL)

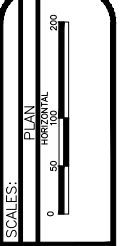
SEE STORM DRAIN PLAN (GREEN) (TYPICAL)

SEE WATER PLAN (BLUE) (TYPICAL)

SEE SANITARY SEWER PLAN (RED) (TYPICAL)

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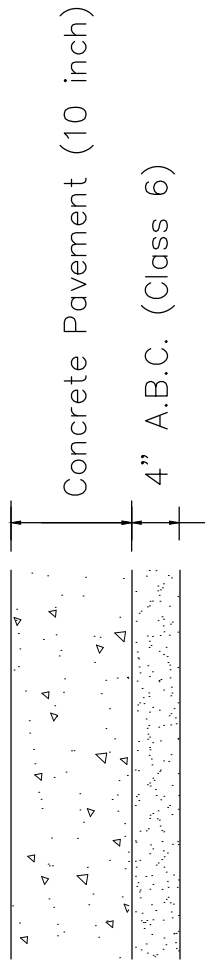


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ENGINEERING DIVISION

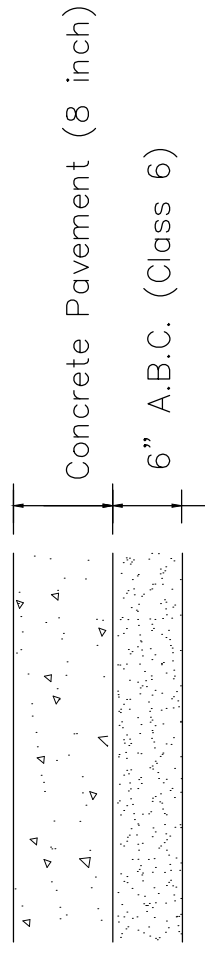
LAS COLONIAS BUSINESS PARK PHASE 2
PROJECT OVERVIEW

Notes:

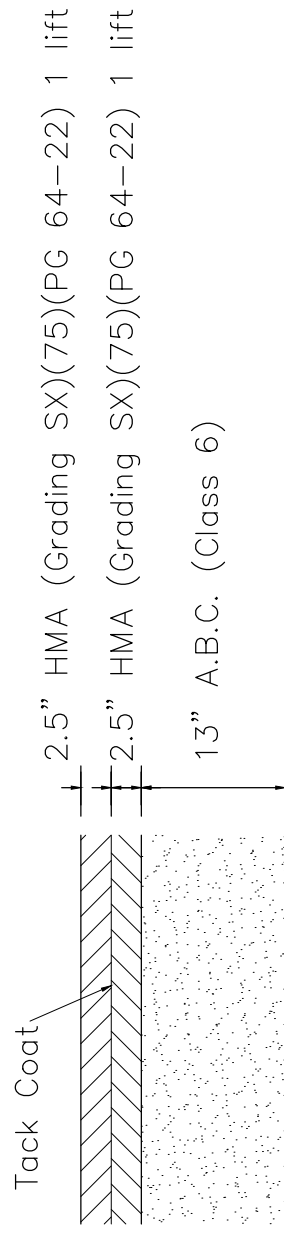
- Extend Full Pavement Base Section 6" Beyond Back Of Curbs (Typical)
- See Plan set for layout and geometry of walks, curbs, gutters, walls, etc..



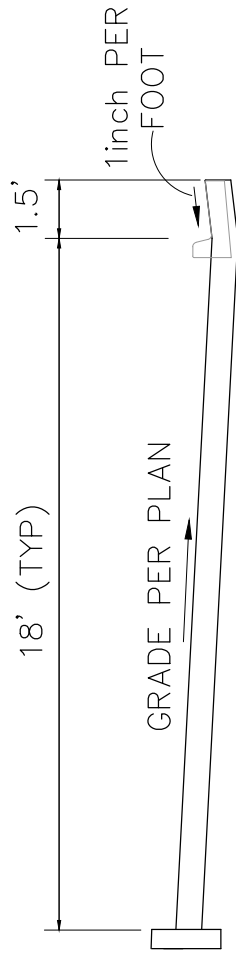
CONCRETE PAVEMENT SECTION (10" THICK) (ROUNDABOUT)



CONCRETE PAVEMENT SECTION (8" THICK) (PARKING AND PLAZA)



ROADWAY AND PARKING ASPHALT PAVEMENT SECTION



GUTTER OF ALL PARKING AREAS SHALL CONTINUE SAME ALIGNMENT AND CROSS SLOPE OF CURB AND GUTTER ON EITHER ENDS OF SAID PARKING AS SHOWN

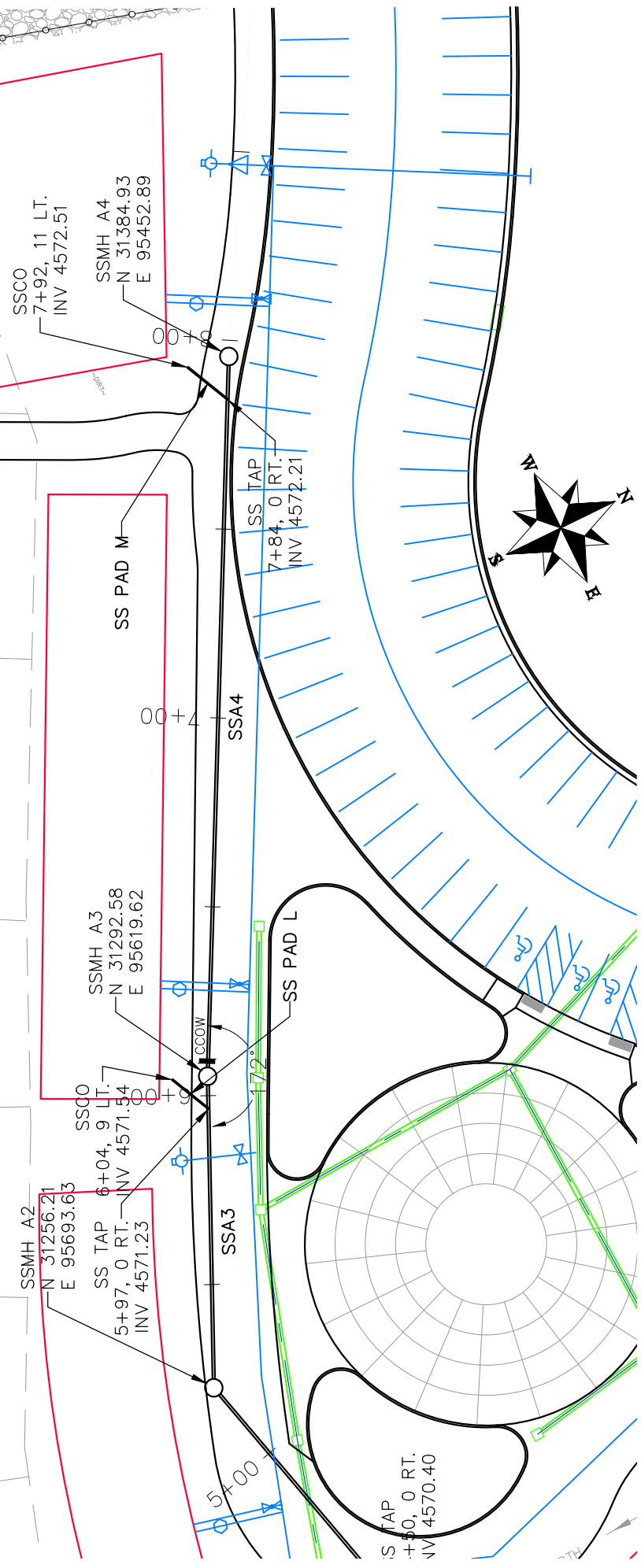
ON STREET PARKING GUTTER

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	2018	SCALE:
REVISION Δ			JCS	DATE	2018	PLAN & PROFILE
REVISION Δ			JCS	DATE	2018	HORIZONTAL
REVISION Δ			TOP	DATE	2018	VERTICAL
REVISION Δ			TOP	DATE	2018	VERTICAL



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Las Colonias Business Park
Typical Cross Sections



NOTES:

ALL NEW SANITARY SEWER MANHOLES (SSMH) SHALL BE 48" I.D. INCLUDES CONNECTION OF ADJACENT SEWER LINE, FORMING INVERTS AND ADJUSTING TO FINAL GRADE. (SEE CITY OF GRAND JUNCTION STANDARD DETAIL SS-02).

ALL SEWER PIPE SHALL BE SIZED PER PLAN NOTES AND BE SDR-35 PVC. INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

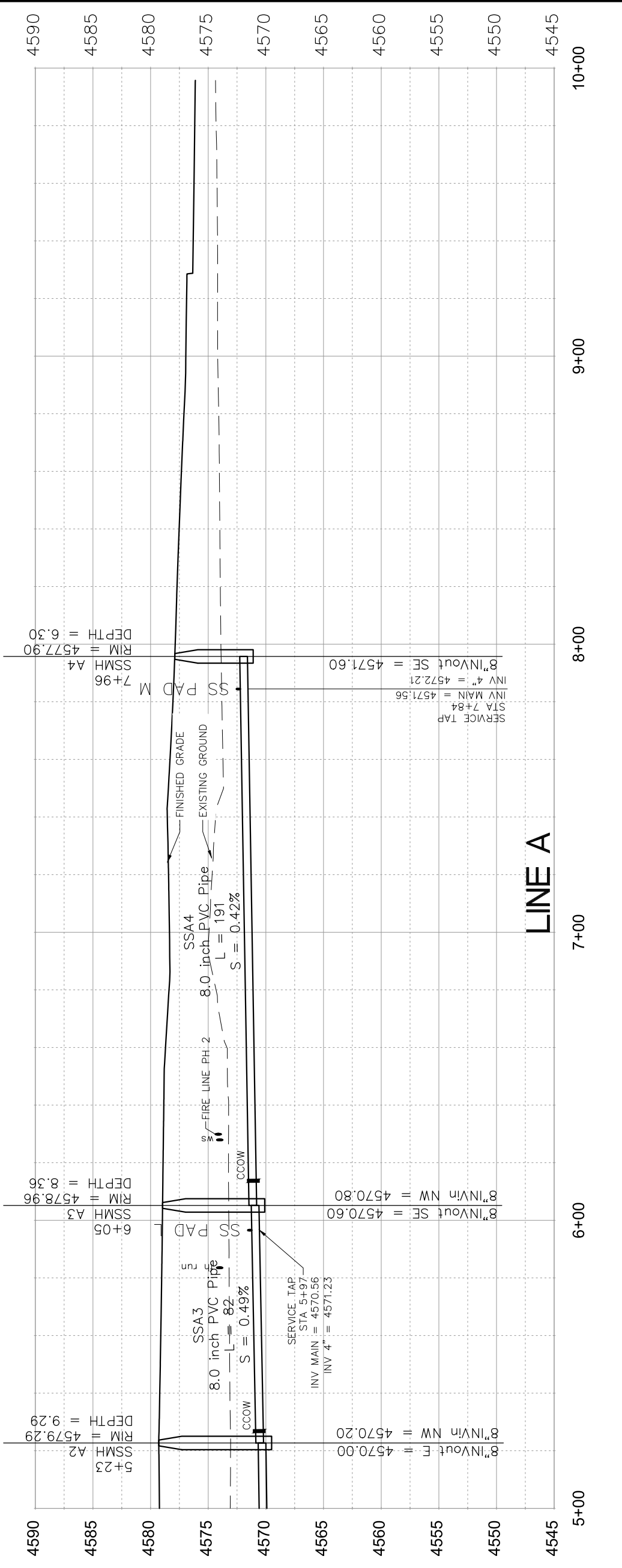
ALL SEWER TAPS SHALL BE FULL BODY WYES (SEE STD. DETAIL SS-06).

ALL SEWER SERVICE LINES SHALL BE 4" SDR-35 PVC

AT THE END OF ALL SEWER SERVICES INSTALL 2-WAY SANITARY SEWER SERVICE CLEANOUT (SSCO). (STD. DETAIL SS-07). INCLUDES CLEANOUT RING AND COVER AND CONCRETE COLLAR IN UNPAVED AREAS (SEE STD. DETAIL SS-07).

WHERE PIPES ARE CALLED TO HAVE A NEW CAP, CAP TOP HALF OF SEWER IN CONCRETE PER STD. DETAIL GU-04. (WATER LINE LESS THAN 18" ABOVE SEWER LINE)

CLAY CUT OFF WALLS (CCOW) SHALL BE PLACED UPSTREAM OF ALL MANHOLES IN ACCORDANCE WITH CITY OF GRAND STANDARD SPECIFICATIONS. (INCIDENTAL TO SEWER INSTALLATION PAY ITEM)



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REVISION	DATE	APPROVED BY	TOP	DATE	2018

DESCRIPTION

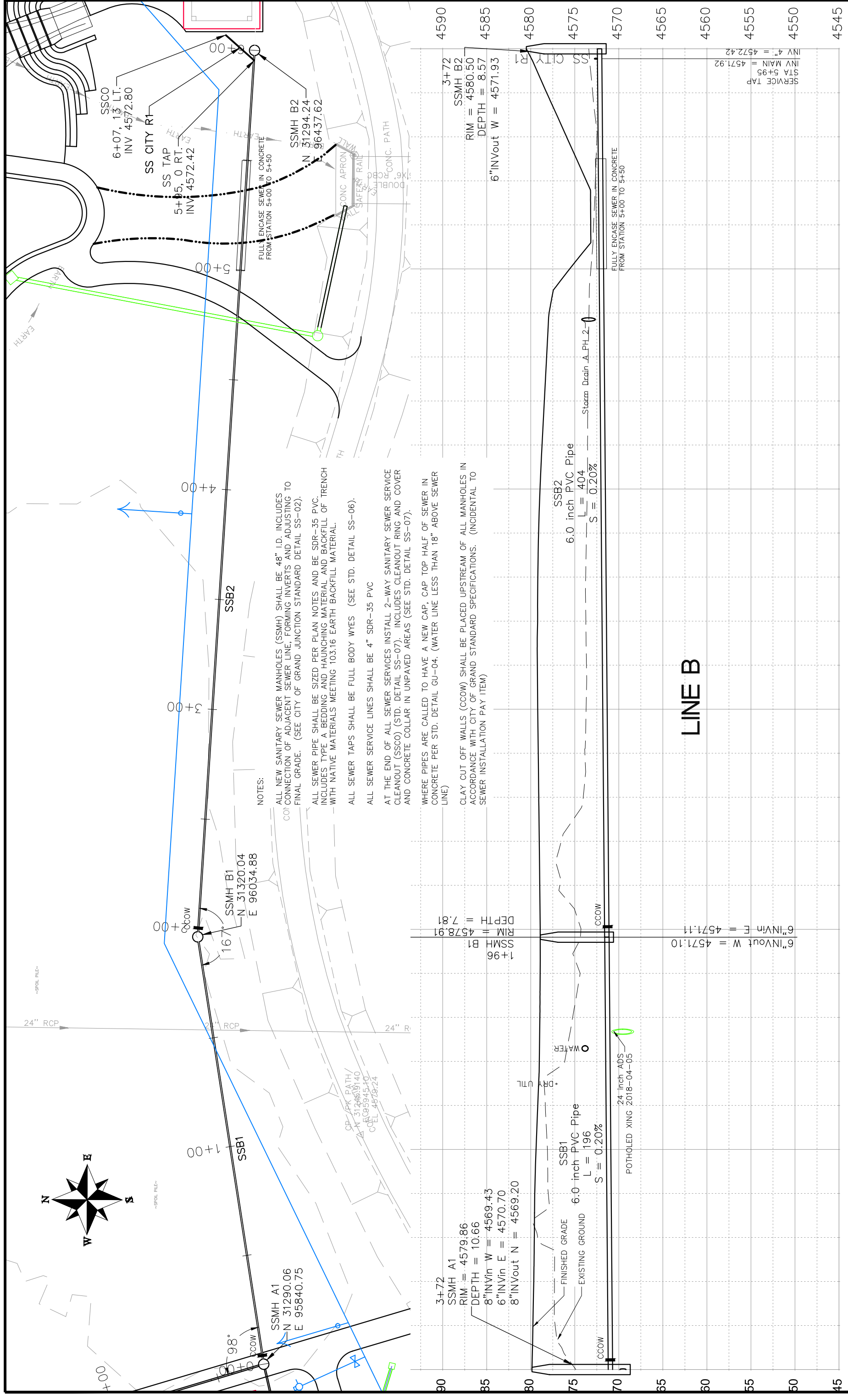
SCALE: PLAN & PROFILE 1" = 20' HORIZONTAL 1" = 2.5' VERTICAL

CITY OF Grand Junction COLORADO

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LAS COLONIAS BUSINESS PARK SANITARY SEWER LINE PLAN AND PROFILE

5



0+00 1+00 2+00 3+00 4+00 5+00 6+00

REVISION	DATE	DESCRIPTION

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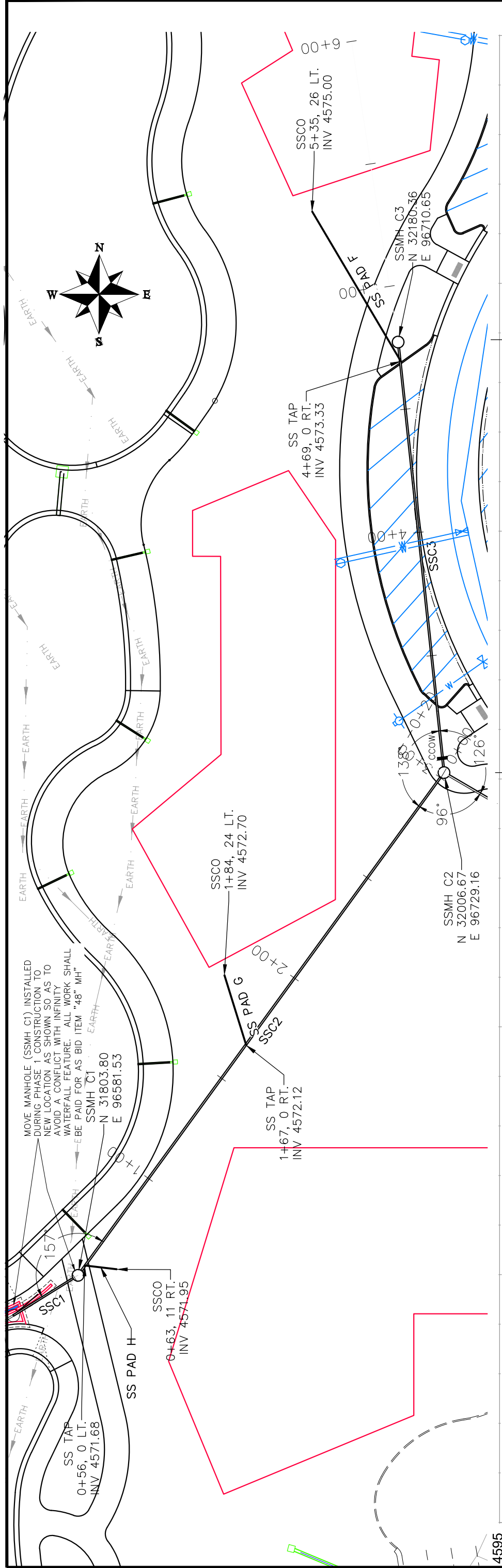
- PLAN & PROFILE: 1" = 40'
- HORIZONTAL: 1" = 100'
- VERTICAL: 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK SANITARY SEWER LINE PLAN AND PROFILE

6



Station	Structure	Dimensions	Coordinates
0+56	SS TAP	0 LT.	INV 4571.68
0+63	SSCO	11 RT.	INV 4571.95
1+67	SS TAP	0 RT.	INV 4572.12
1+84	SSCO	24 LT.	INV 4572.70
4+69	SS TAP	0 RT.	INV 4573.33
5+35	SSCO	26 LT.	INV 4575.00
3+03	SSMH C2	N 32006.67 E 96729.16	
3+03	SSMH C2		RIM = 4579.35 DEPTH = 7.35
4+77	SSMH C3	N 32180.36 E 96710.65	
4+77	SSMH C3		RIM = 4580.02 DEPTH = 7.32
0+52	SSMH C1		RIM = 4578.33 DEPTH = 7.40
3+03	SSMH C2		RIM = 4579.35 DEPTH = 7.35
4+77	SSMH C3		RIM = 4580.02 DEPTH = 7.32

NOTES:
 ALL NEW SANITARY SEWER MANHOLES (SSMH) SHALL BE 48" I.D. INCLUDES CONNECTION OF ADJACENT SEWER LINE, FORMING INVERTS AND ADJUSTING TO FINAL GRADE. (SEE CITY OF GRAND JUNCTION STANDARD DETAIL SS-02).
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REVISION	2018	2018	2018	2018

DRAWN BY: JCS
 DESIGNED BY: JCS
 CHECKED BY: TCP
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SCALES:
 PLAN & PROFILE: 1" = 40'
 HORIZONTAL: 1" = 40'
 VERTICAL: 1" = 20'

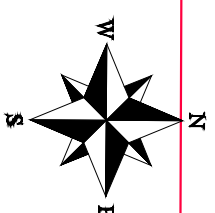
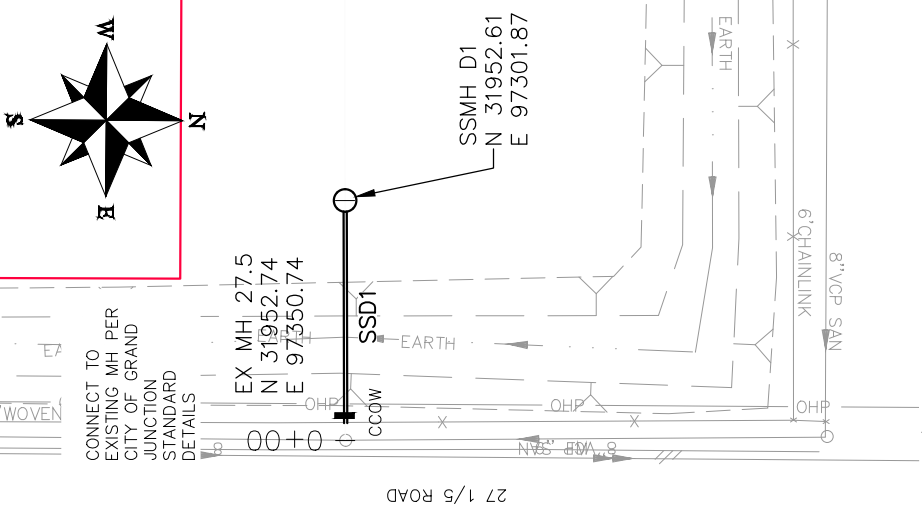
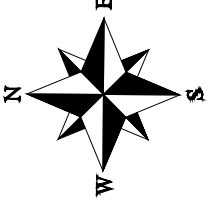
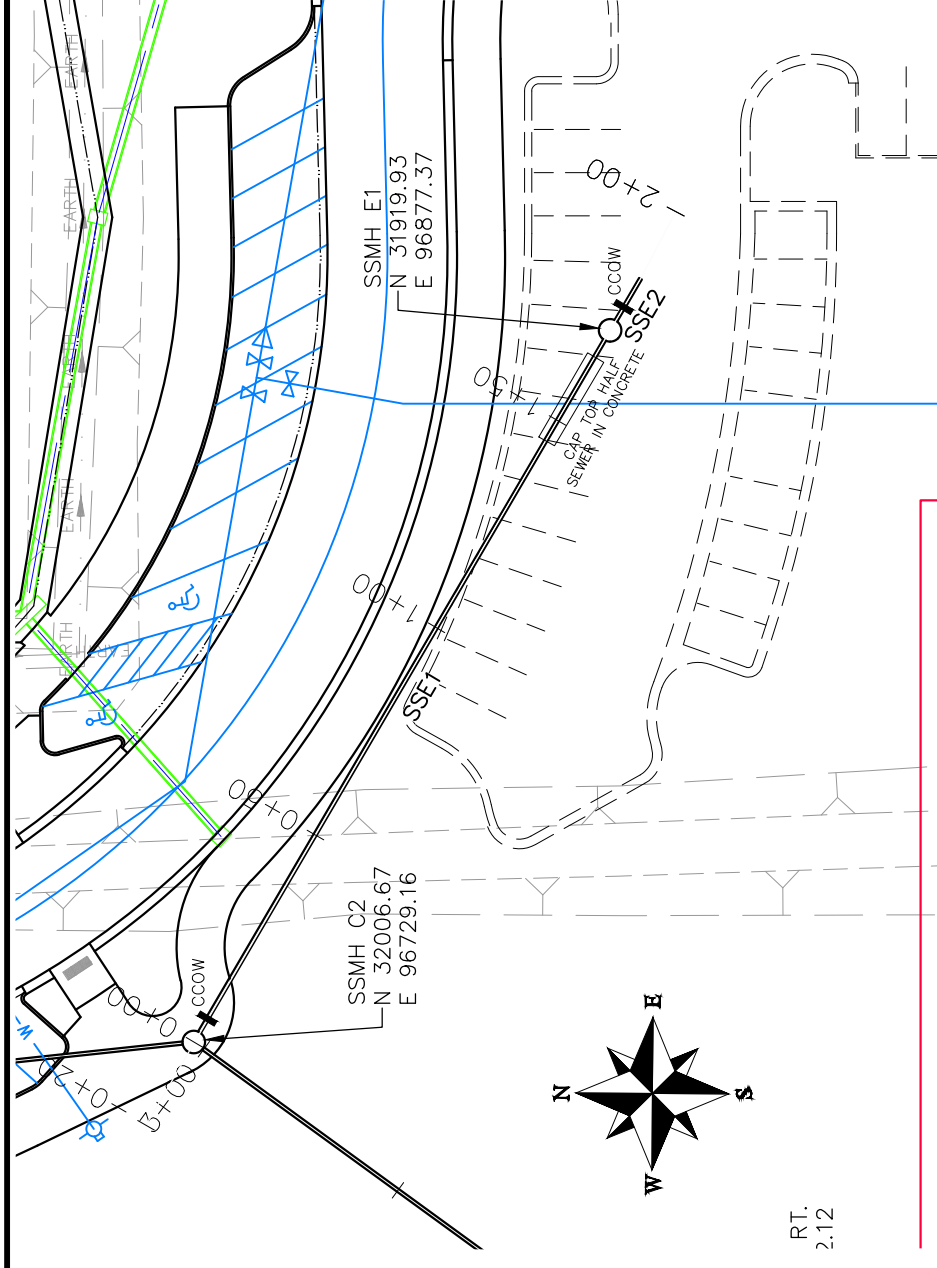
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 ENGINEERING DIVISION

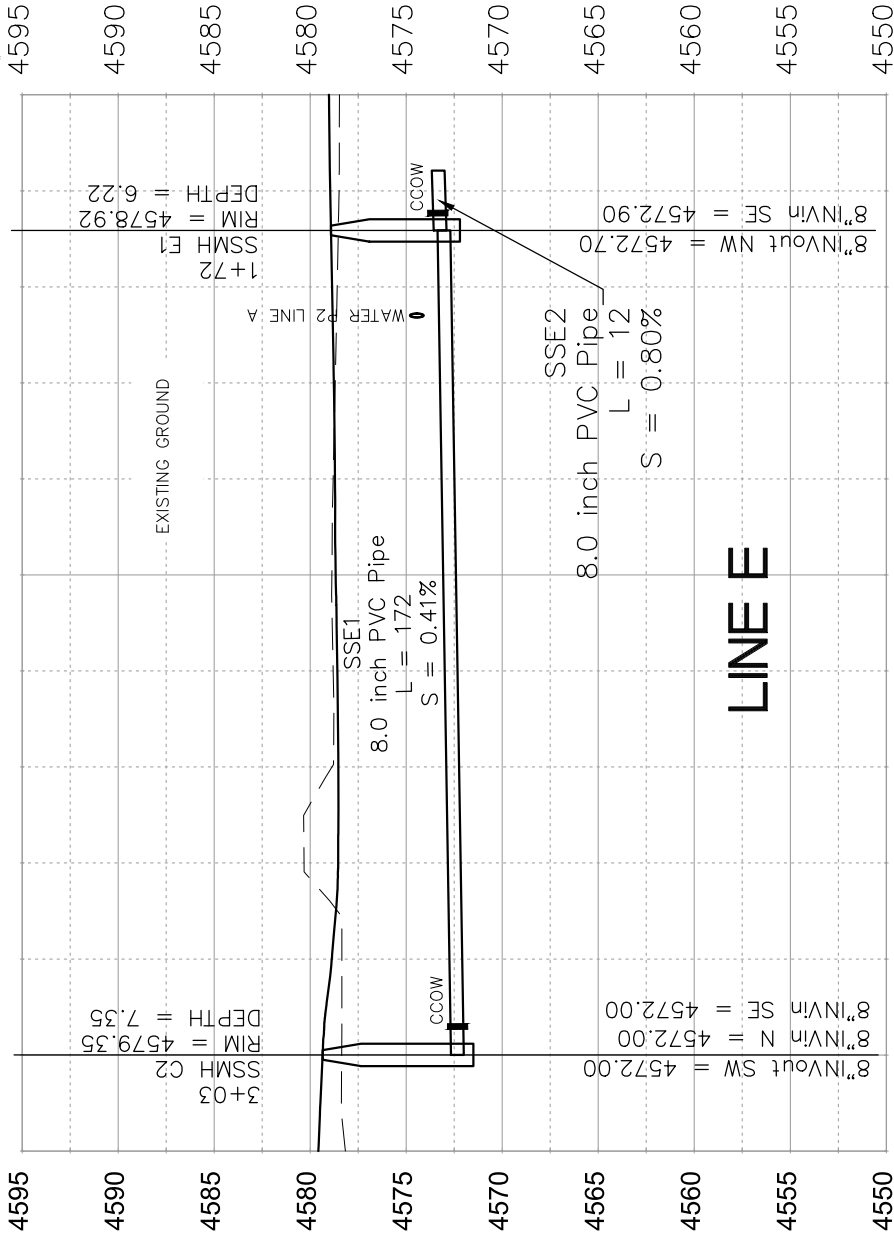
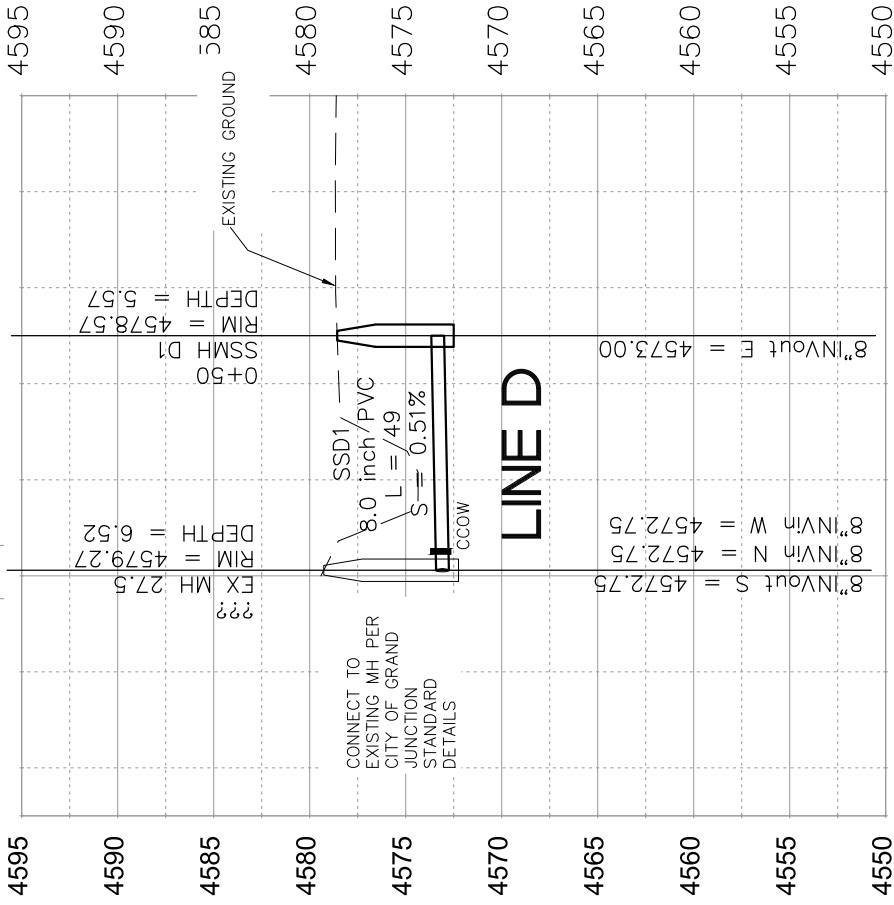
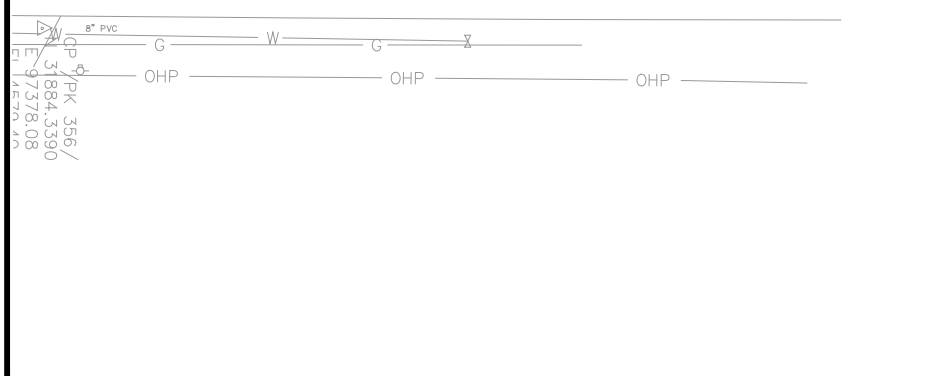
LAS COLONIAS BUSINESS PARK
 SANITARY SEWER LINE PLAN AND PROFILE

7



NOTES:

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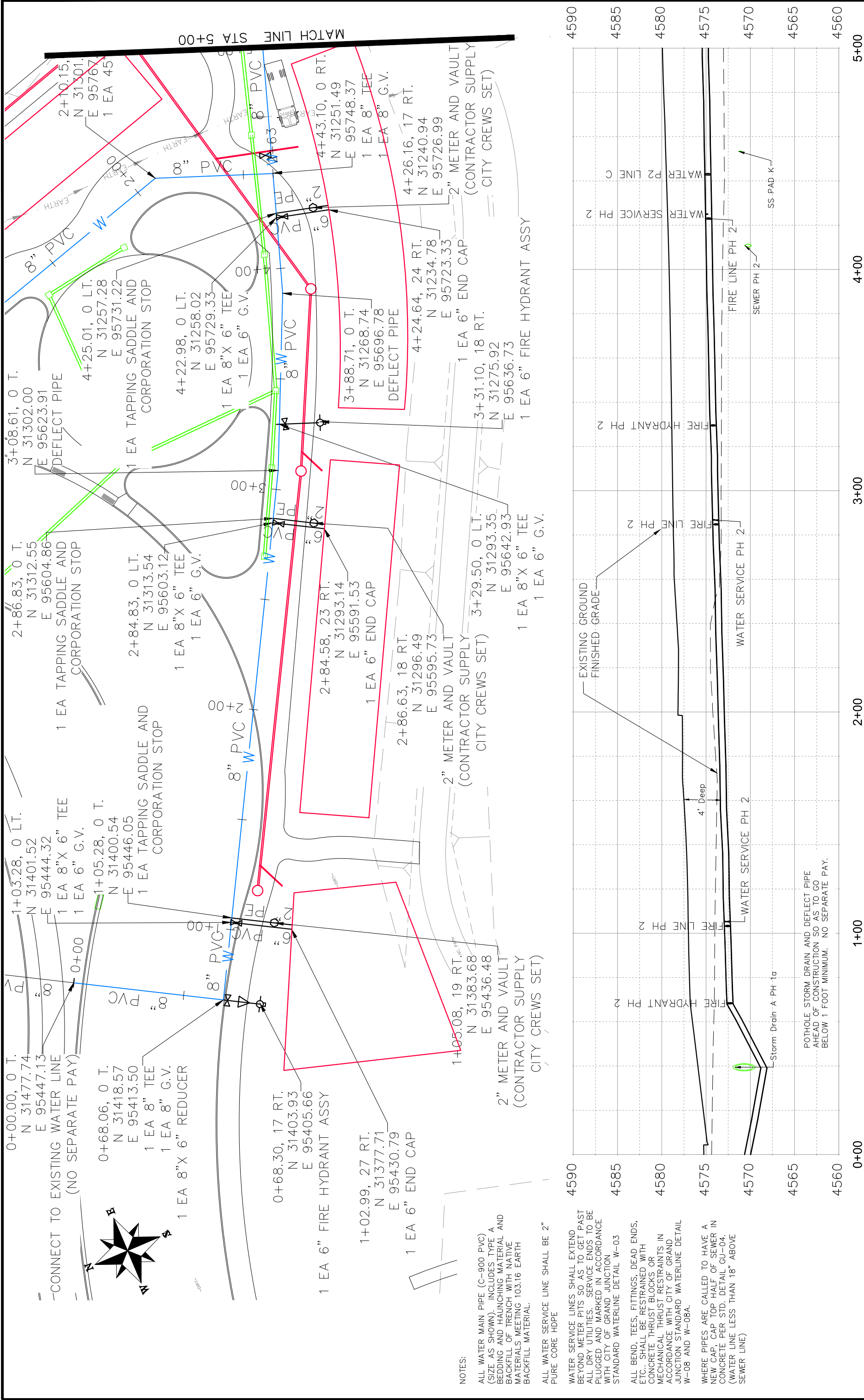


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**LAS COLONIAS BUSINESS PARK
SANITARY SEWER LINE PLAN AND PROFILE**



NOTES:

- ALL WATER MAIN PIPE (C-900 PVC) (SIZE AS SHOWN). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.
- ALL WATER SERVICE LINE SHALL BE 2" PURE CORE HDPE
- WATER SERVICE LINES SHALL EXTEND BEYOND METER PITS SO AS TO GET PAST ALL DRY UTILITIES. SERVICE ENDS TO BE PLUGGED AND MARKED IN ACCORDANCE WITH CITY OF GRAND JUNCTION STANDARD WATERLINE DETAIL W-03
- ALL BEND, TEES, FITTINGS, DEAD ENDS, ETC., SHALL BE RESTRAINED WITH CONCRETE THRUST BLOCKS OR MECHANICAL THRUST RESTRAINTS IN ACCORDANCE WITH CITY OF GRAND JUNCTION STANDARD WATERLINE DETAIL W-08 AND W-08A.
- WHERE PIPES ARE CALLED TO HAVE A NEW CAP, CAP TOP HALF OF SEWER IN CONCRETE PER STD. DETAIL GU-04. (WATER LINE LESS THAN 18" ABOVE SEWER LINE)

POTHOLE STORM DRAIN AND DEFLECT PIPE AHEAD OF CONSTRUCTION SO AS TO GO BELOW 1 FOOT MINIMUM. NO SEPARATE PAY.

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DRAWN BY	JCS	DATE	2018
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APPROVED BY	TOP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 25'



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ENGINEERING DIVISION

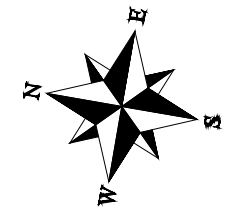
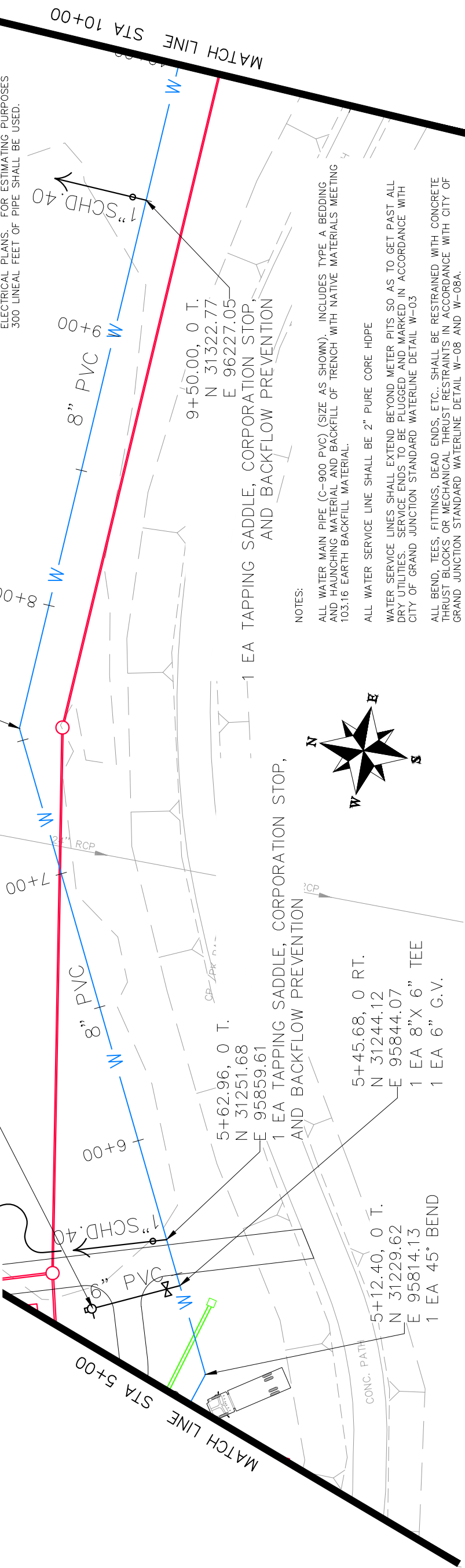
LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE

AN UNDETERMINED AMOUNT OF 1" SCHEDULE 40 PVC, 1" TEES, AND 5 YARD HYDRANTS WILL BE REQUIRED FOR VENDOR WATER SUPPLY PURPOSES. HYDRANT LOCATIONS COINCIDE WITH ELECTRICAL PEDESTAL LOCATIONS AS SHOWN ON THE ELECTRICAL PLANS. FOR ESTIMATING PURPOSES 300 LINEAL FEET OF PIPE SHALL BE USED.

5+46.69, 32 LT.
N 31273.74
E 95830.83
1 EA 6" FIRE HYDRANT ASSY

7+54.45, 0 T.
N 31335.26
E 96031.90
1 EA 22 1/2° BEND

AN UNDETERMINED AMOUNT OF 1" SCHEDULE 40 PVC, 1" TEES, AND 5 YARD HYDRANTS WILL BE REQUIRED FOR VENDOR WATER SUPPLY PURPOSES. HYDRANT LOCATIONS COINCIDE WITH ELECTRICAL PEDESTAL LOCATIONS AS SHOWN ON THE ELECTRICAL PLANS. FOR ESTIMATING PURPOSES 300 LINEAL FEET OF PIPE SHALL BE USED.



NOTES:

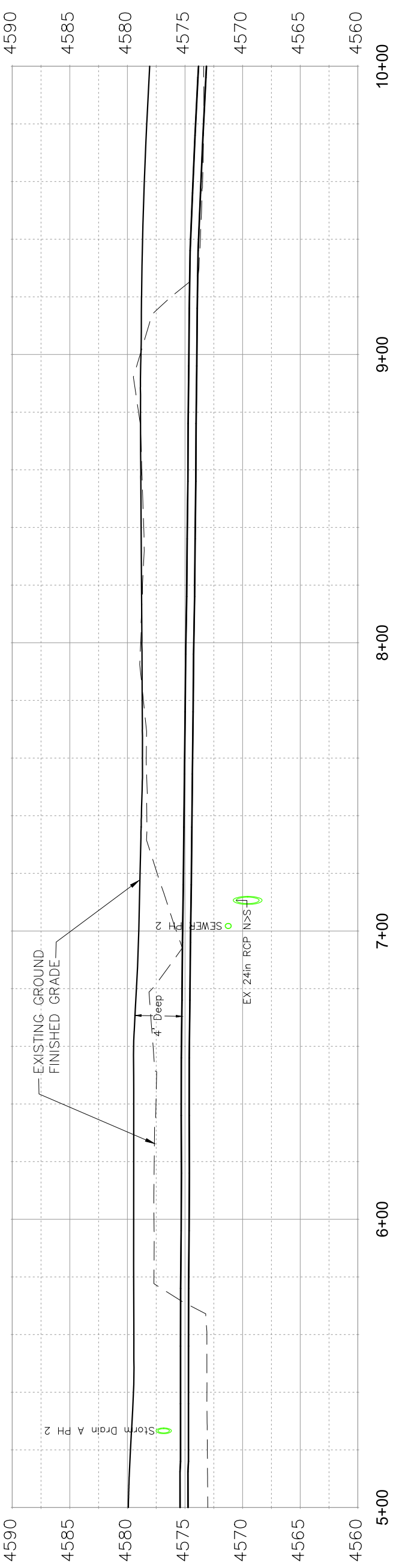
ALL WATER MAIN PIPE (C-900 PVC) (SIZE AS SHOWN) INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

ALL WATER SERVICE LINE SHALL BE 2" PURE CORE HDPE

WATER SERVICE LINES SHALL EXTEND BEYOND METER PITS SO AS TO GET PAST ALL DRY UTILITIES. SERVICE ENDS TO BE PLUGGED AND MARKED IN ACCORDANCE WITH CITY OF GRAND JUNCTION STANDARD WATERLINE DETAIL W-03

ALL BEND, TEES, FITTINGS, DEAD ENDS, ETC., SHALL BE RESTRAINED WITH CONCRETE THRUST BLOCKS OR MECHANICAL THRUST RESTRAINTS IN ACCORDANCE WITH CITY OF GRAND JUNCTION STANDARD WATERLINE DETAIL W-08 AND W-08A.

WHERE PIPES ARE CALLED TO HAVE A NEW CAP, CAP TOP HALF OF SEWER IN CONCRETE PER STD. DETAIL GU-04. (WATER LINE LESS THAN 18" ABOVE SEWER LINE)



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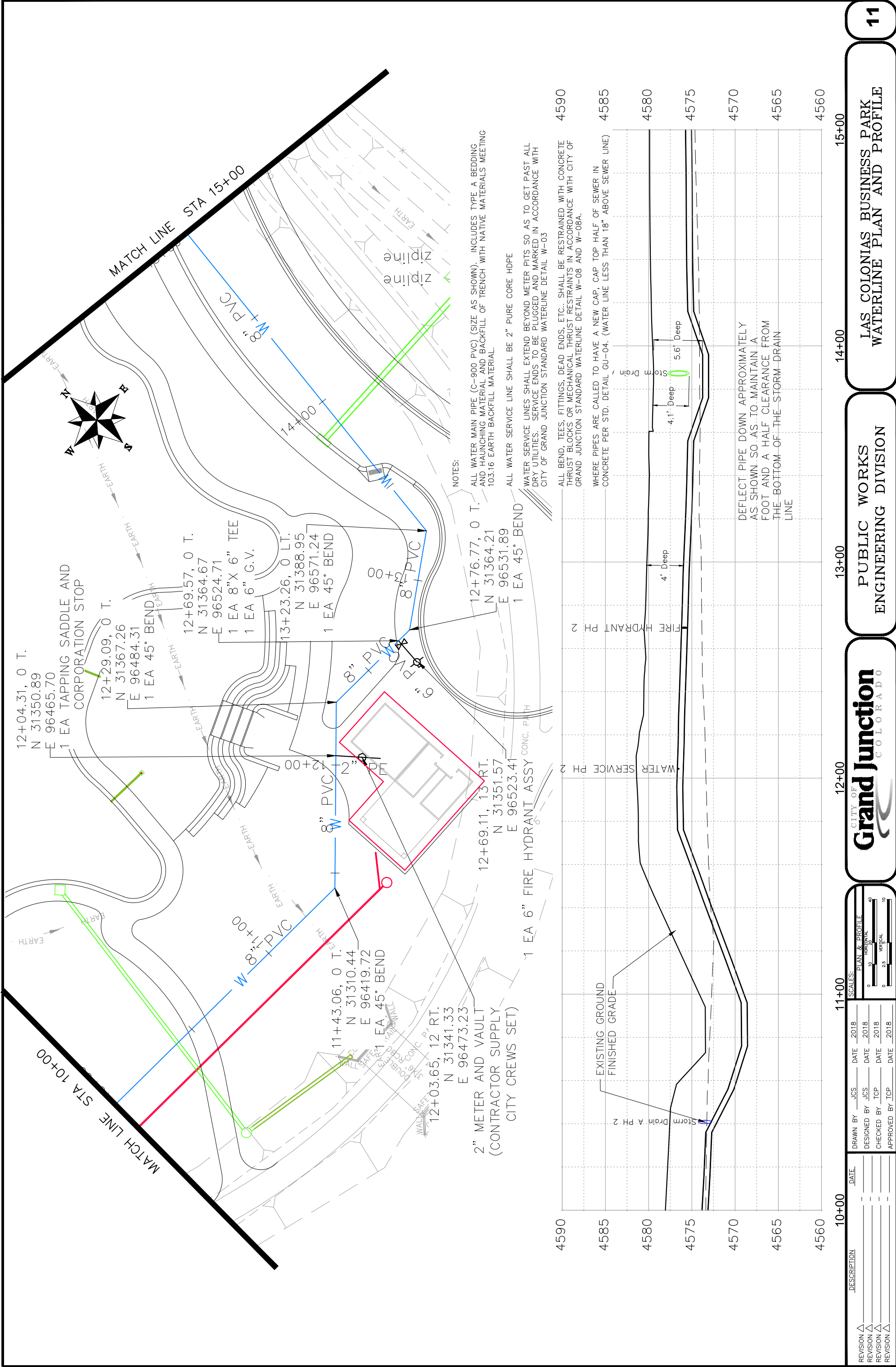
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APPROVED BY	TCJ	DATE	2018

SCALE	PLAN & PROFILE
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LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE



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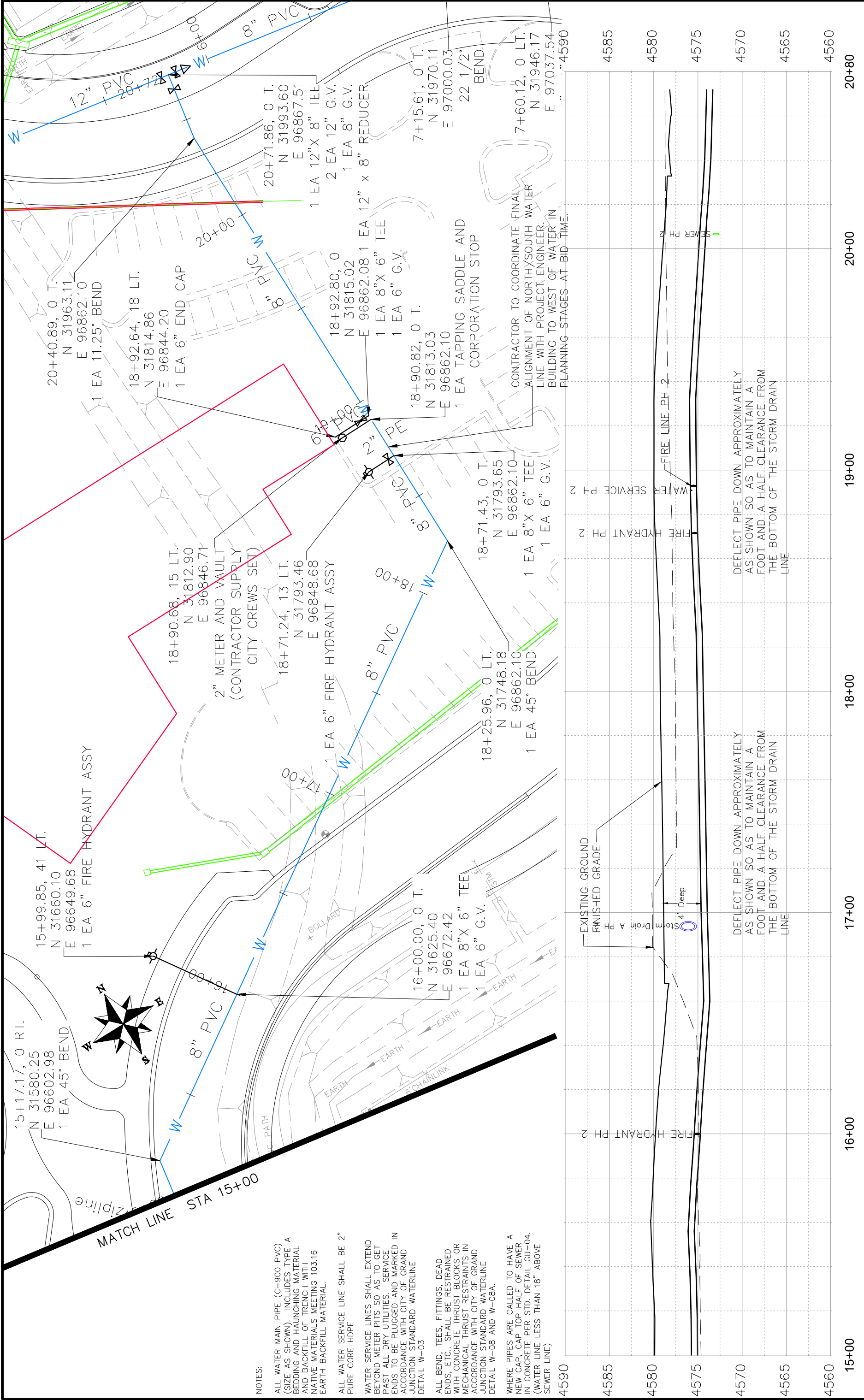
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2018	2018	2018	2018

SCALE	SCALE
PLAN & PROFILE	PLAN & PROFILE
1" = 10'	1" = 10'
1" = 2.5'	1" = 2.5'

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COLORADO

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ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE



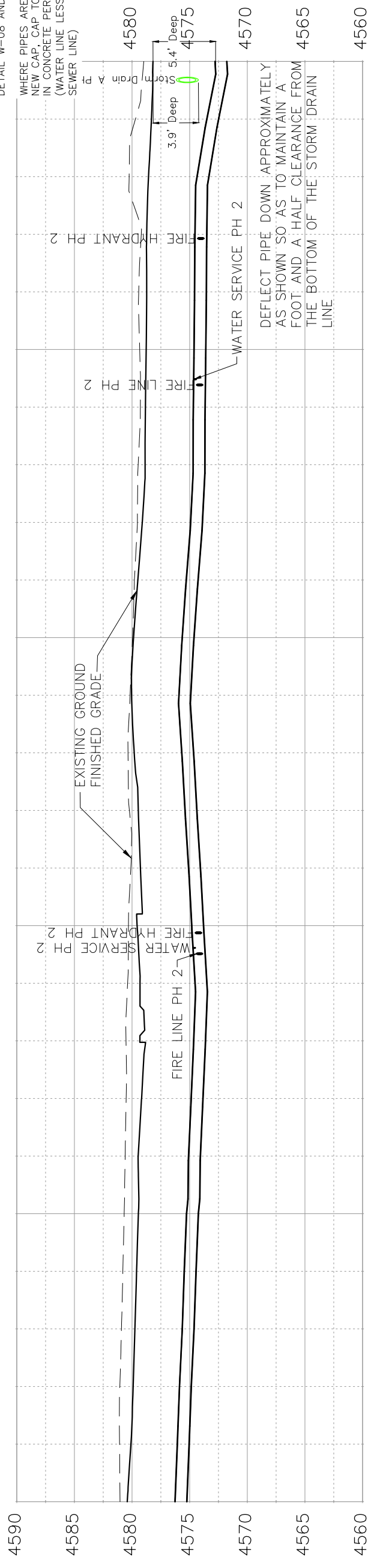
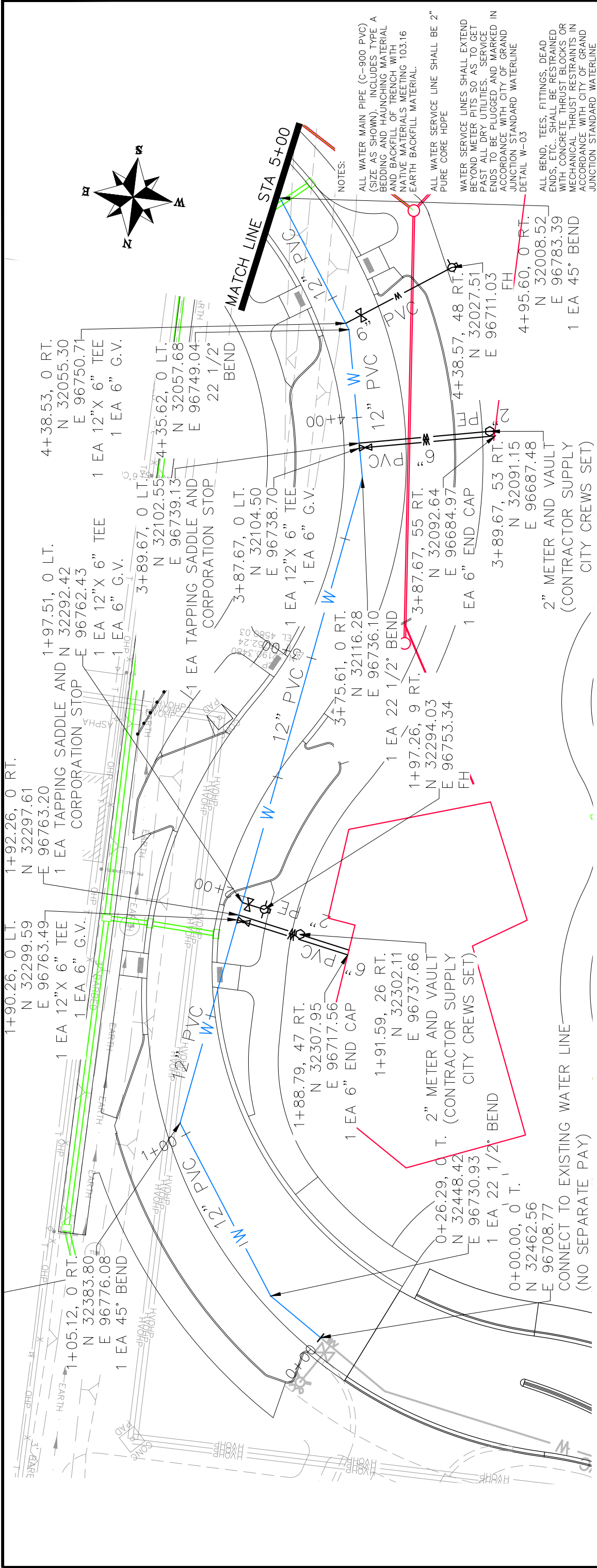
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ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE



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4575
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4560

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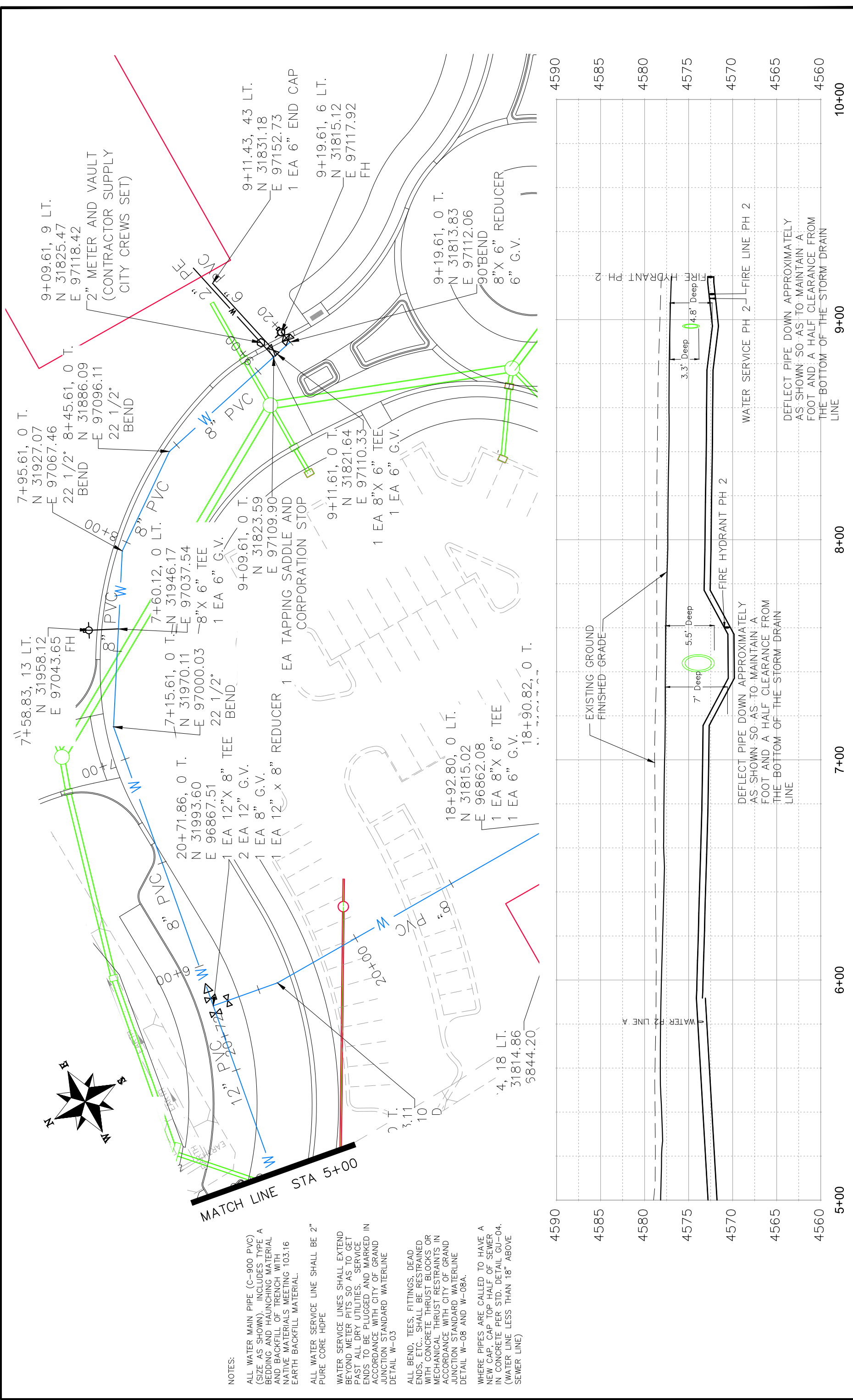
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0	2.5
0	10



**PUBLIC WORKS
ENGINEERING DIVISION**

**LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE**



NOTES:

ALL WATER MAIN PIPE (C-900 PVC) (SIZE AS SHOWN). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

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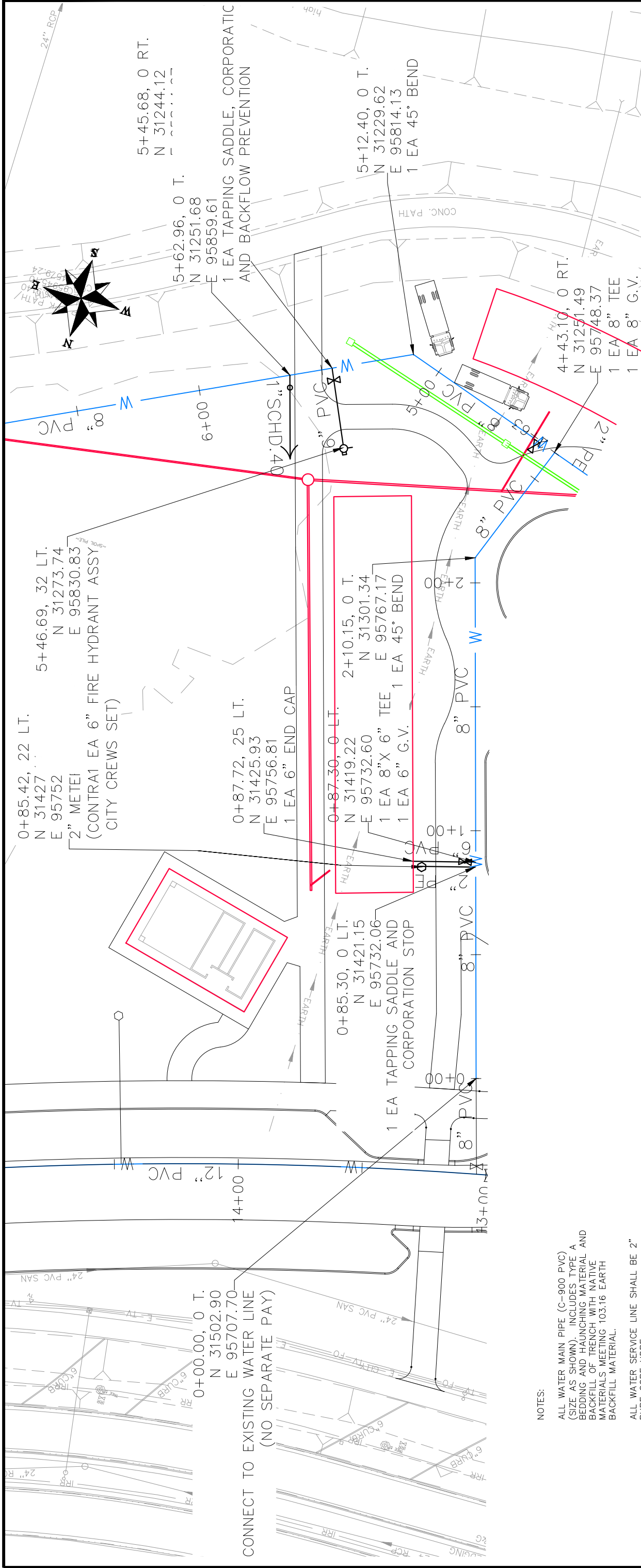
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LAS COLONIAS BUSINESS PARK
WATERLINE PLAN AND PROFILE

14



NOTES:

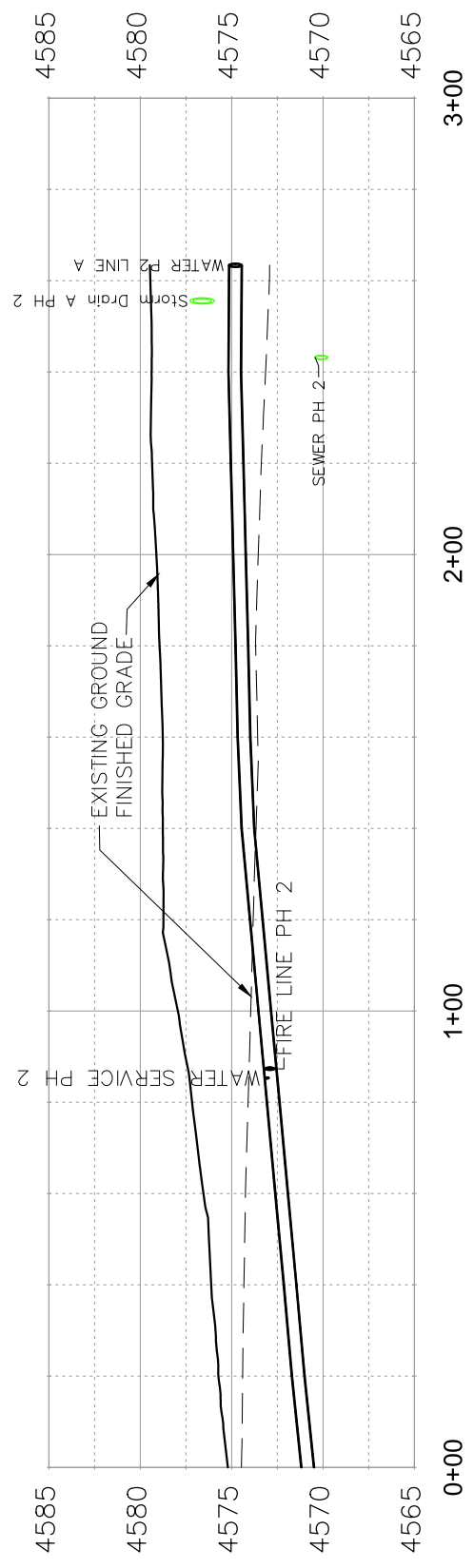
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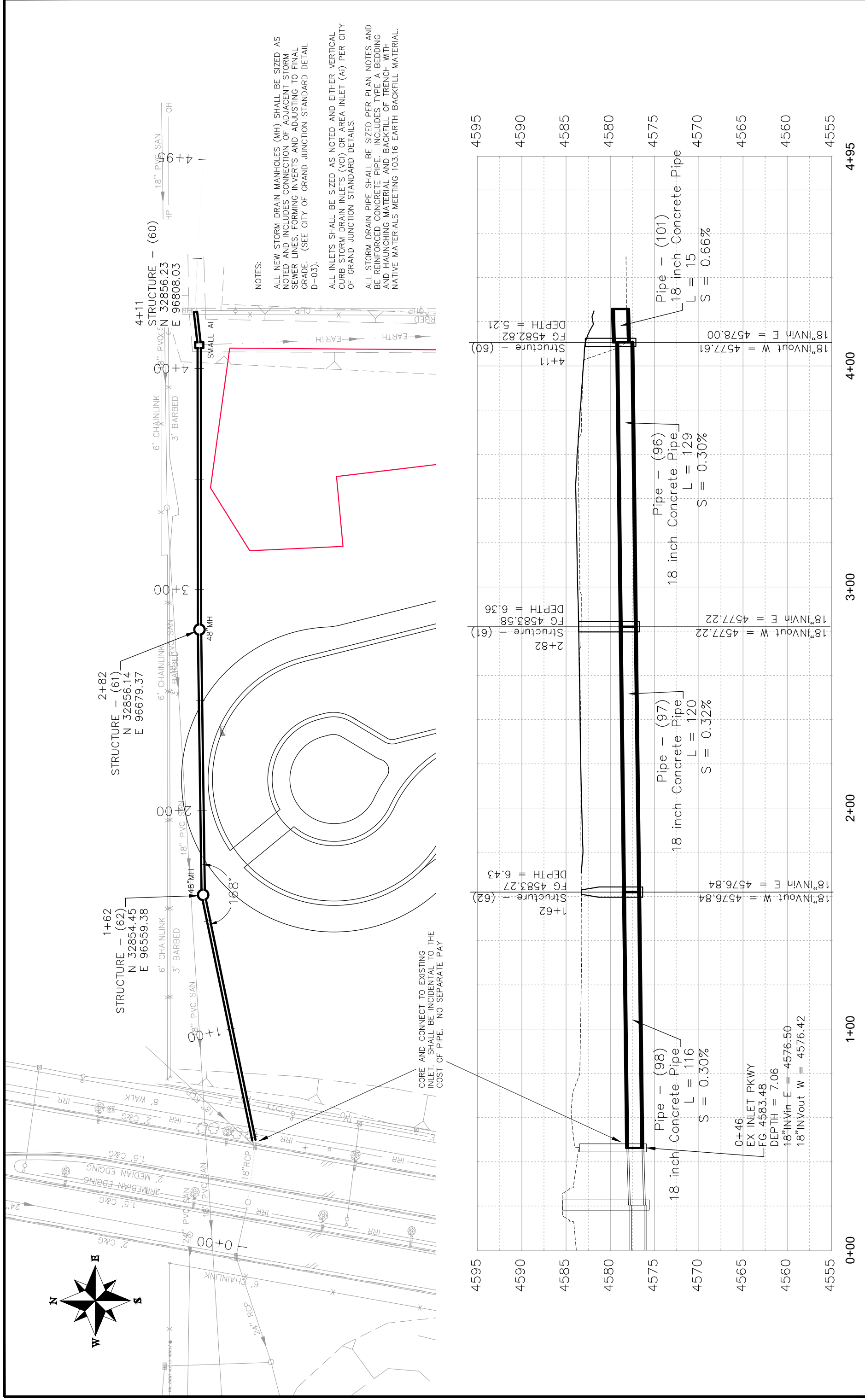
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REVISION	DESCRIPTION	DATE

SCALE:	DATE
PLAN & PROFILE	2017
HORIZONTAL	2017
VERTICAL	2017

Grand Junction
CITY OF COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
STORM DRAIN PLAN AND PROFILE

NOTES:

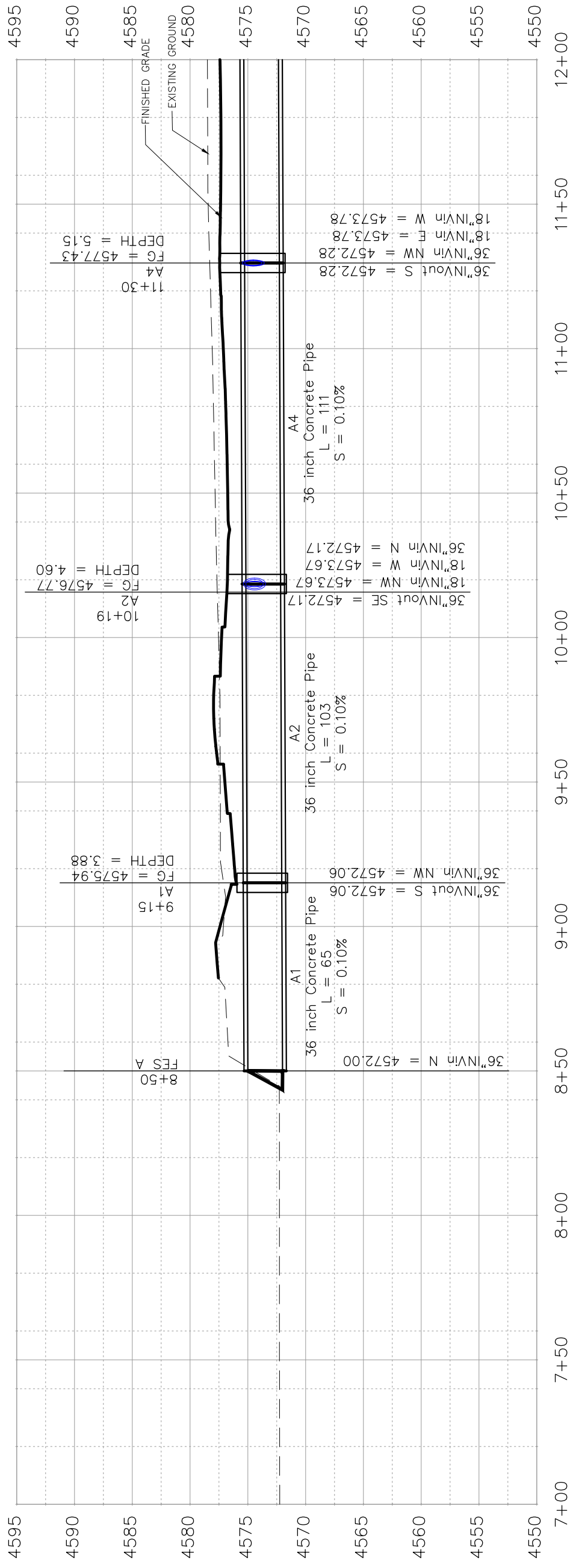
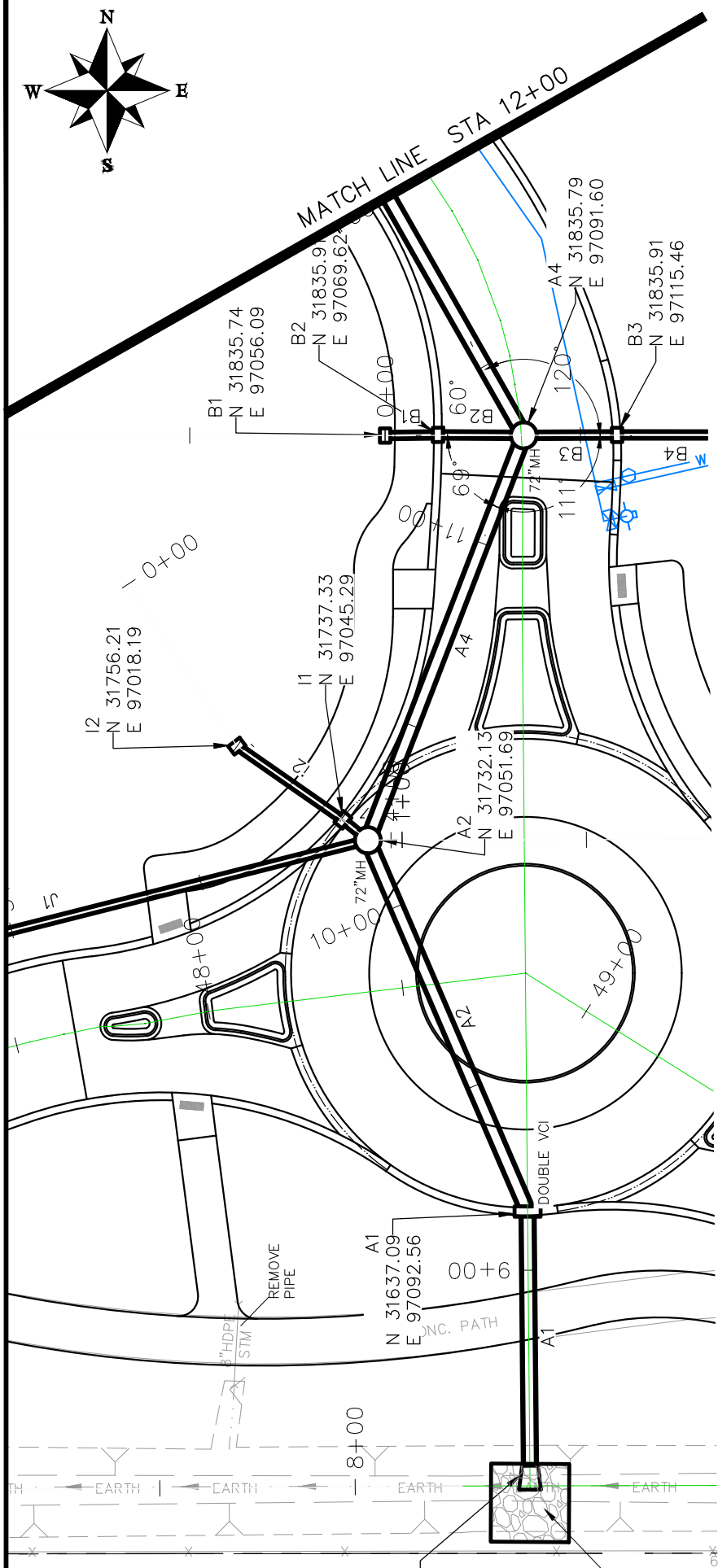
ALL NEW STORM DRAIN MANHOLES (MH) SHALL BE SIZED AS NOTED AND INCLUDES CONNECTION OF ADJACENT STORM SEWER LINES, FORMING INVERTS AND ADJUSTING TO FINAL GRADE. (SEE CITY OF GRAND JUNCTION STANDARD DETAIL D-03).

ALL INLETS SHALL BE SIZED AS NOTED AND EITHER VERTICAL CURB STORM DRAIN INLETS (VCI) OR AREA INLET (AI) PER CITY OF GRAND JUNCTION STANDARD DETAILS.

ALL STORM DRAIN PIPE SHALL BE SIZED PER PLAN NOTES AND BE REINFORCED CONCRETE PIPE. INCLUDES TYPE 'A' BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

36" FLARED END SECTION
FES A
N 31572.05
E 97093.16

RIP-RAP (D50=12")
(40 SY)



REVISION	DESCRIPTION	DATE

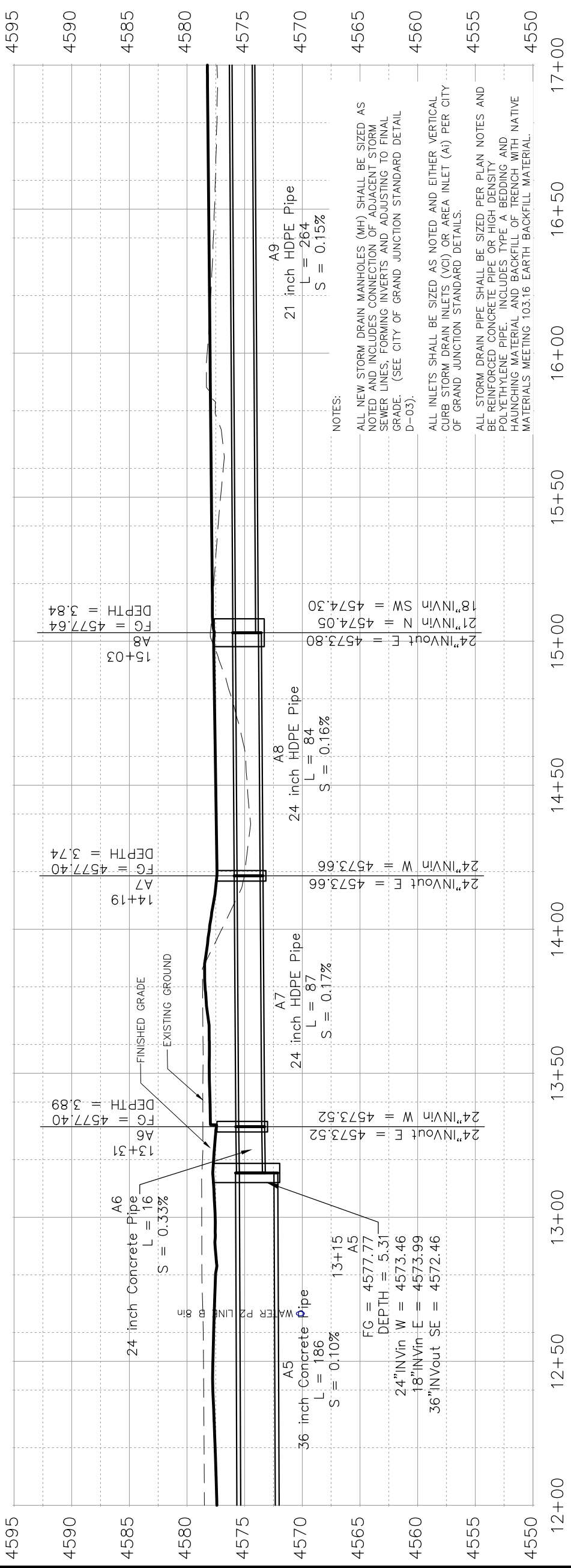
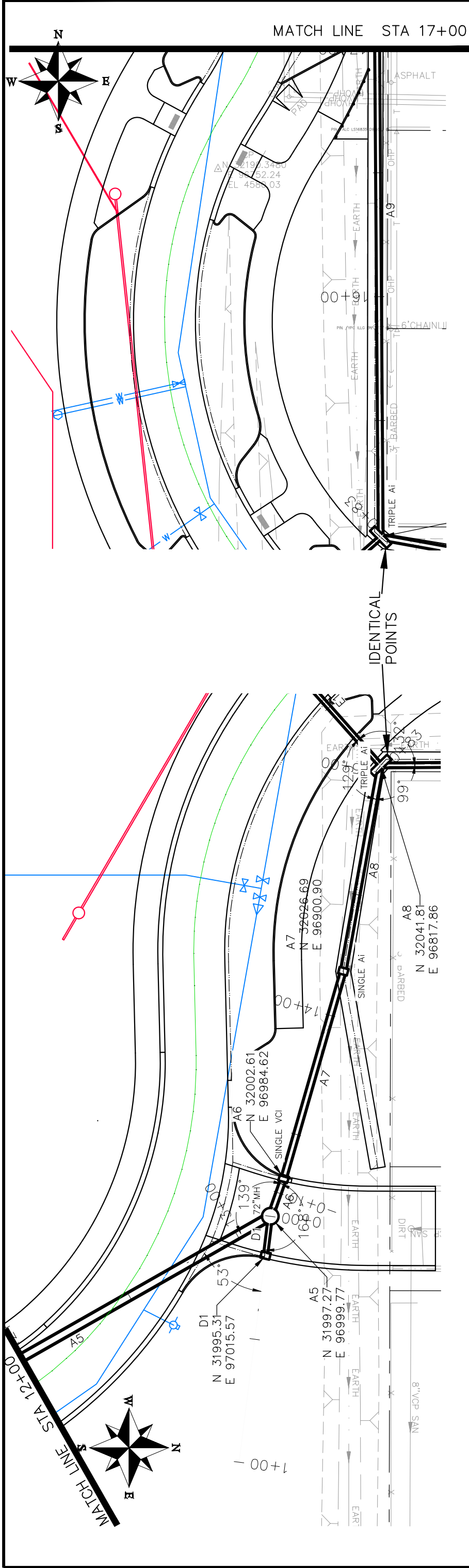
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

SCALE:	PLAN & PROFILE
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0	2.5' VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
STORM DRAIN PLAN AND PROFILE



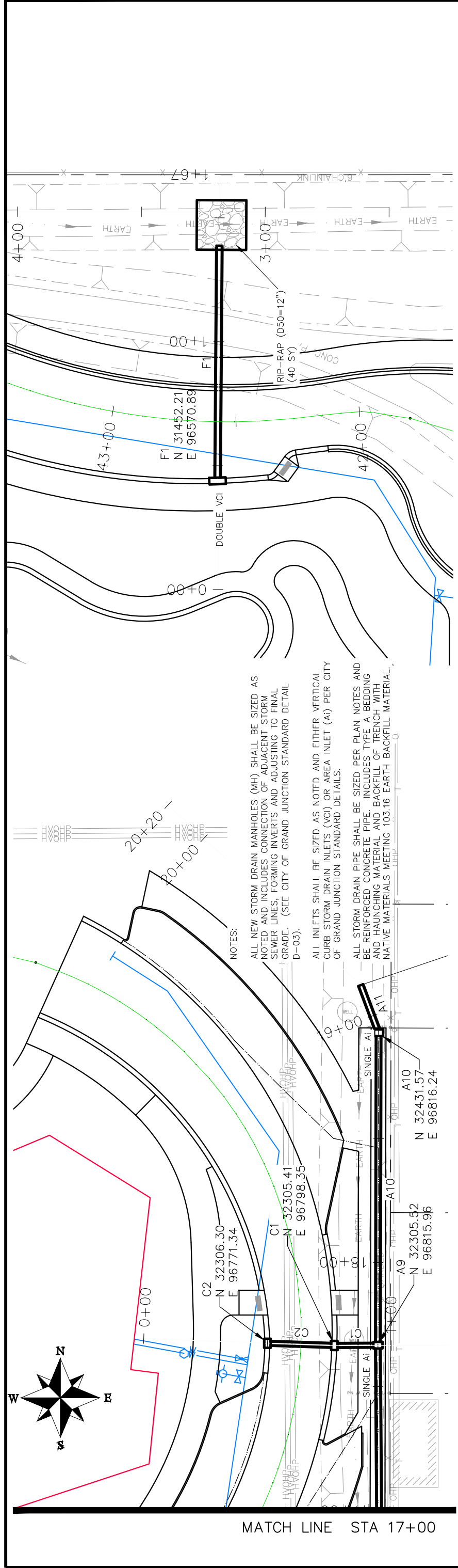
NOTES:
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REVISION	DATE	DRAWN BY	DATE
REVISION	2018	JCS	2018
REVISION	2018	JCS	2018
REVISION	2018	JCS	2018

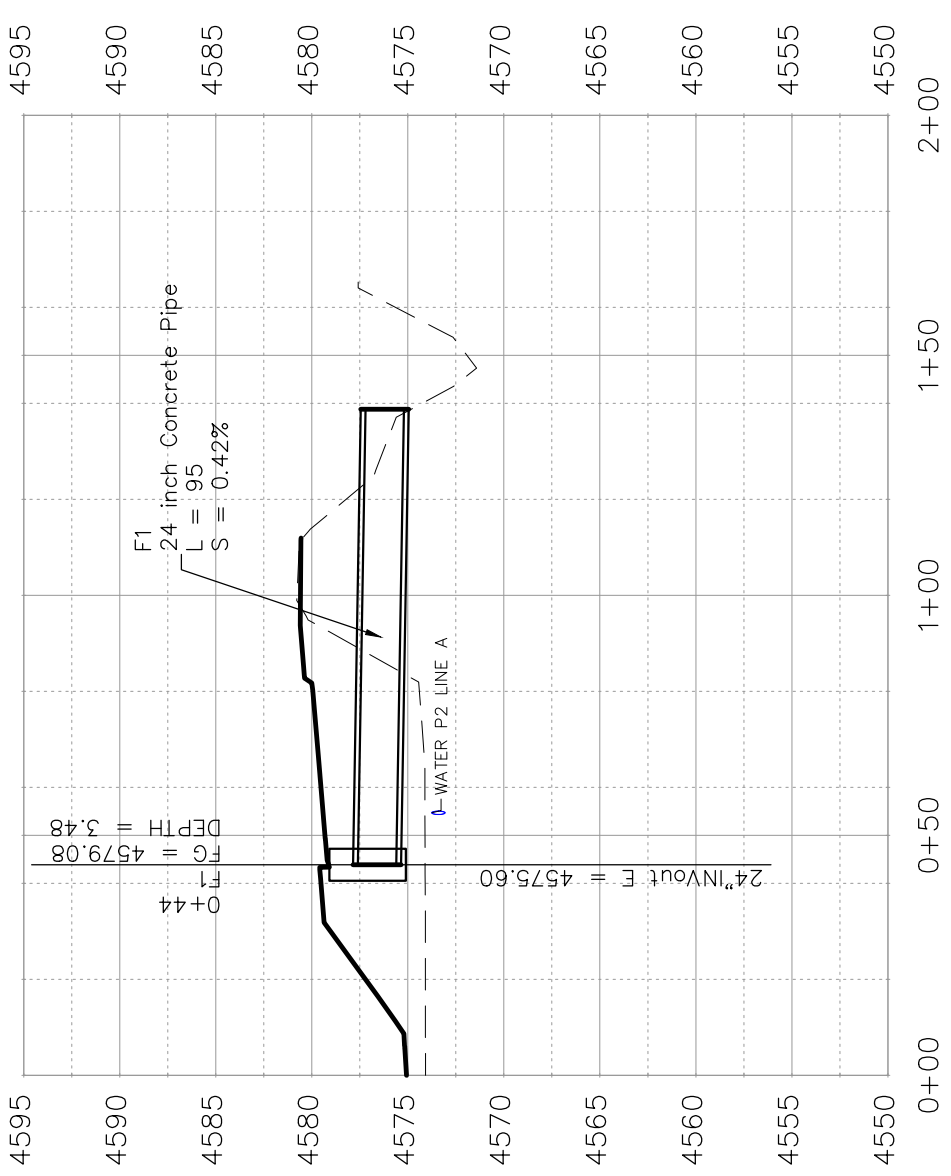
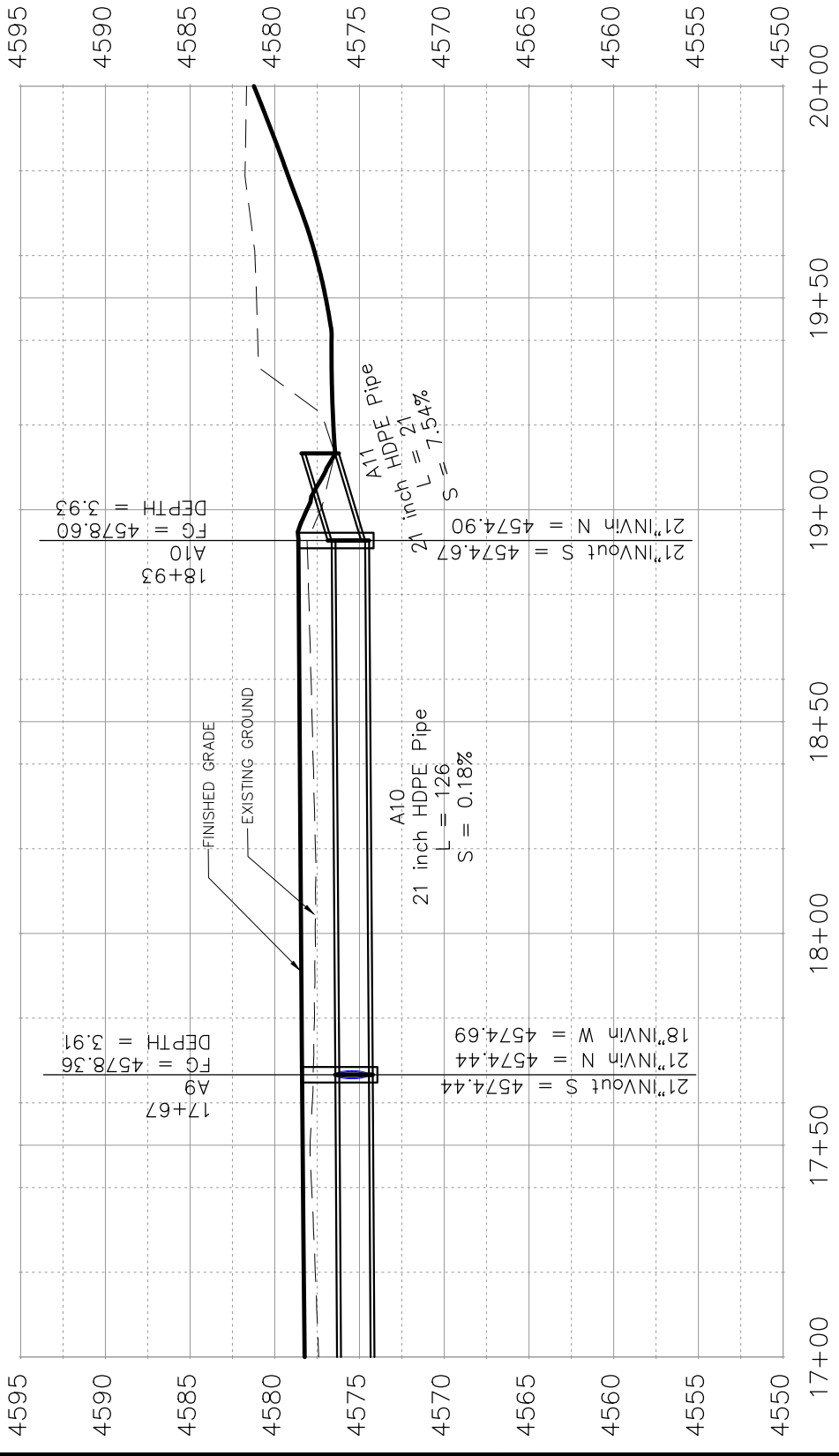


PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 STORM DRAIN PLAN AND PROFILE



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REVISION	DESCRIPTION	DATE

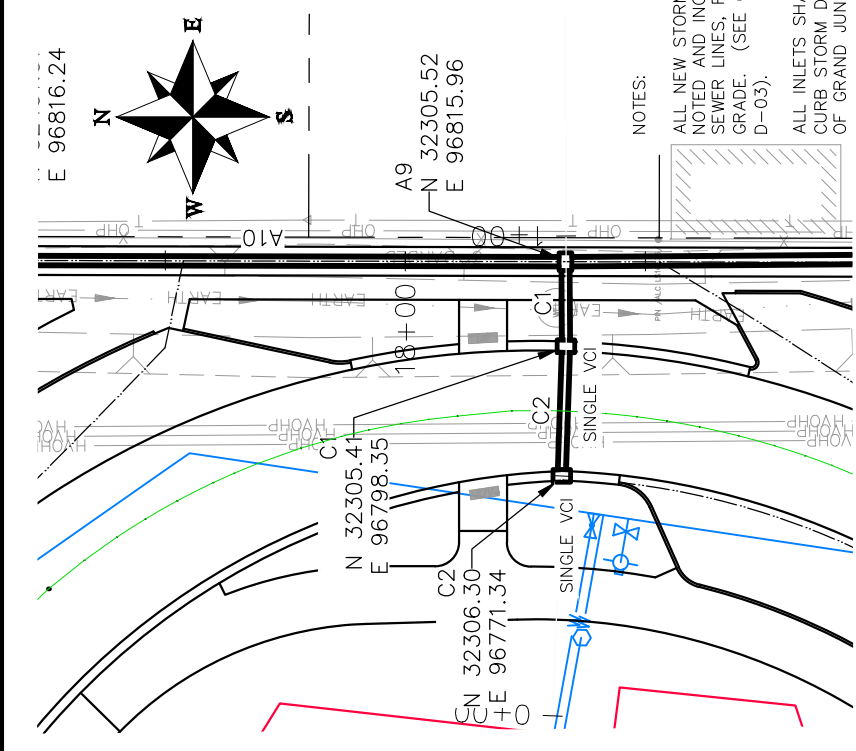
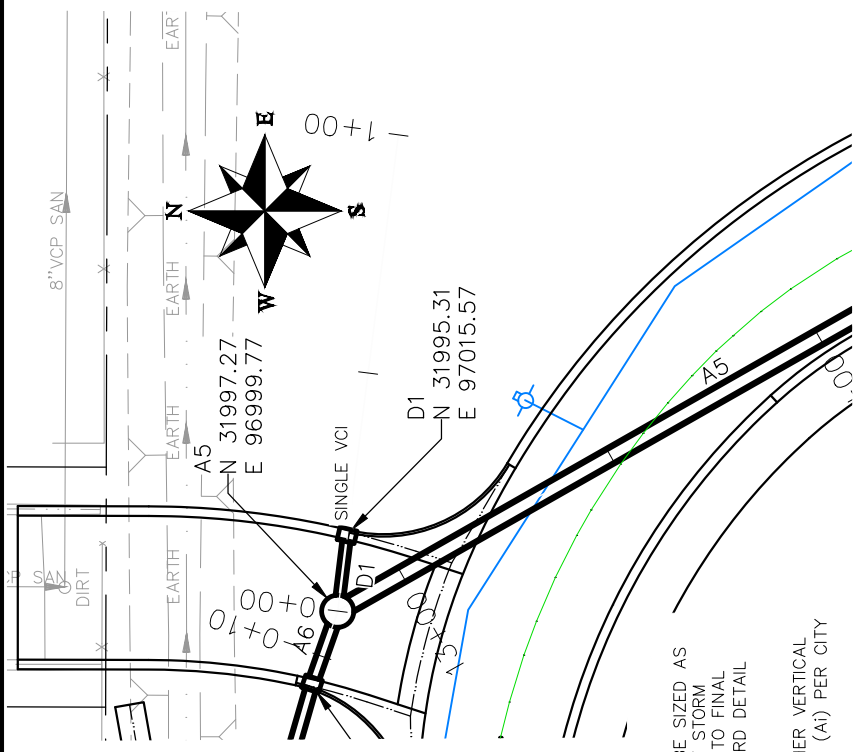
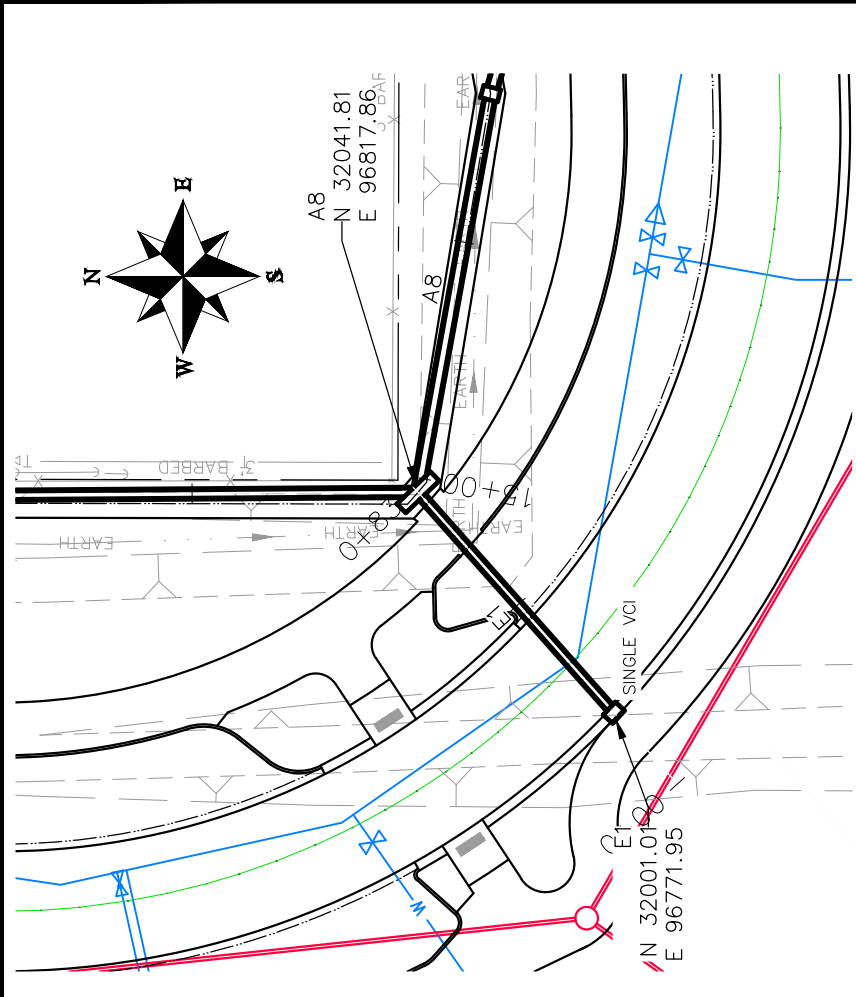
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JCS	2018
DESIGNED BY	DATE
JCS	2018
CHECKED BY	DATE
JCS	2018
APPROVED BY	DATE
JCS	2018

SCALE:	PLAN & PROFILE
0 10 20	HORIZONTAL
0 2.5 5 10	VERTICAL

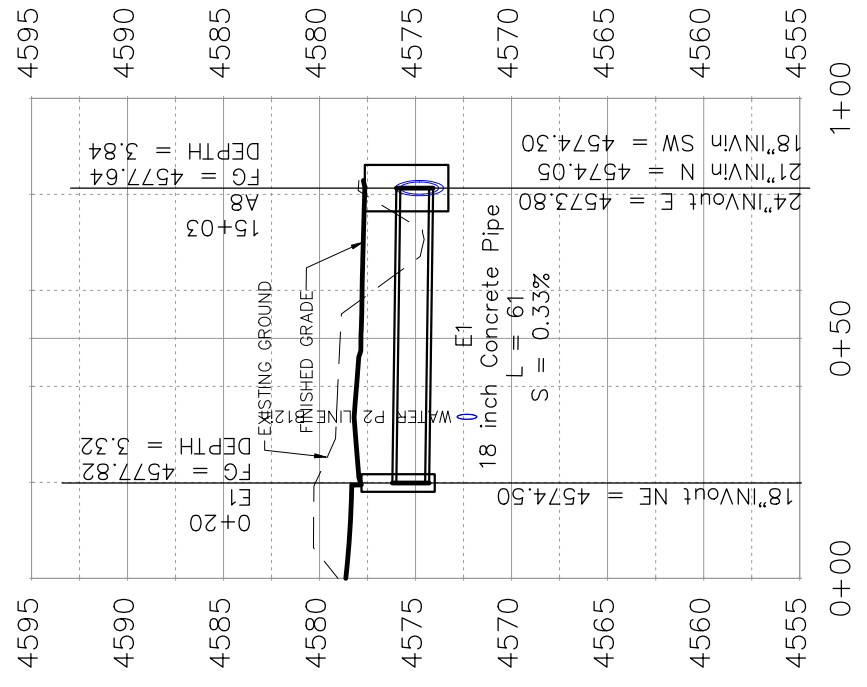
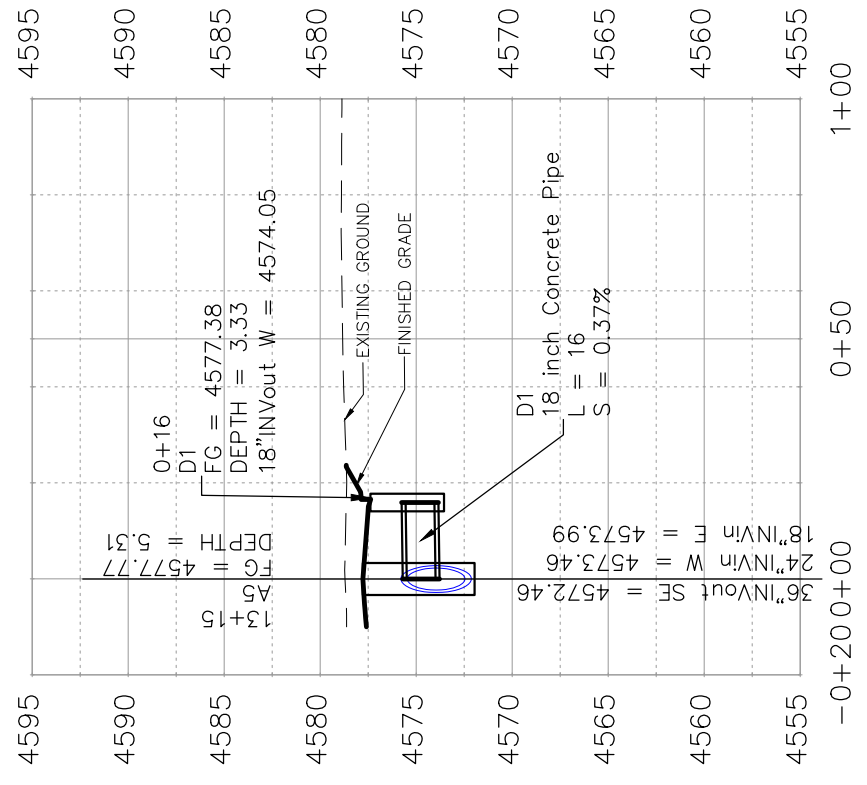
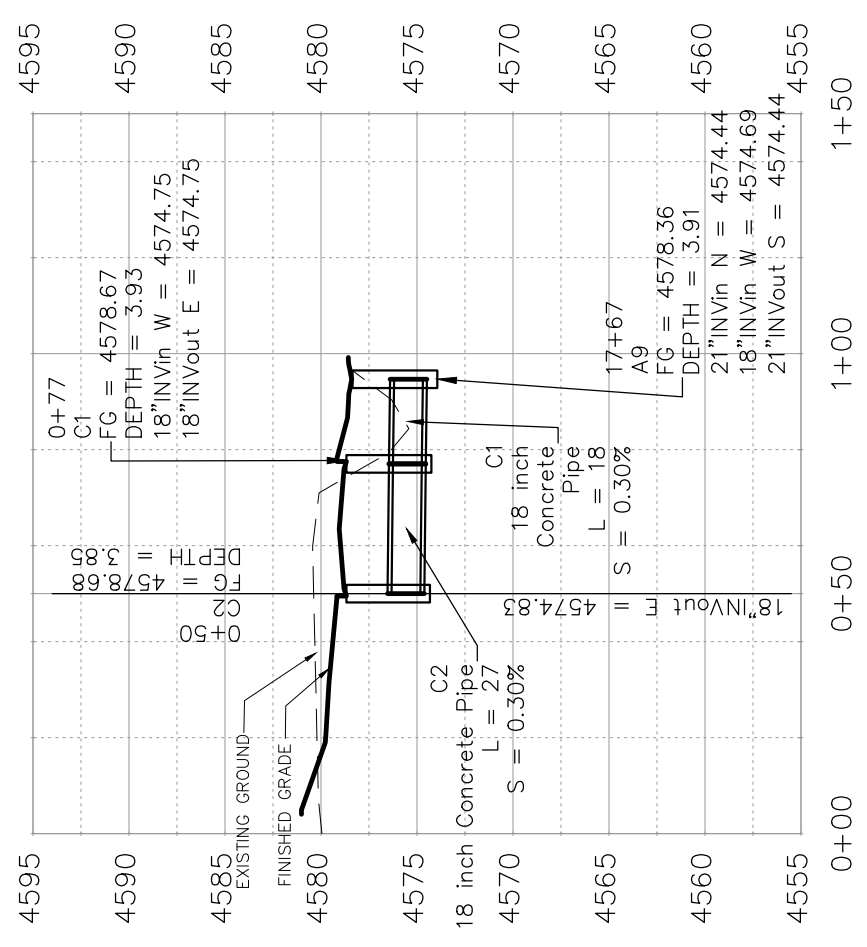


PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
STORM DRAIN PLAN AND PROFILE



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REVISION	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018

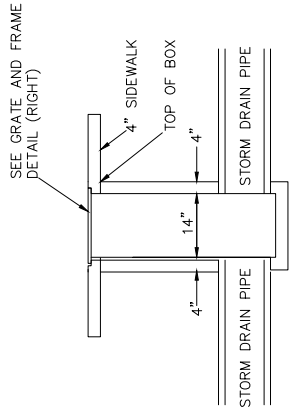


PUBLIC WORKS
 ENGINEERING DIVISION

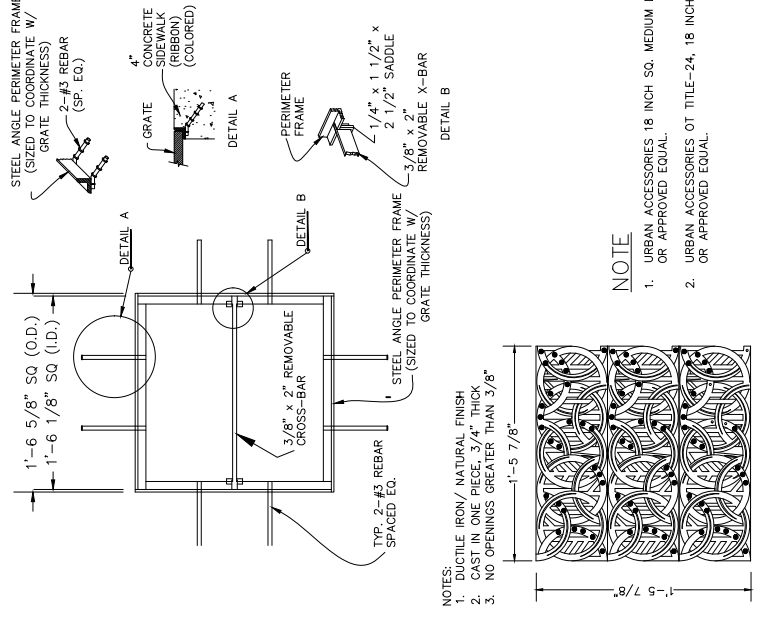
LAS COLONIAS BUSINESS PARK PHASE 2
 STORM DRAIN PLAN AND PROFILE

NOTES:
 INLETS SHALL BE SPECIAL SMALL AREA INLETS (SP SMALL AI) PER DETAILS THIS PAGE
 OR
 VERTICAL CURB STORM DRAIN INLETS (VCI) PER CITY OF GRAND JUNCTION STANDARD DETAILS.

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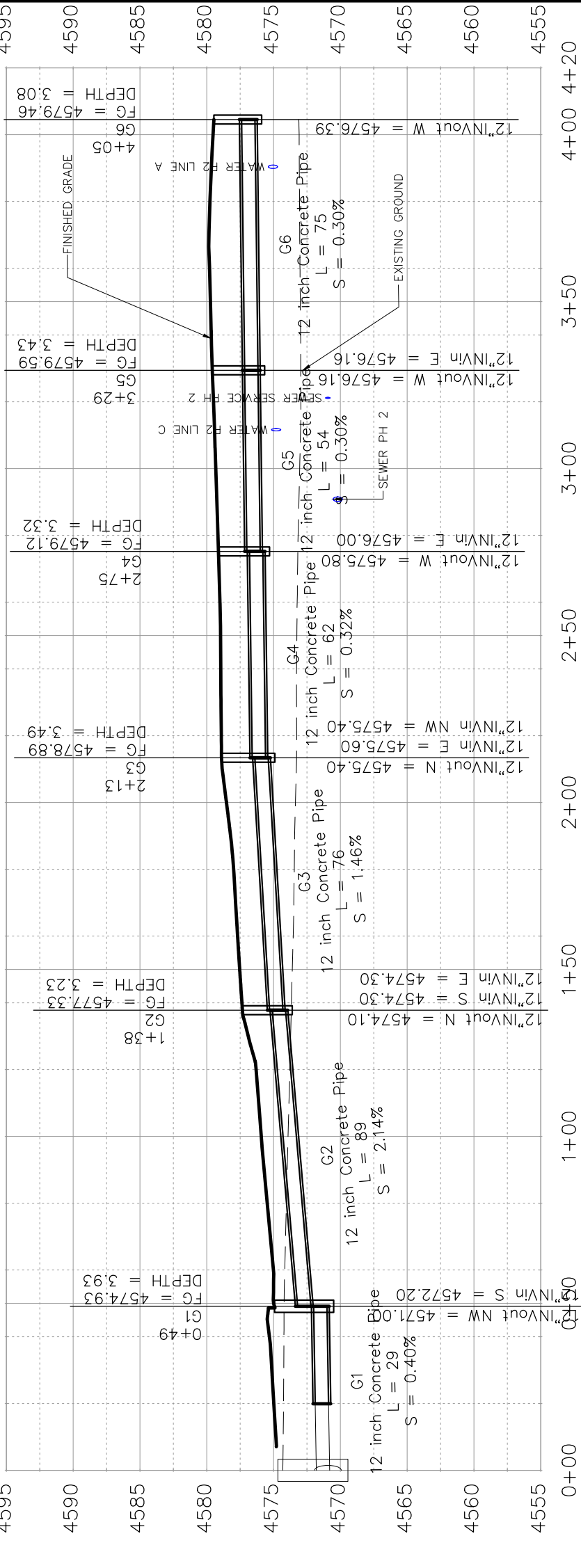
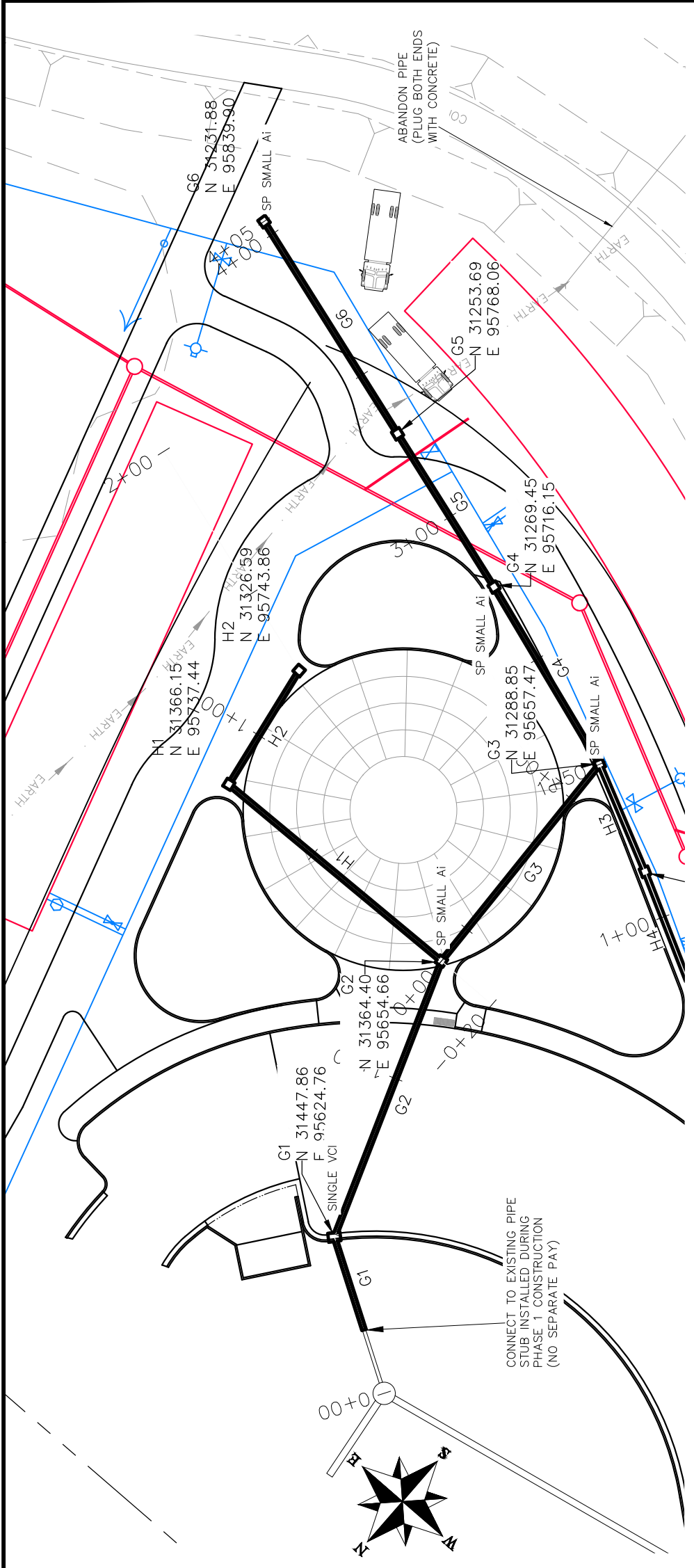
SPECIAL SMALL AREA INLET
 N.T.S.



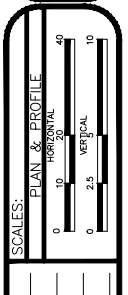
NOTES:
 1. DUCTILE IRON / NATURAL FINISH
 2. DUCTILE IRON / POLYESTER FINISH
 3. NO OPENINGS GREATER THAN 3/8"

- NOTE
1. URBAN ACCESSORIES 18 INCH SQ. MEDIUM DUTY "S" FRAME OR APPROVED EQUAL.
 2. URBAN ACCESSORIES OT TITLE-24, 18 INCH SQ. DRAIN COVER OR APPROVED EQUAL.

GRATE FRAME FOR SPECIAL SMALL AREA INLET

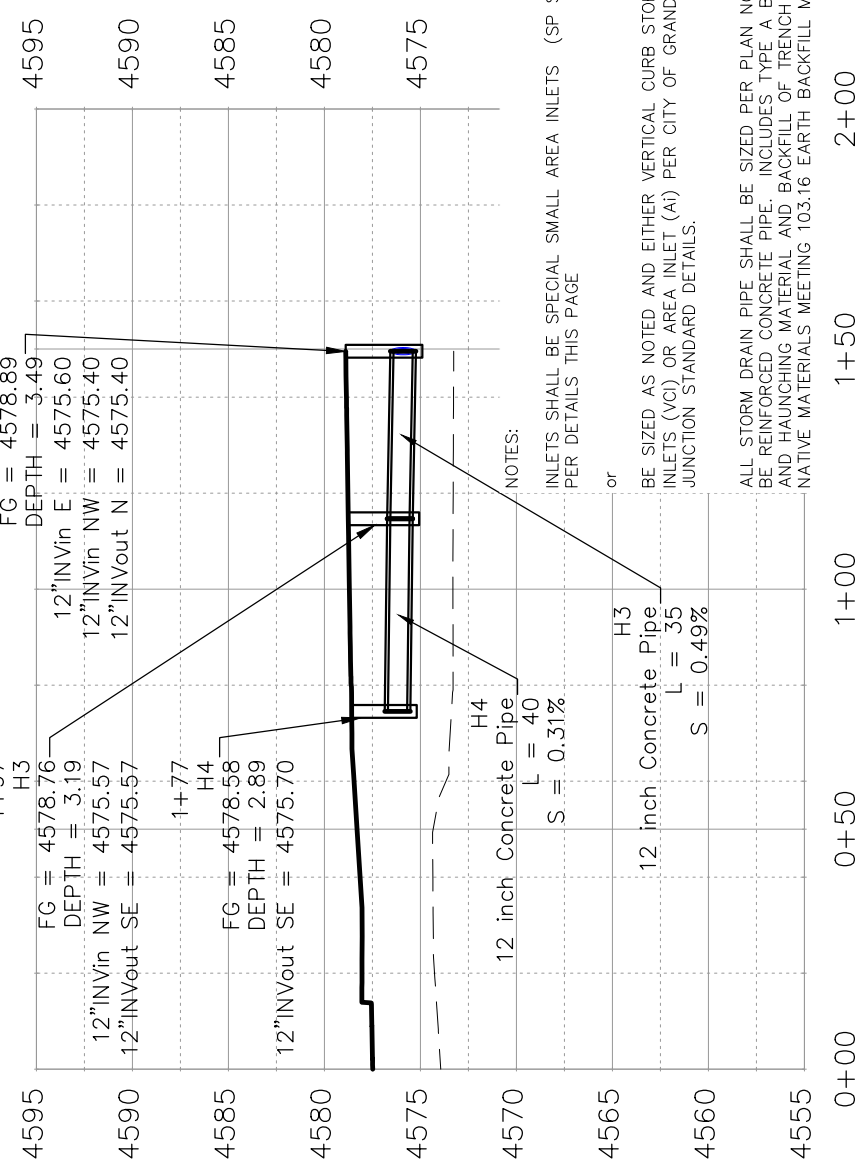
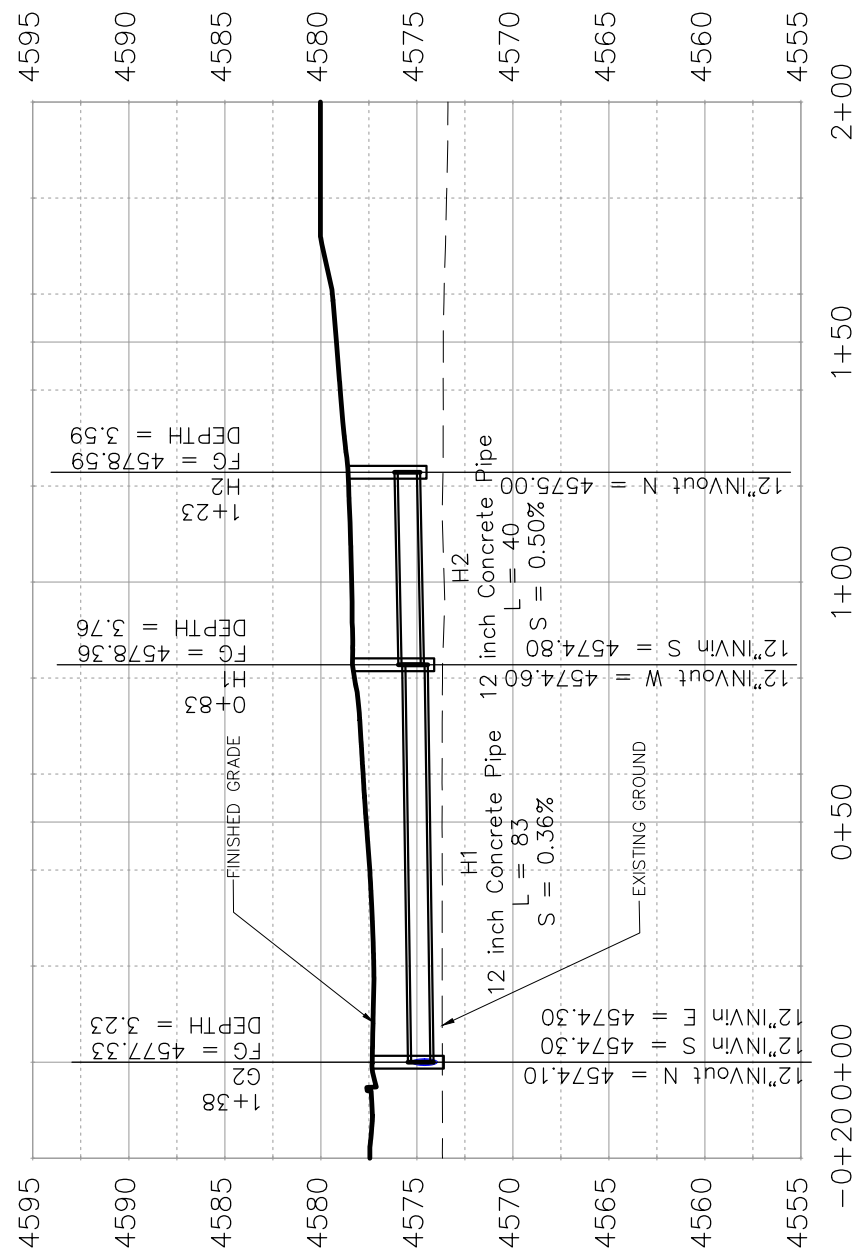
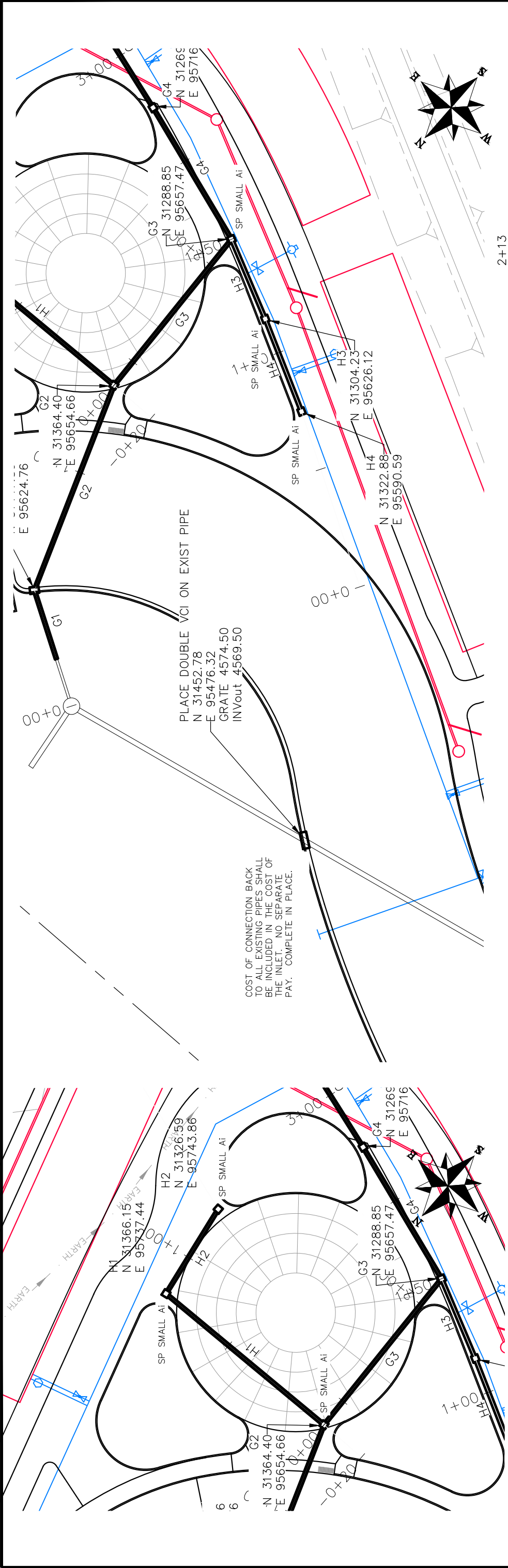


REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	2018
			JCS		
			DESIGNED BY		
			CHECKED BY		
			APPROVED BY		



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 1A
 STORM DRAIN PLAN AND PROFILE



NOTES:
 INLETS SHALL BE SPECIAL SMALL AREA INLETS (SP SMALL AI) PER DETAILS THIS PAGE
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REVISION	DATE	DESCRIPTION

SCALE	DATE	DATE	DATE	DATE
PLAN & PROFILE	2018	2018	2018	2018
HORIZONTAL	0	0	0	0
VERTICAL	2.5	2.5	2.5	2.5

DATE	DATE	DATE	DATE



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 1A
 STORM DRAIN PLAN AND PROFILE

REVISION	DESCRIPTION	DATE
REVISION		
REVISION		
REVISION		

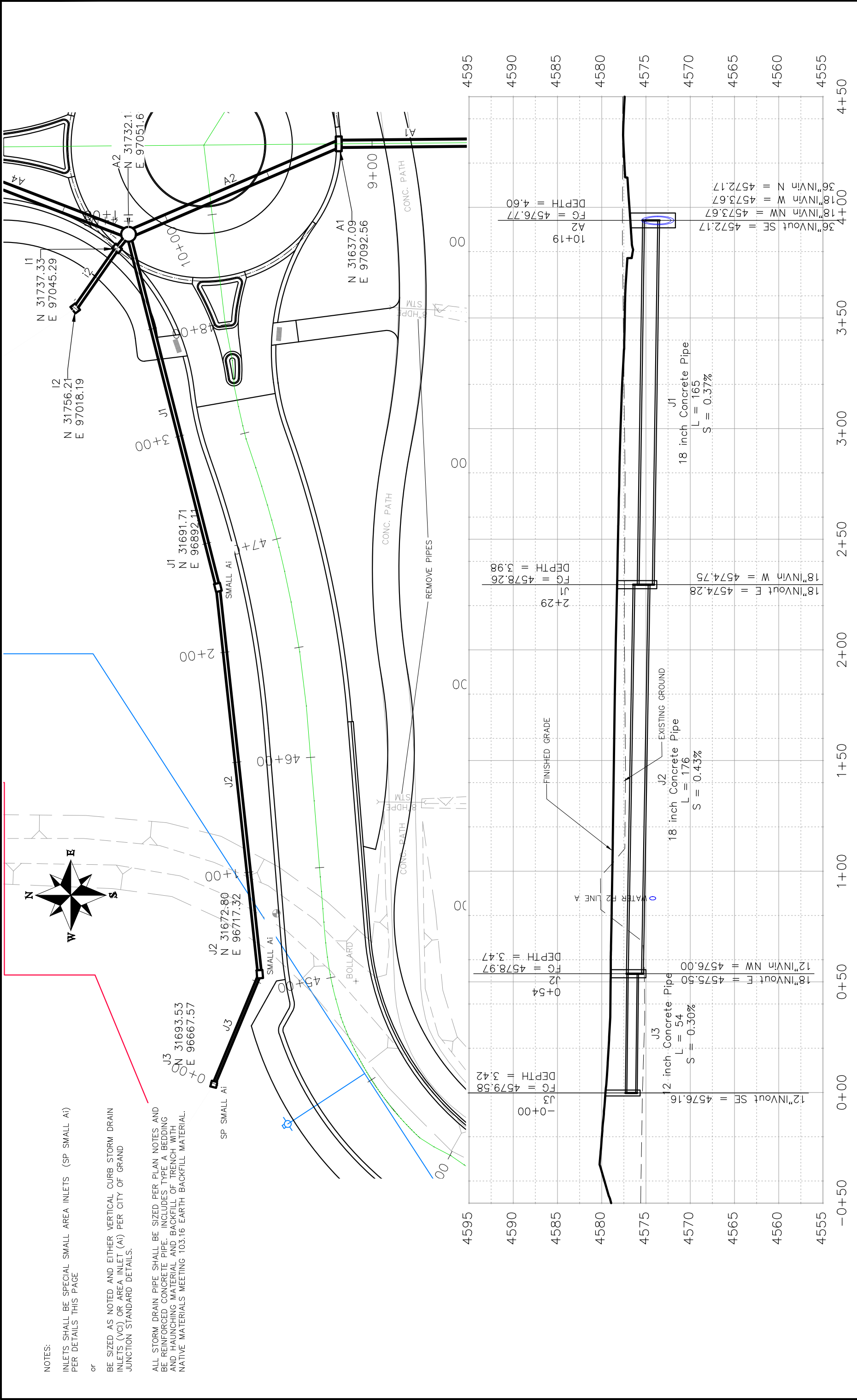
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JCS	2018
DESIGNED BY	DATE
JCS	2018
CHECKED BY	DATE
TCP	2018
APPROVED BY	DATE
TCP	2018

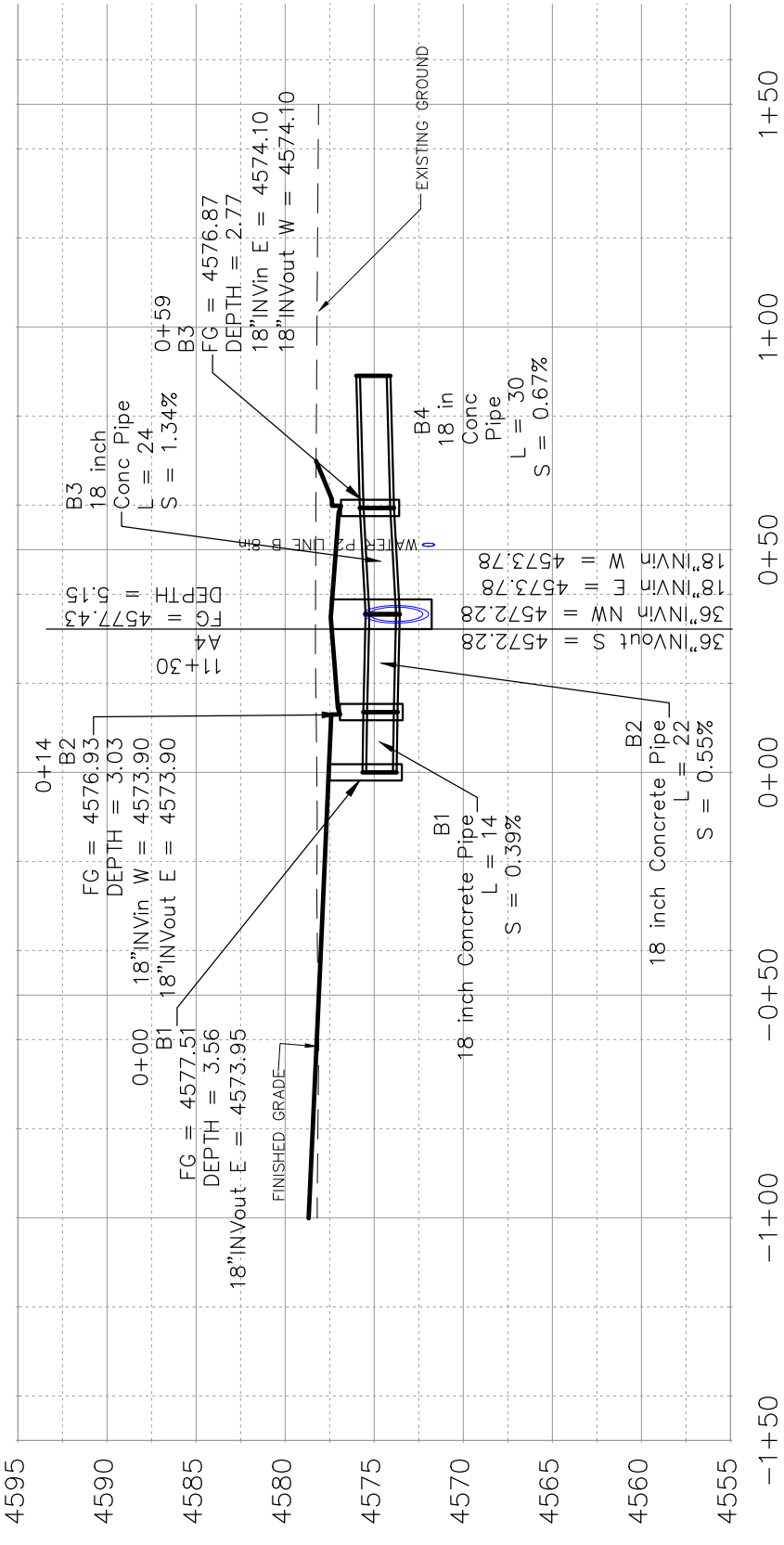
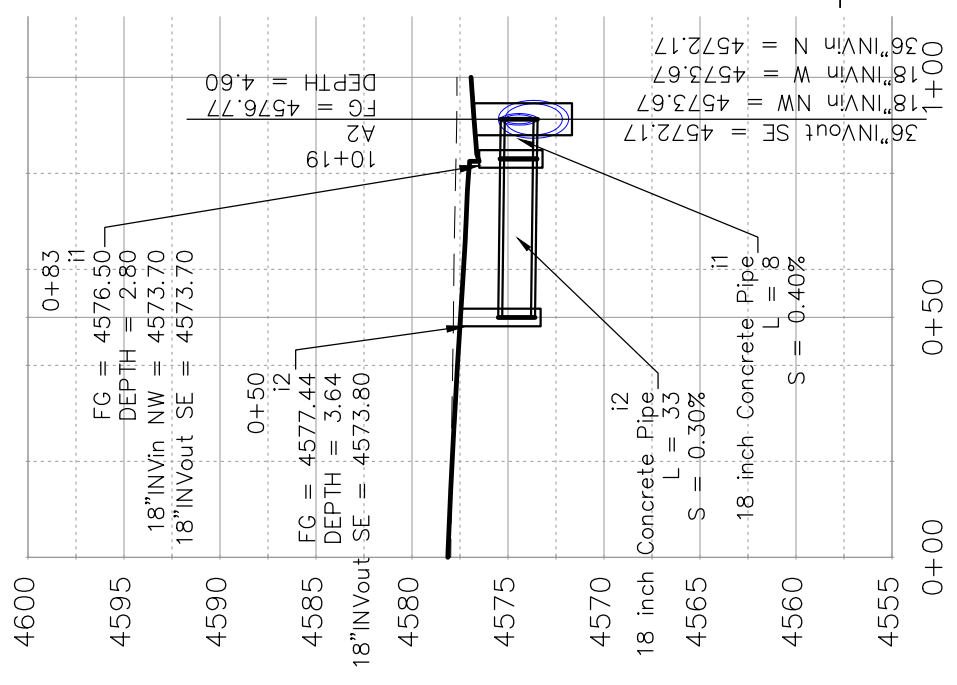
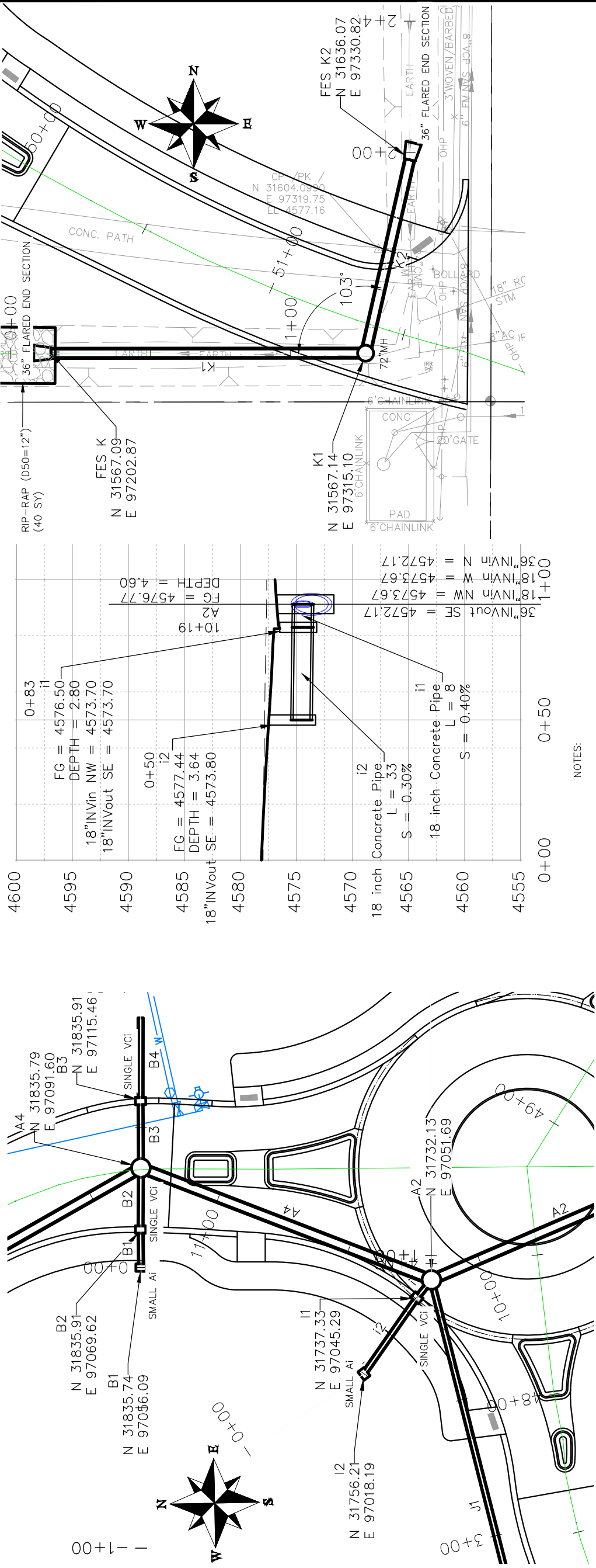
SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 1A
STORM DRAIN PLAN AND PROFILE





NOTES:
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REVISION	DATE	DRAWN BY	JCS	DATE	2018
REVISION	DATE	DESIGNED BY	JCS	DATE	2018
REVISION	DATE	CHECKED BY	TOP	DATE	2018
REVISION	DATE	APPROVED BY	TOP	DATE	2018

DESCRIPTION

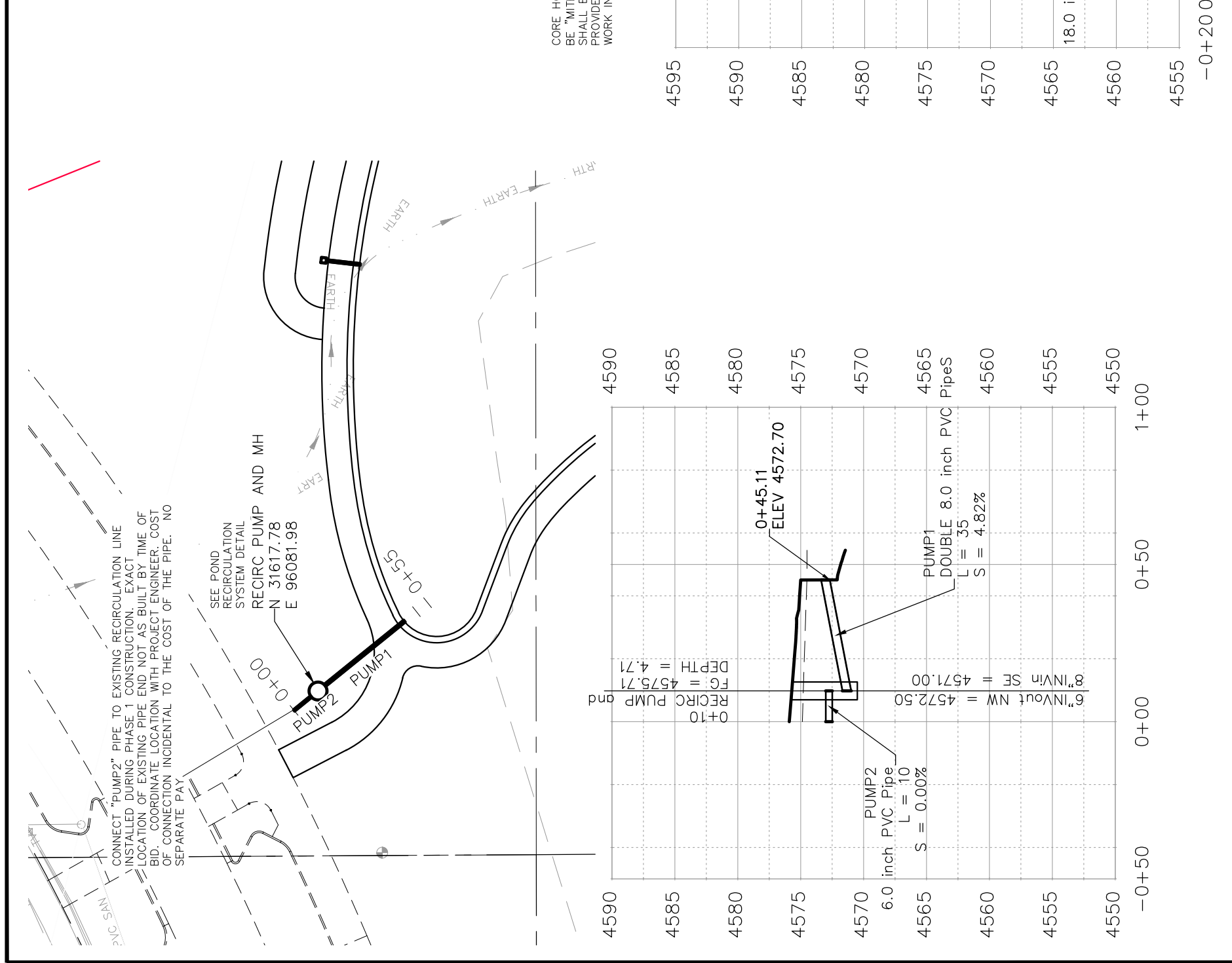
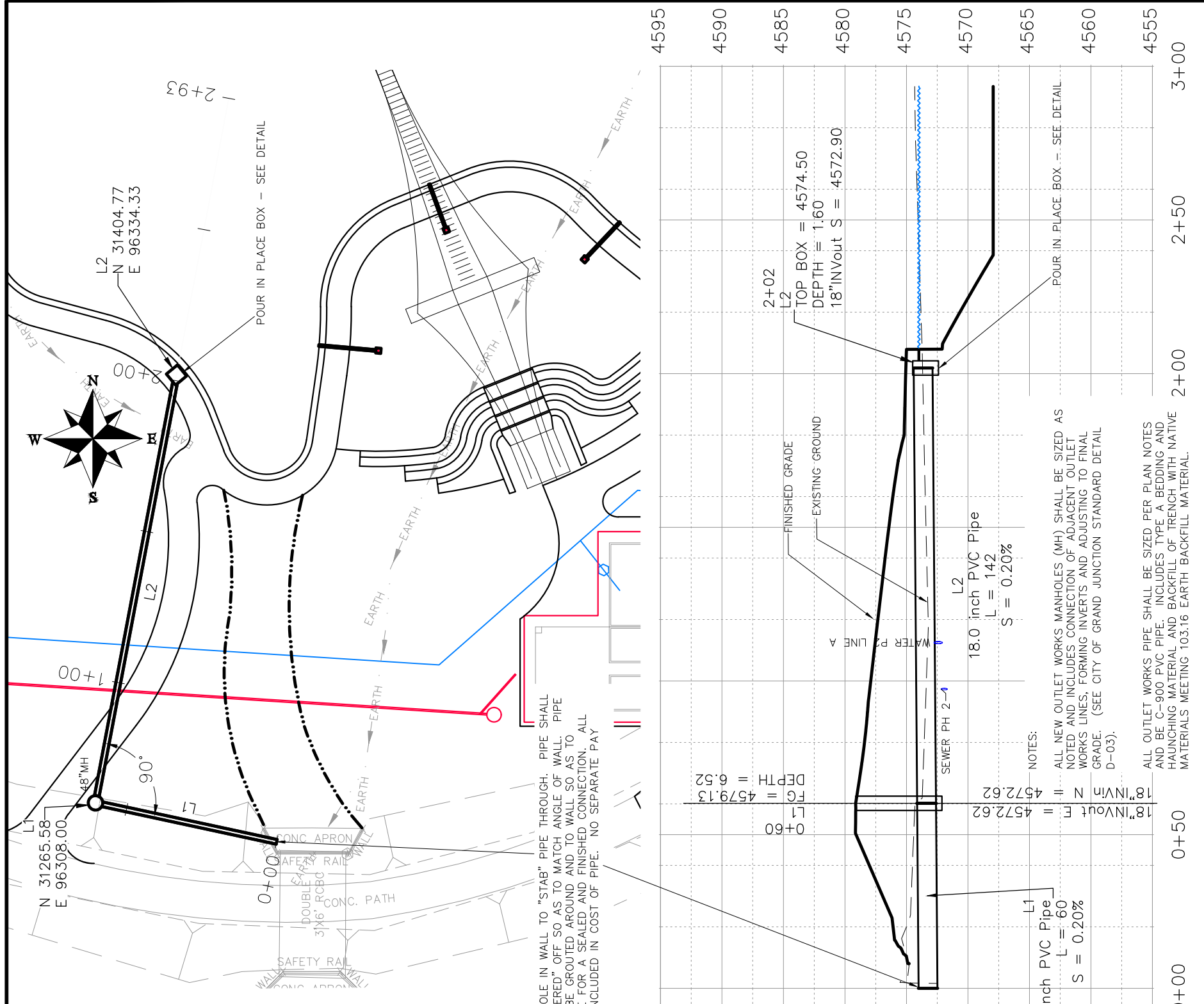
SCALE: PLAN & PROFILE: 1" = 20' HORIZONTAL, 1" = 2.5' VERTICAL

CITY OF **Grand Junction** COLORADO

PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2 STORM DRAIN PLAN AND PROFILE

24

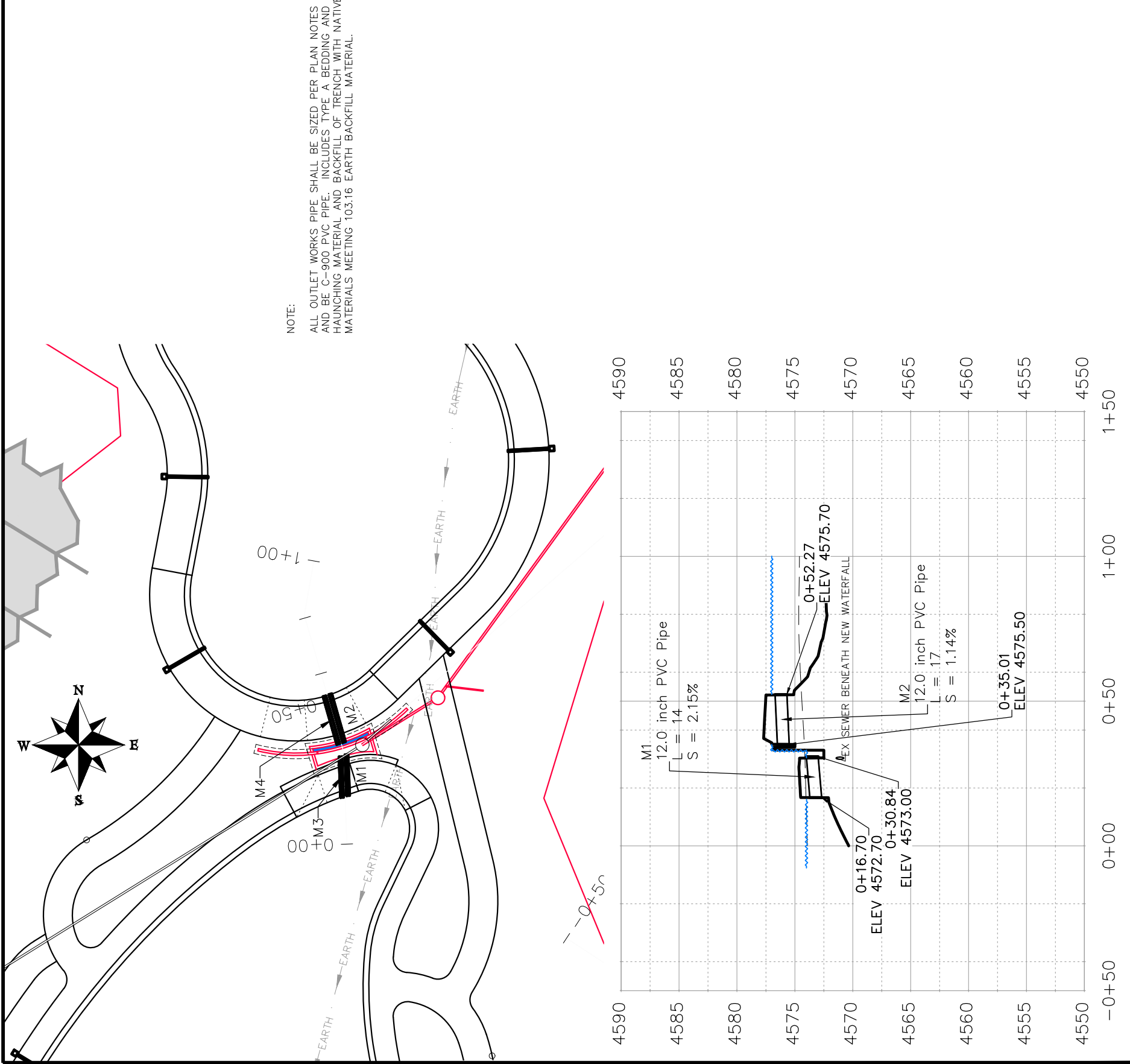
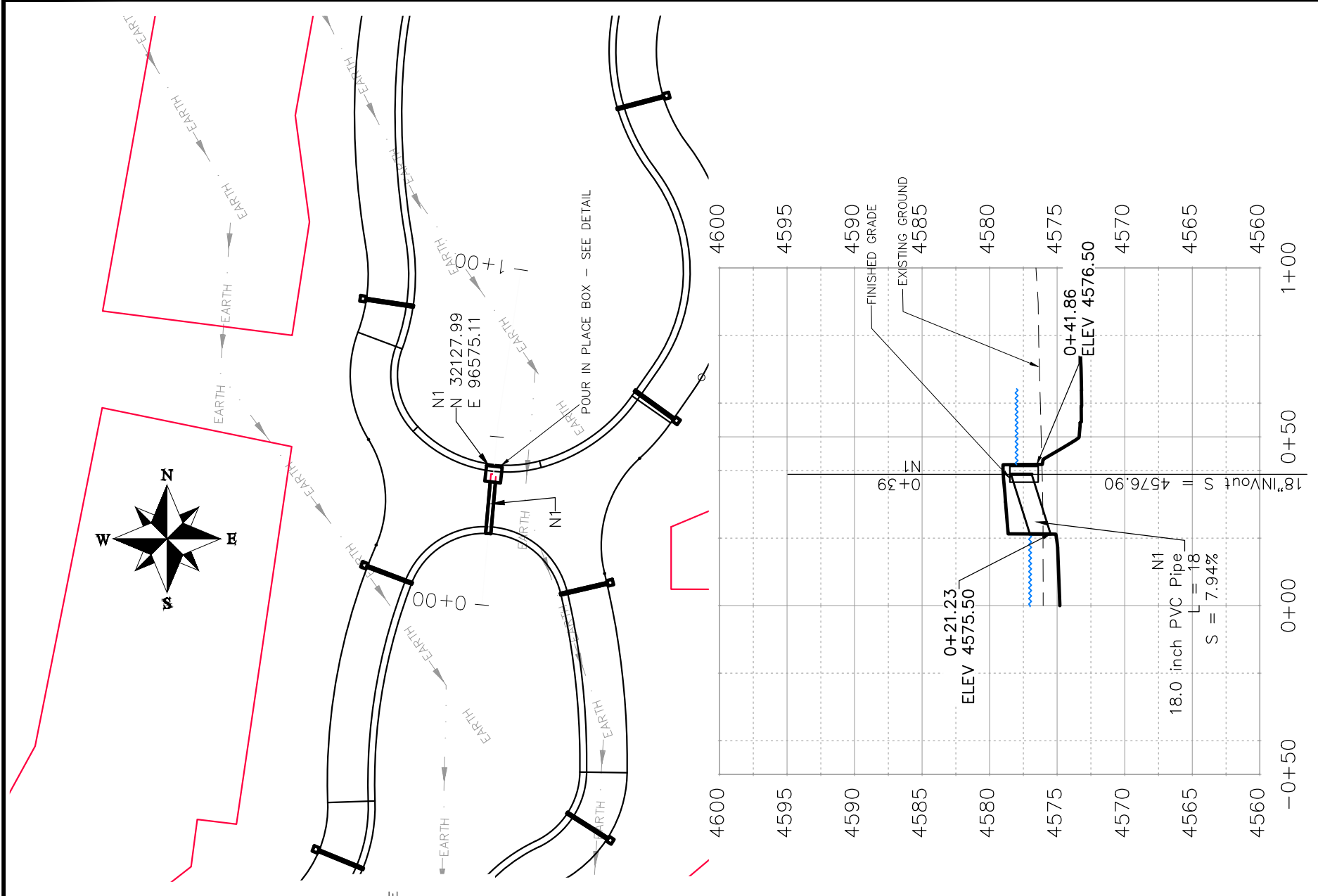


REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	2018
			JCS	2018	
			JCS	2018	
			TOP	2018	
			TOP	2018	



PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2 OUTLET WORKS PLAN AND PROFILE



NOTE:
 ALL OUTLET WORKS PIPE SHALL BE SIZED PER PLAN NOTES AND BE C-900 PVC PIPE. INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

REVISION	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018
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REVISION			CHECKED BY	TCP	DATE	2018
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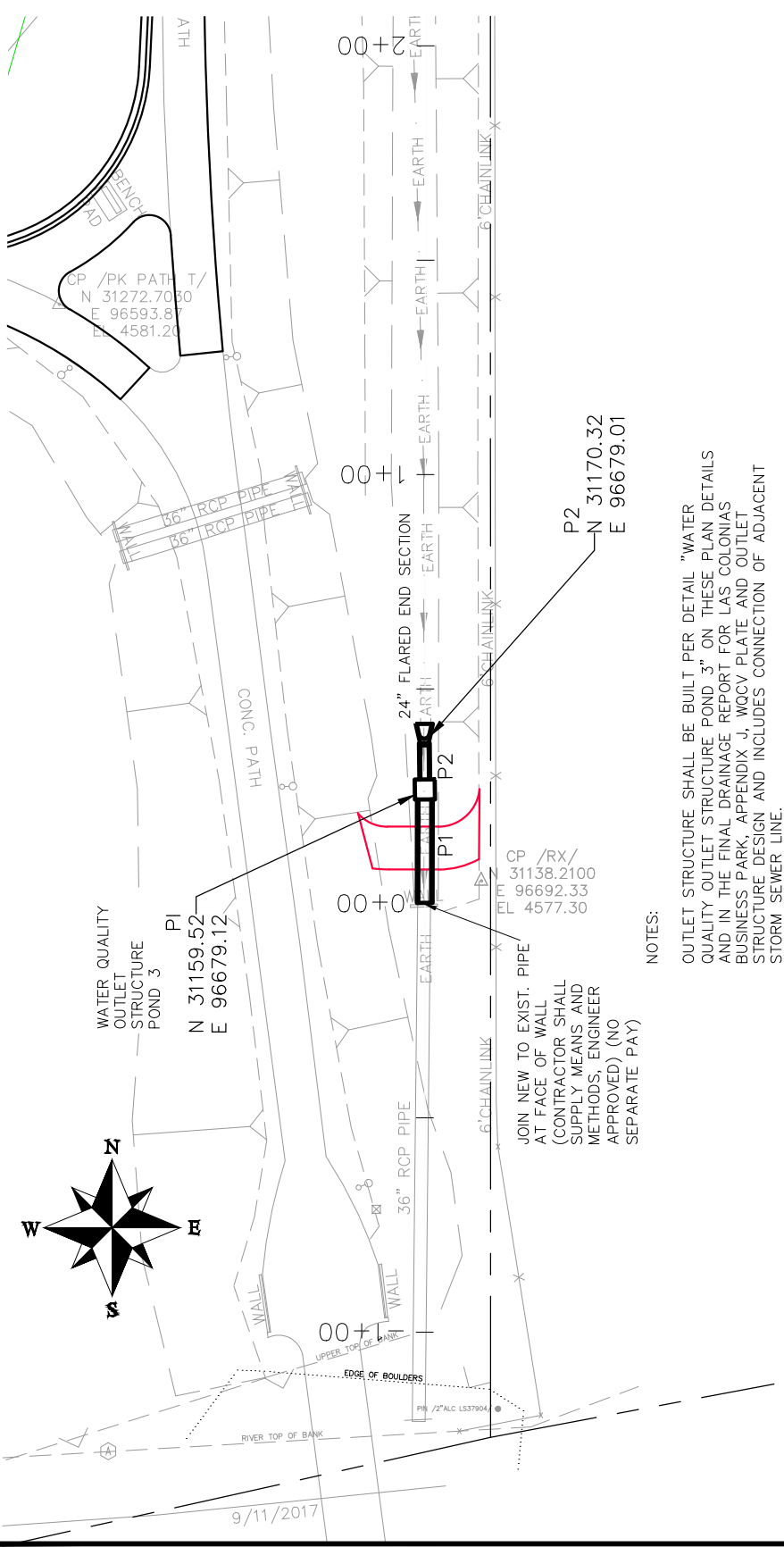
SCALES:
 PLAN & PROFILE: 1" = 10'
 HORIZONTAL: 1" = 10'
 VERTICAL: 1" = 2.5'

Grand Junction
 CITY OF COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 OUTLET WORKS PLAN AND PROFILE

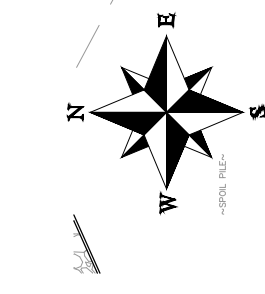
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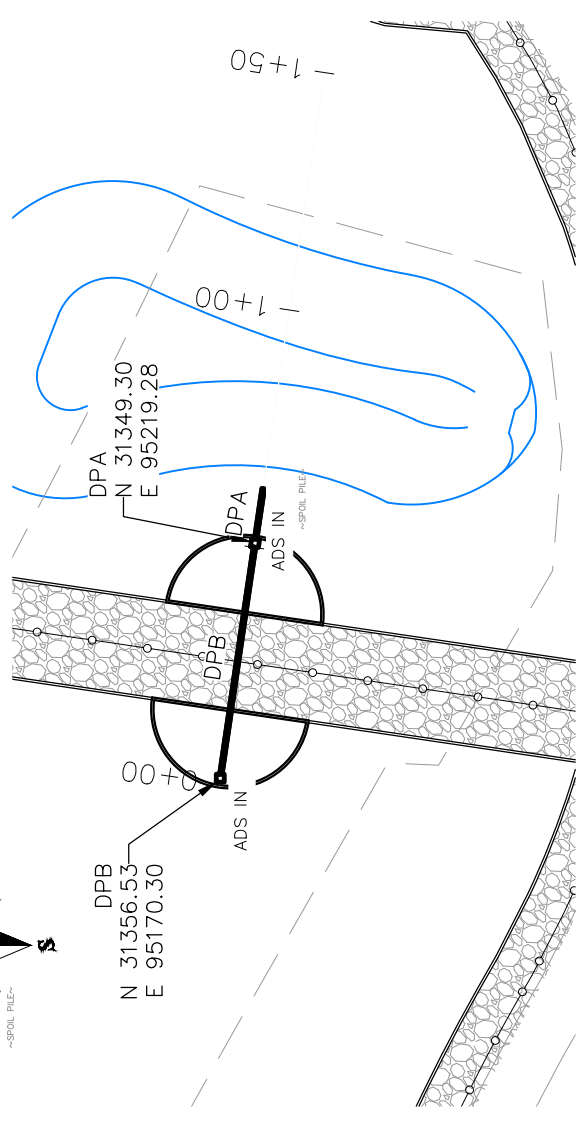
NOTES:

OUTLET STRUCTURE SHALL BE BUILT PER DETAIL "WATER QUALITY OUTLET STRUCTURE POND 3" ON THESE PLAN DETAILS AND IN THE FINAL DRAINAGE REPORT FOR LAS COLONIAS BUSINESS PARK, APPENDIX J, WOVY PLATE AND OUTLET STRUCTURE DESIGN AND INCLUDES CONNECTION OF ADJACENT STORM SEWER LINE.

ALL STORM DRAIN PIPE SHALL BE SIZED PER PLAN NOTES AND BE REINFORCED CONCRETE PIPE. INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.



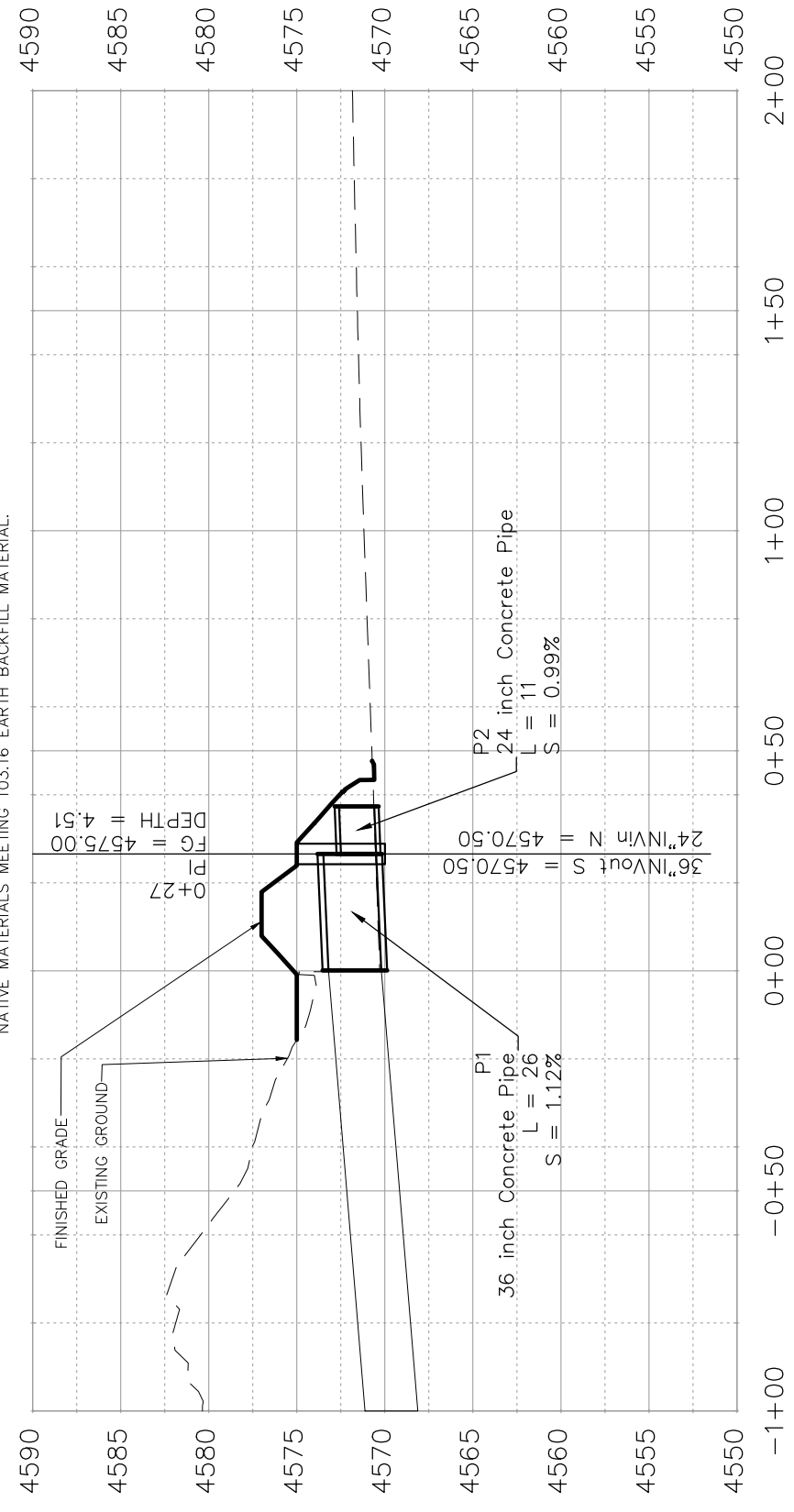
DPB
 N 31356.53
 E 95170.30



NOTE:

ALL ADS AREA DRAIN INLETS (ADS IN) SHALL BE ADS BRAND 12"x12" INLETS OR ENGINEER APPROVED EQUAL. INCLUDES CONNECTION OF PIPE AND ALL OTHER NECESSARY WORK. COMPLETE IN PLACE

ALL ADS AREA DRAIN PIPES SHALL BE 6" C-900 PVC PIPE. INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

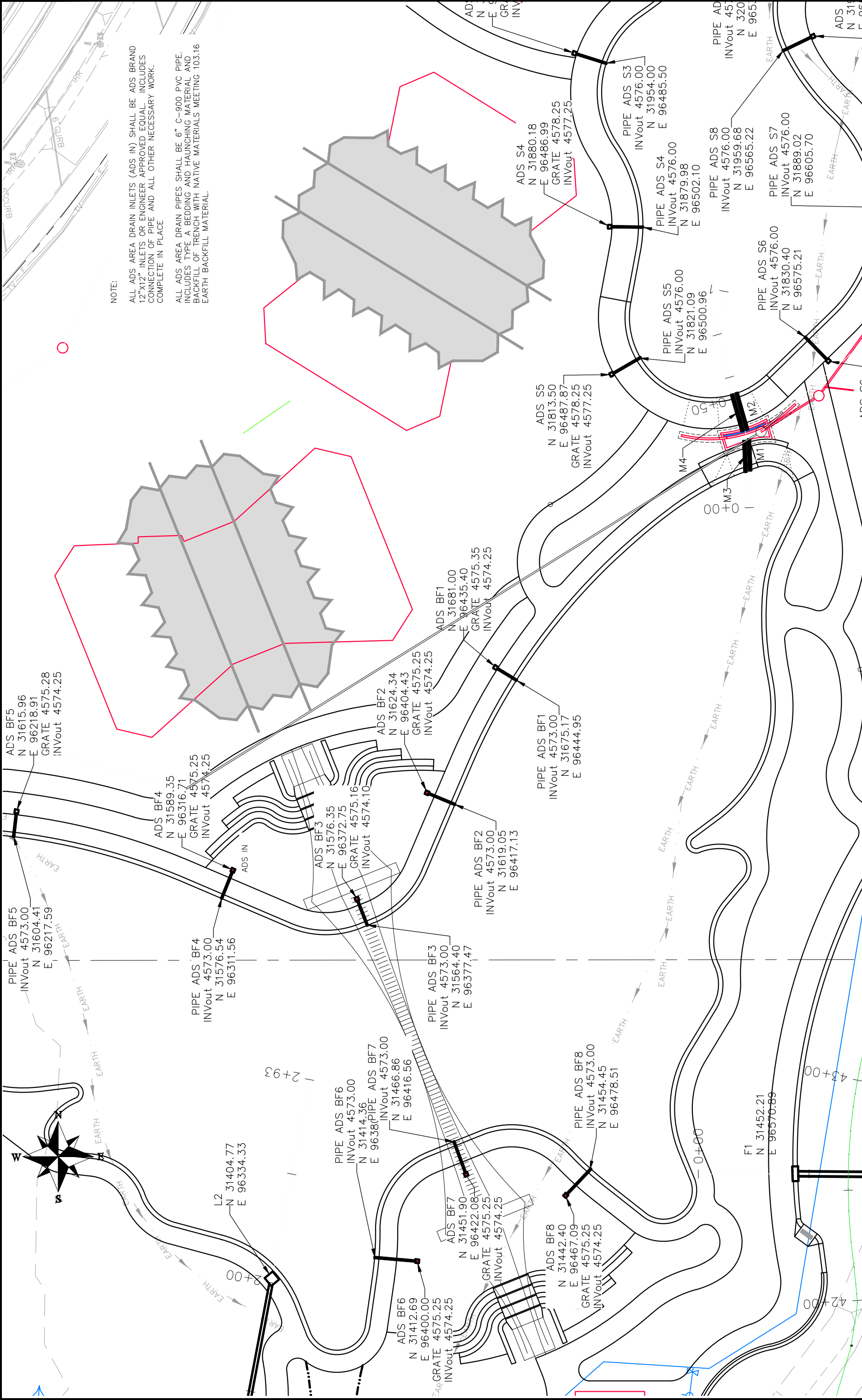


REVISION	DATE	DATE	DATE
△		2018	2018
△		2018	2018
△		2018	2018
△		2018	2018

CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 OUTLET WORKS PLAN AND PROFILE



NOTE:
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 ALL ADS AREA DRAIN PIPES SHALL BE 6" C-900-PVC PIPE. INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.16 EARTH BACKFILL MATERIAL.

REVISION	DATE	DESCRIPTION

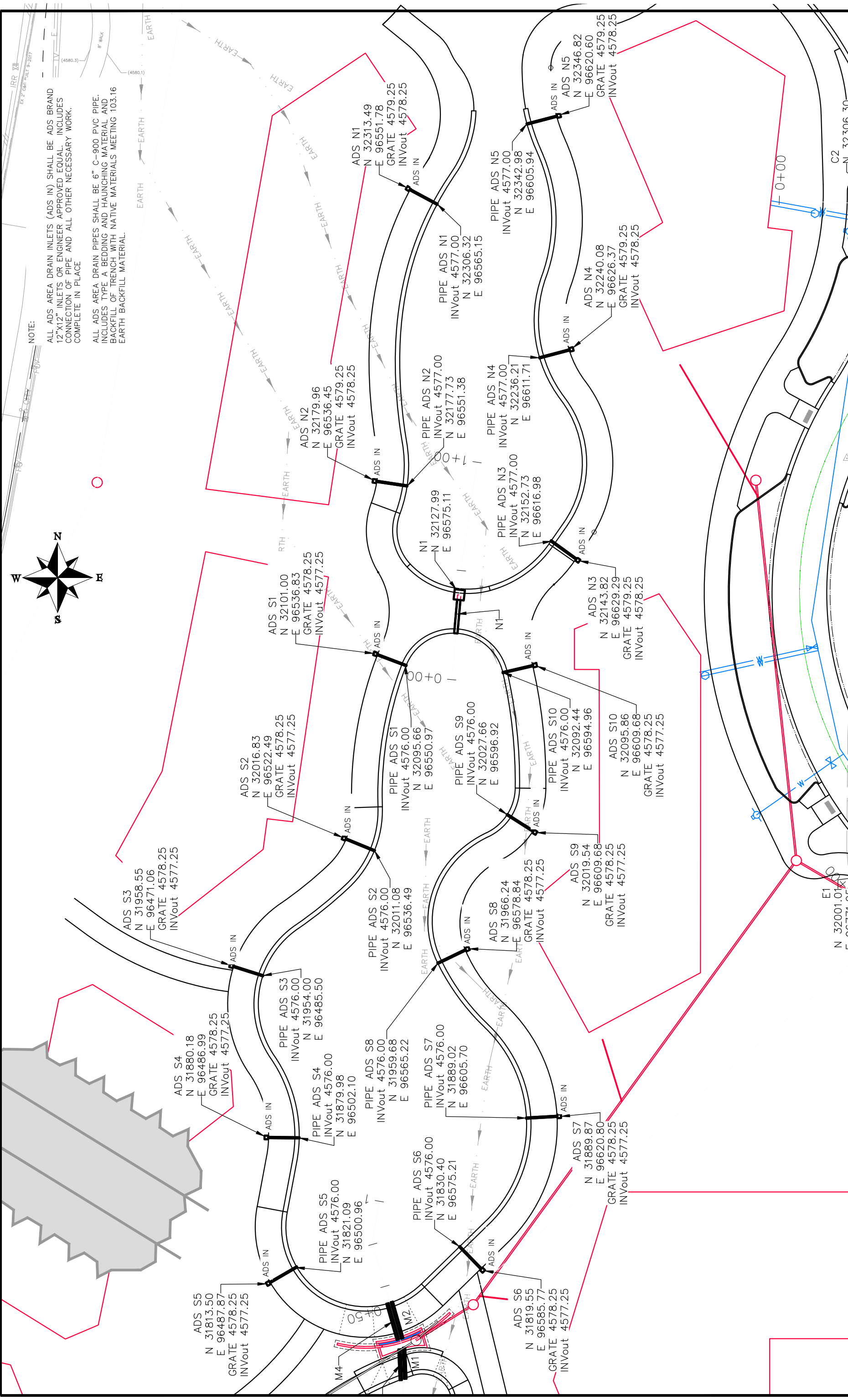
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

PLAN & PROFILE	SCALE
HORIZONTAL	1" = 10'
VERTICAL	1" = 2.5'



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 ADS AREA DRAIN PLAN



NOTE:

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REVISION	DATE	DESCRIPTION

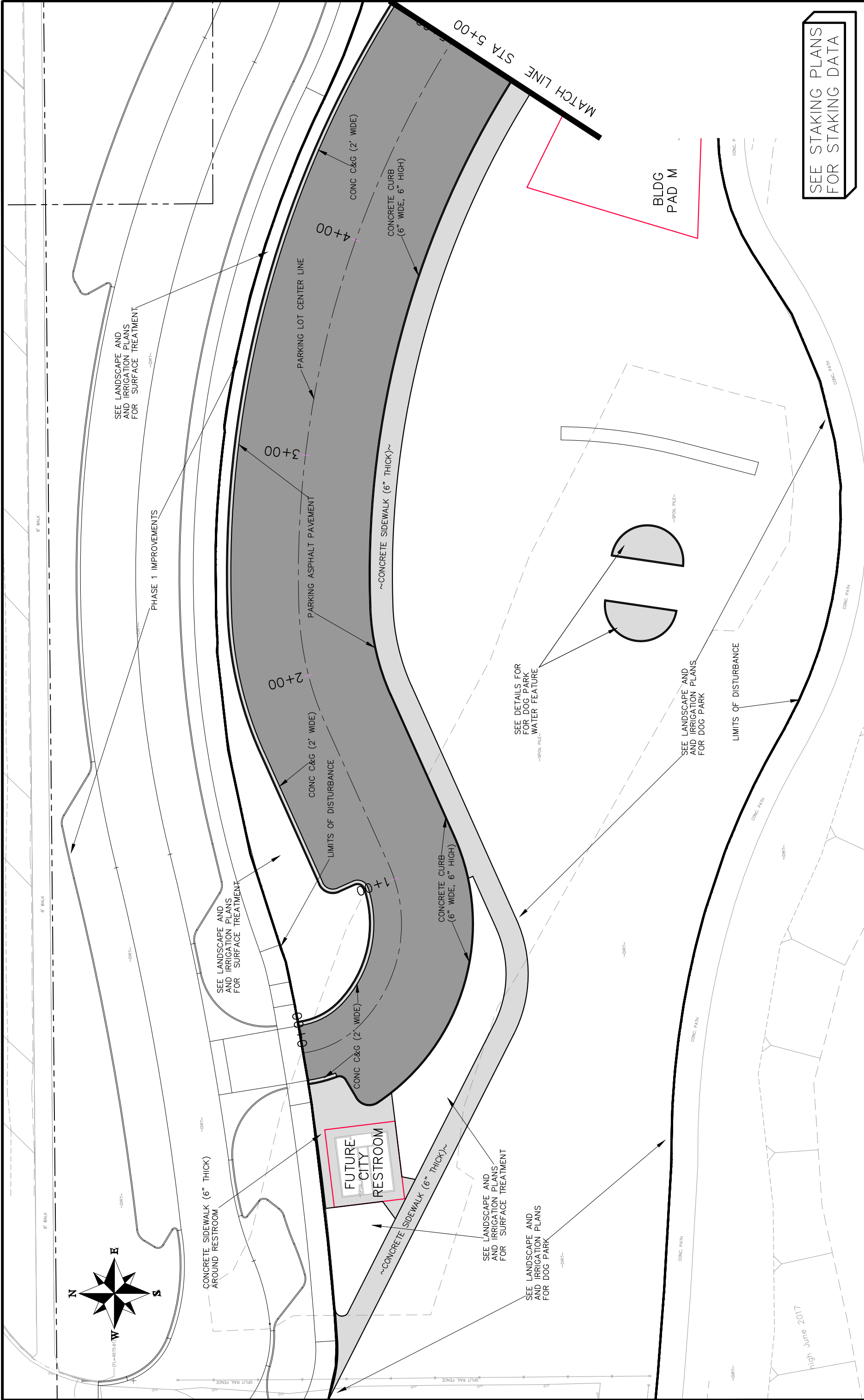
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCF	DATE	2018
APPROVED BY	TCF	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 20'
HORIZONTAL	1" = 40'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
ADS AREA DRAIN PLAN



SEE STAKING PLANS FOR STAKING DATA

REVISION	DESCRIPTION	DATE
REVISION		
REVISION		
REVISION		

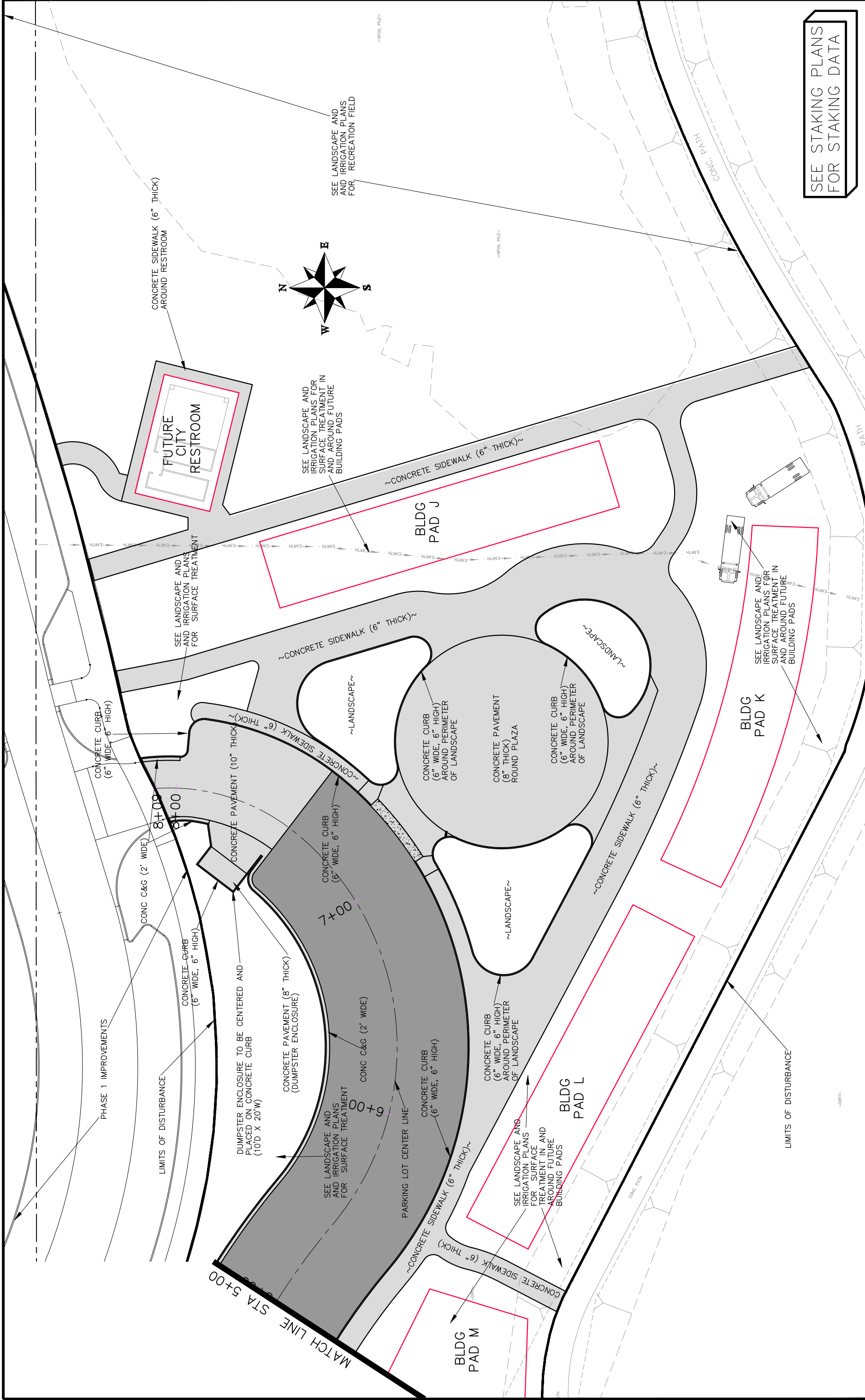
CITY OF
Grand Junction
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Improvement Plan

SCALE	DATE	DATE
PLAN & PROFILE	2017	2017
HORIZONTAL	2017	2017
VERTICAL	2017	2017

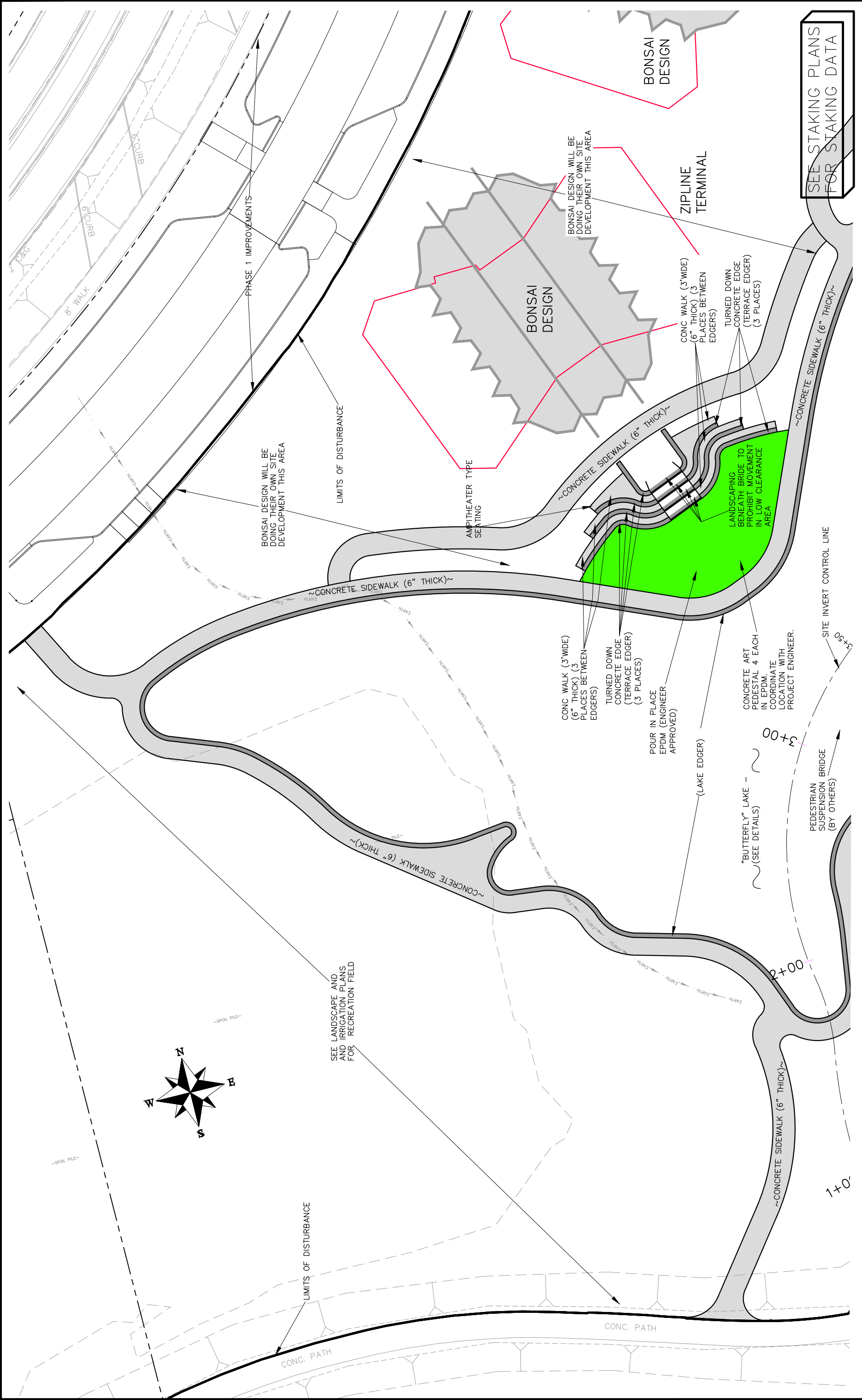
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CHECKED BY	DATE
TOP	2017
APPROVED BY	DATE
TOP	2017



REVISION Δ	DATE	DRAWN BY JCS	DATE 2017
REVISION Δ		DESIGNED BY JCS	DATE 2017
REVISION Δ		CHECKED BY TCP	DATE 2017
REVISION Δ		APPROVED BY TCP	DATE 2017

SCALES: PLAN & PROFILE 1" = 10' HORIZONTAL
 1" = 4' VERTICAL
 1" = 10' VERTICAL

CITY OF **Grand Junction** COLORADO
 PUBLIC WORKS ENGINEERING DIVISION
 Las Colonias Business Park Phase 2 Improvement Plan
 31

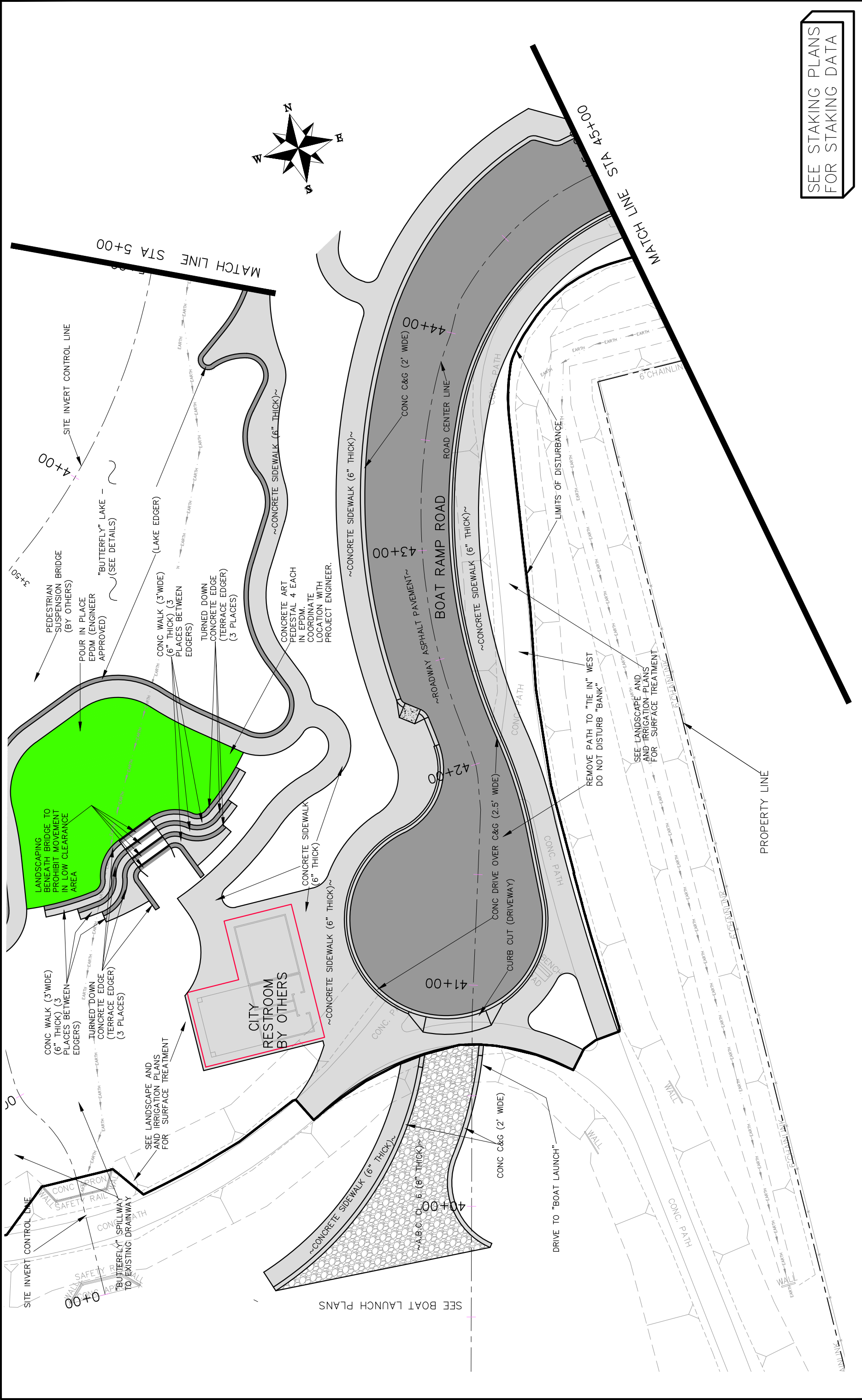


REVISION	DATE	DESCRIPTION
REVISION	2017	
REVISION	2017	
REVISION	2017	

CITY OF
Grand Junction
 COLORADO

**PUBLIC WORKS
ENGINEERING DIVISION**

**Las Colonias Business Park Phase 2
Improvement Plan**



SEE STAKING PLANS FOR STAKING DATA

REVISION	DATE	DESCRIPTION

DRAWN BY	JCS	DATE	2017
DESIGNED BY	JCS	DATE	2017
CHECKED BY	TOP	DATE	2017
APPROVED BY	TOP	DATE	2017

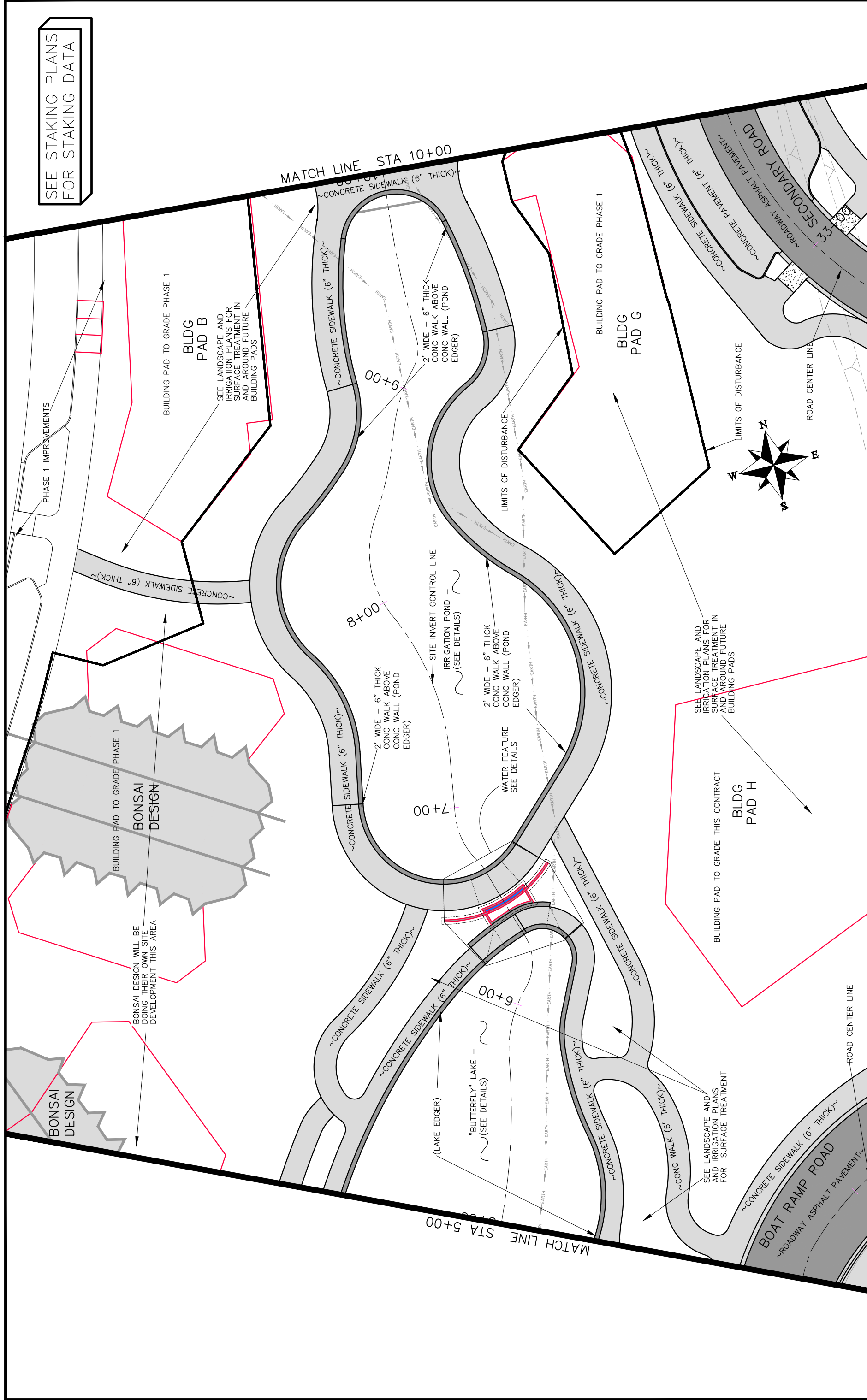
SCALE:	PLAN & PROFILE
0	10
0	40
0	NA
0	NA



PUBLIC WORKS ENGINEERING DIVISION

Las Colonias Business Park Phase 2 Improvement Plan

SEE STAKING PLANS FOR STAKING DATA



BONSAI DESIGN

BONSAI DESIGN WILL BE DOING THEIR OWN SITE DEVELOPMENT THIS AREA

BONSAI DESIGN

BUILDING PAD TO GRADE PHASE 1

BLDG PAD B

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT IN AND AROUND FUTURE BUILDING PADS

MATCH LINE STA 10+00

9+00

8+00

7+00

6+00

MATCH LINE STA 5+00

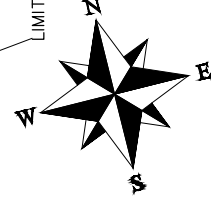
BUILDING PAD TO GRADE PHASE 1

BLDG PAD G

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT IN AND AROUND FUTURE BUILDING PADS

BUILDING PAD TO GRADE THIS CONTRACT

BLDG PAD H



LIMITS OF DISTURBANCE

ROAD CENTER LINE

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~ROADWAY ASPHALT PAVEMENT~

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT

SEE LANDSCAPE AND IRRIGATION PLANS FOR SURFACE TREATMENT

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~CONCRETE SIDEWALK (6\"/>

~ROADWAY ASPHALT PAVEMENT~

~ROADWAY ASPHALT PAVEMENT~

~ROADWAY ASPHALT PAVEMENT~

~ROADWAY ASPHALT PAVEMENT~

BOAT RAMP ROAD

SECONDARY ROAD

REVISION	DATE	DESCRIPTION

DATE	DATE	DATE	DATE

DESIGNED BY	CHECKED BY	APPROVED BY
JCS	JCS	TCP

PLAN & PROFILE	SCALE
HORIZONTAL	1\"/>
VERTICAL	1\"/>

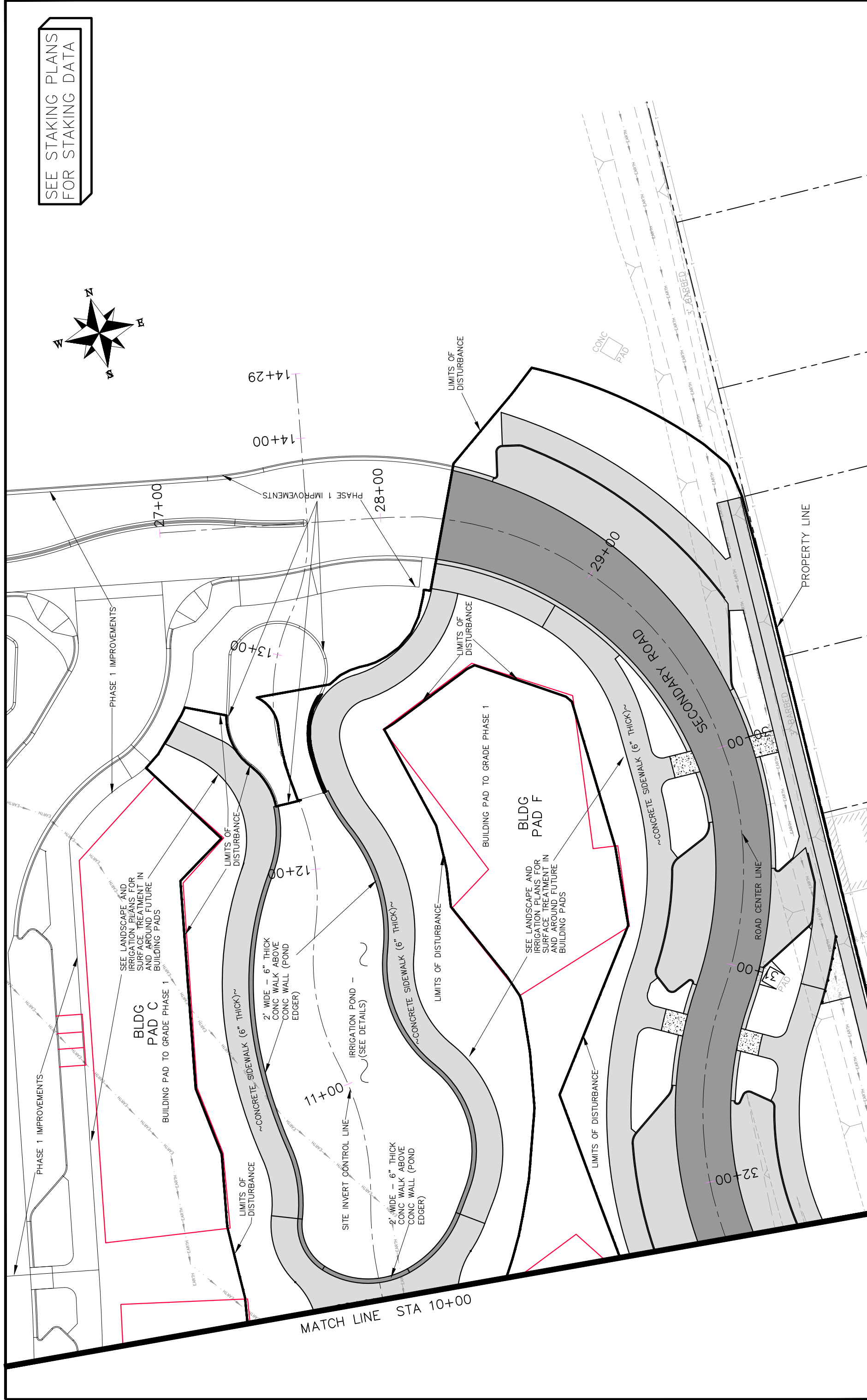
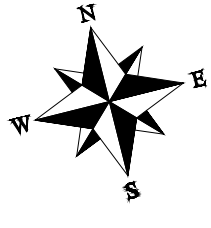


PUBLIC WORKS ENGINEERING DIVISION

Las Colonias Business Park Phase 2 Improvement Plan

N:\landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\IMPROVEMENT PLAN PH2.dwg, 005, 7/3/2018 6:21:38 AM

SEE STAKING PLANS
FOR STAKING DATA



REVISION	DATE	DESCRIPTION
REVISION		
REVISION		
REVISION		

DATE	DATE	DATE	DATE
2017	2017	2017	2017

SCALE:	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL

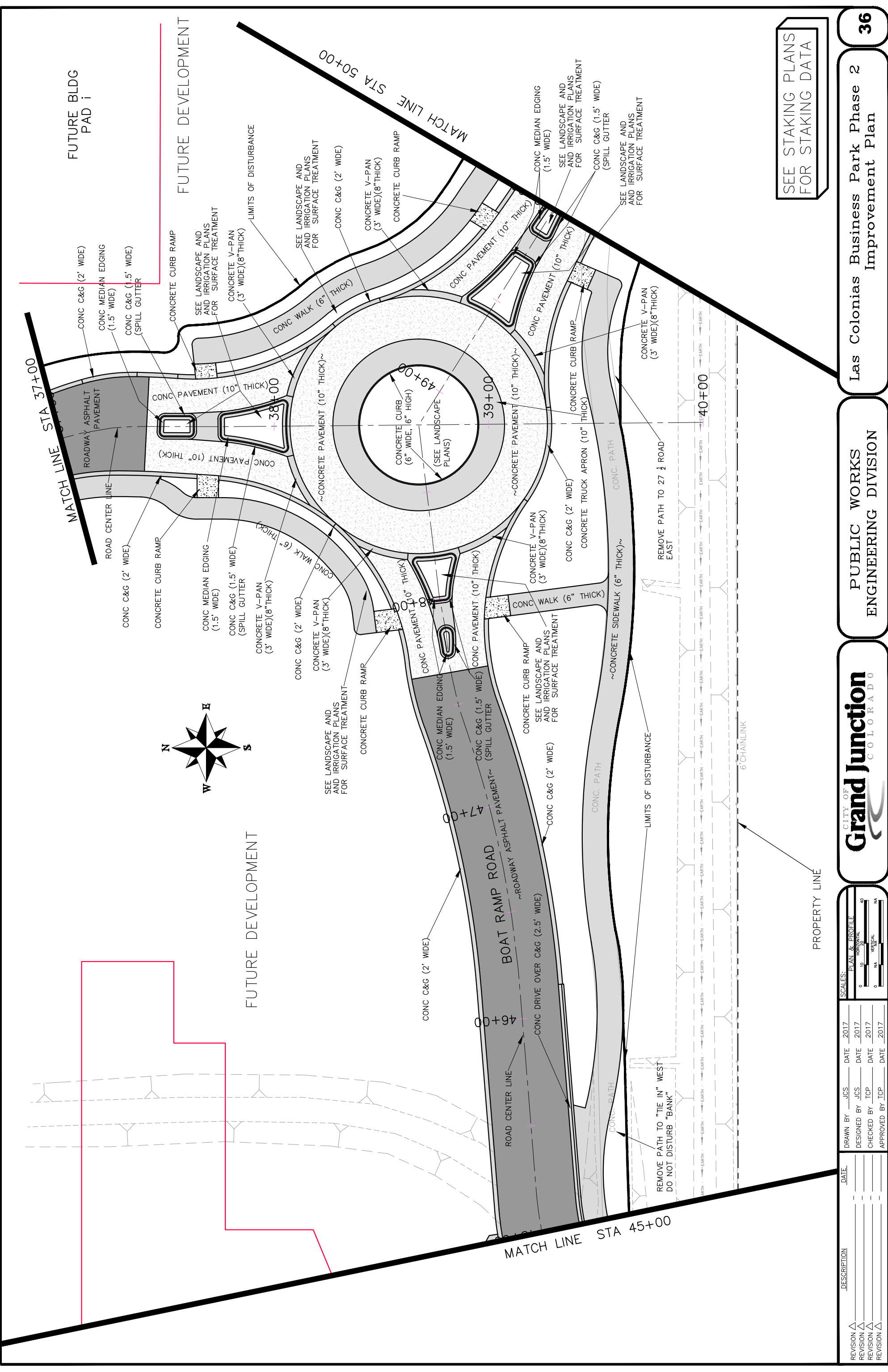
DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
JCS	JCS	TCP	TCP



PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Improvement Plan

35



REVISION	DATE	DESCRIPTION

DRAWN BY	JCS	DATE	2017
DESIGNED BY	JCS	DATE	2017
CHECKED BY	TCP	DATE	2017
APPROVED BY	TCP	DATE	2017

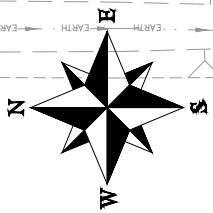
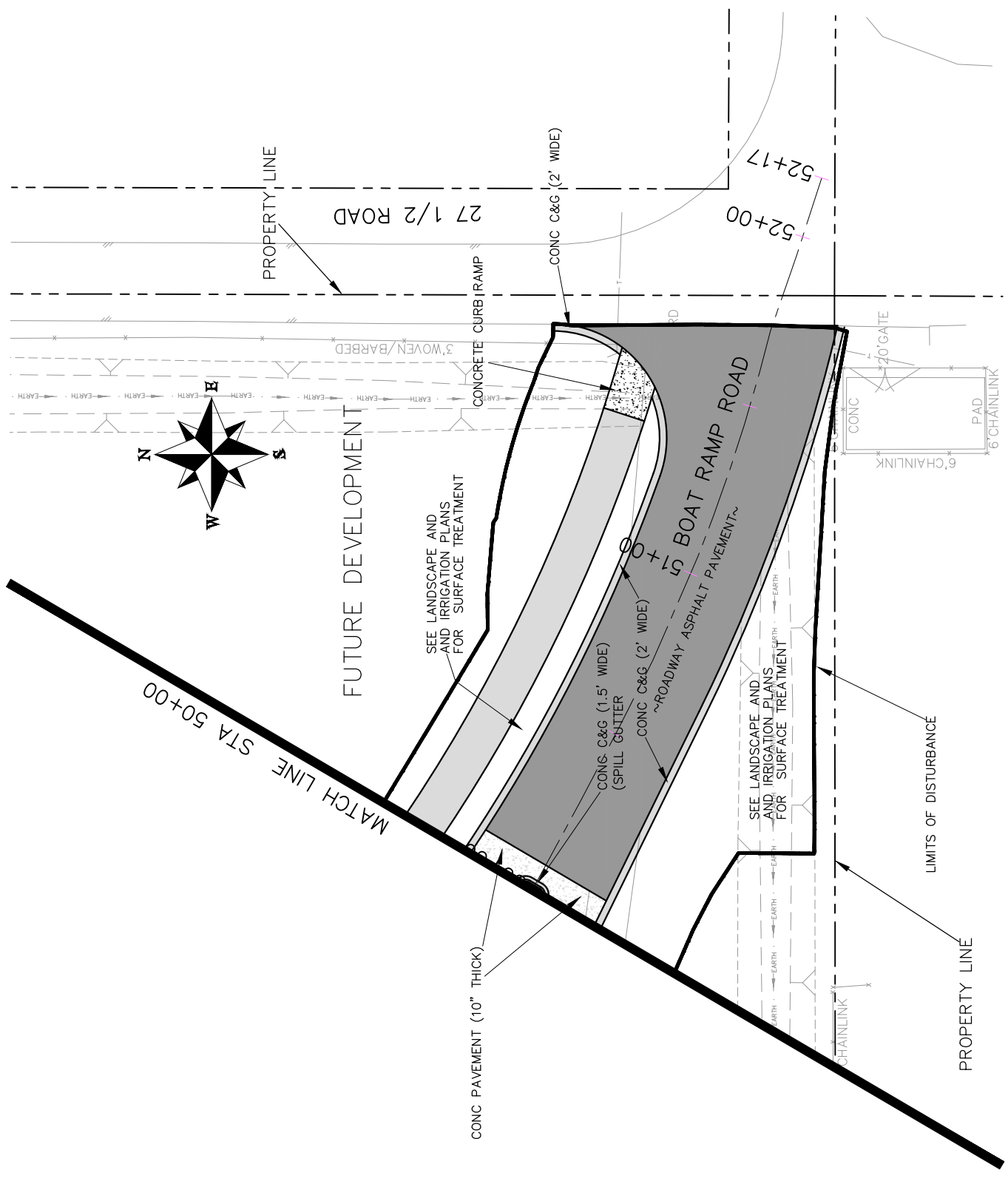
SCALE:	PLAN & PROFILE
0 10 20	HORIZONTAL
0 10 20	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Improvement Plan

36



SEE STAKING PLANS
FOR STAKING DATA

REVISION	DESCRIPTION	DATE
REVISION Δ		
REVISION Δ		
REVISION Δ		

DRAWN BY	JCS	DATE	2017
DESIGNED BY	JCS	DATE	2017
CHECKED BY	TCP	DATE	2017
APPROVED BY	TCP	DATE	2017

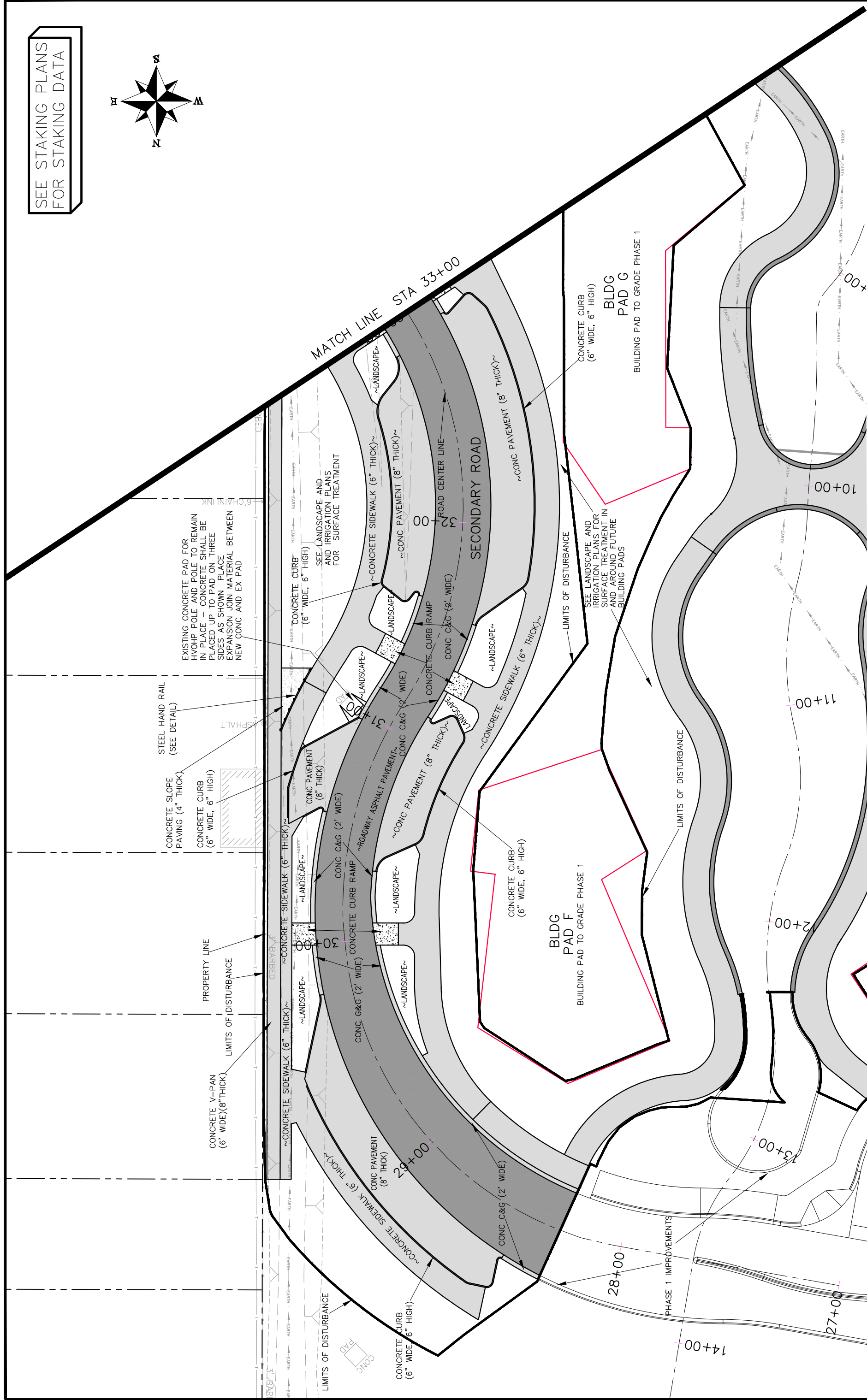
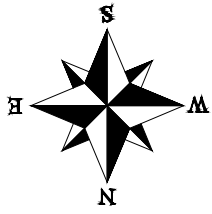
PLAN & PROFILE	SCALE
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Improvement Plan

SEE STAKING PLANS
FOR STAKING DATA



N:\Landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\IMPROVEMENT PLAN PH2.dwg, 009, 7/3/2018 6:21:53 AM

REVISION	DATE	DESCRIPTION

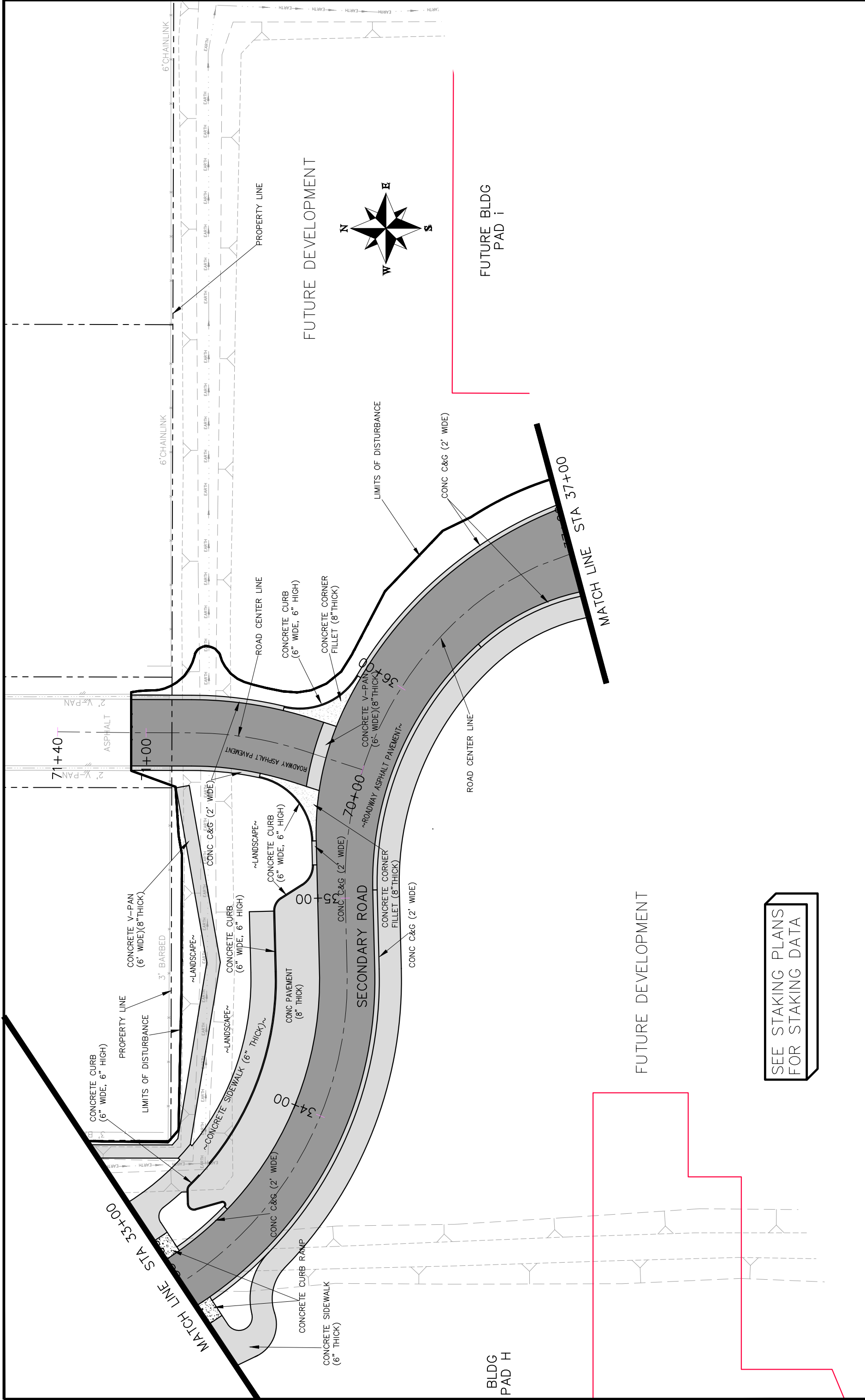
CITY OF
Grand Junction
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Improvement Plan

SCALE:	DATE	DATE
PLAN & PROFILE	2017	2017
HORIZONTAL	1" = 40'	2017
VERTICAL	1" = 4'	2017

DRAWN BY	DATE
JCS	2017
DESIGNED BY	DATE
JCS	2017
CHECKED BY	DATE
TOP	2017
APPROVED BY	DATE
TOP	2017



SEE STAKING PLANS
FOR STAKING DATA

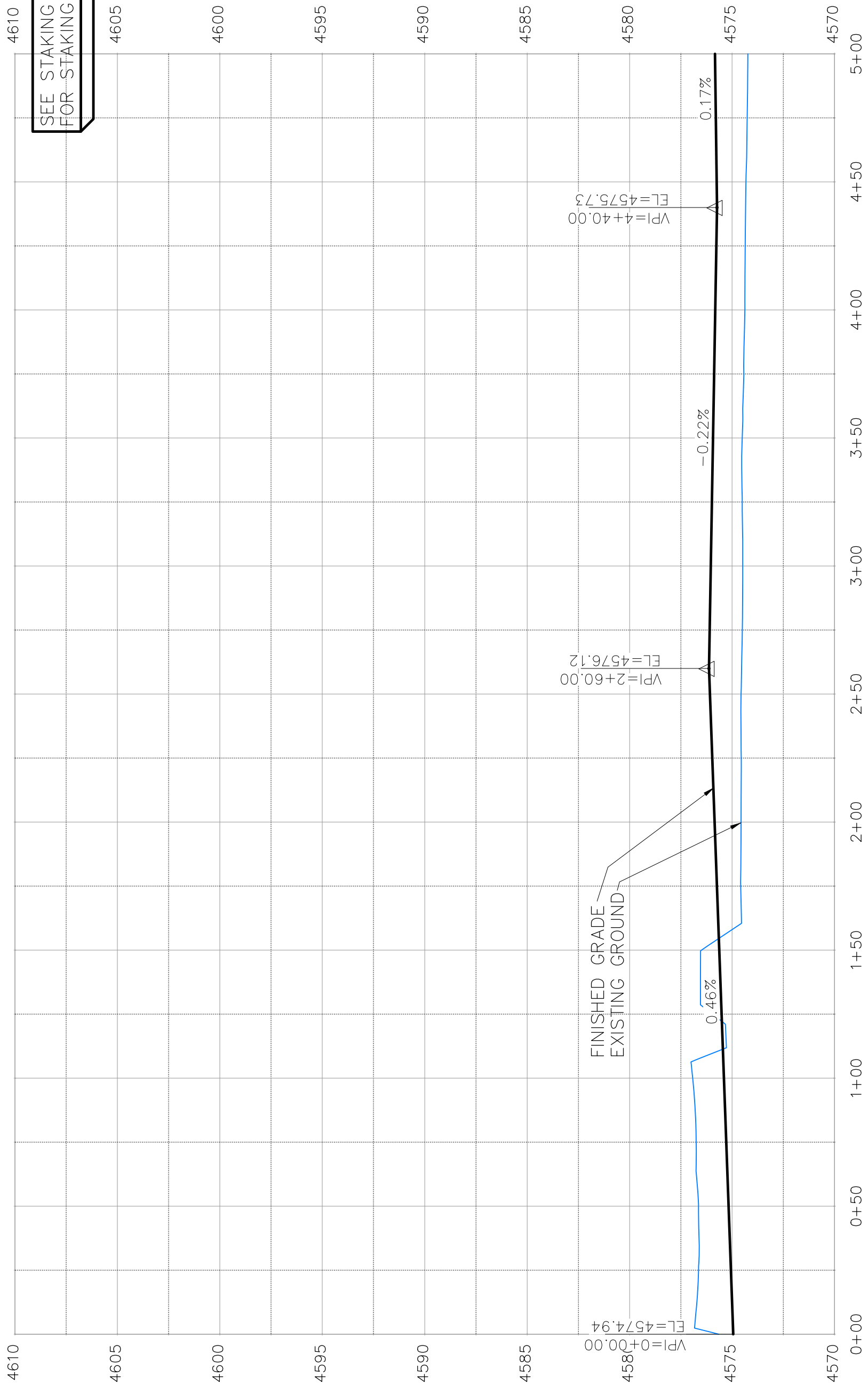
REVISION	DATE	DESCRIPTION

SCALE:	PLAN & PROFILE
0	0
10	10
20	20
30	30
40	40
50	50
60	60
70	70
80	80
90	90
100	100

DRAWN BY	DATE	DATE
JCS	2017	2017
JCS	2017	2017
JCS	2017	2017



PUBLIC WORKS
ENGINEERING DIVISION



PLAZA PARKING LOT VIEW 1

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

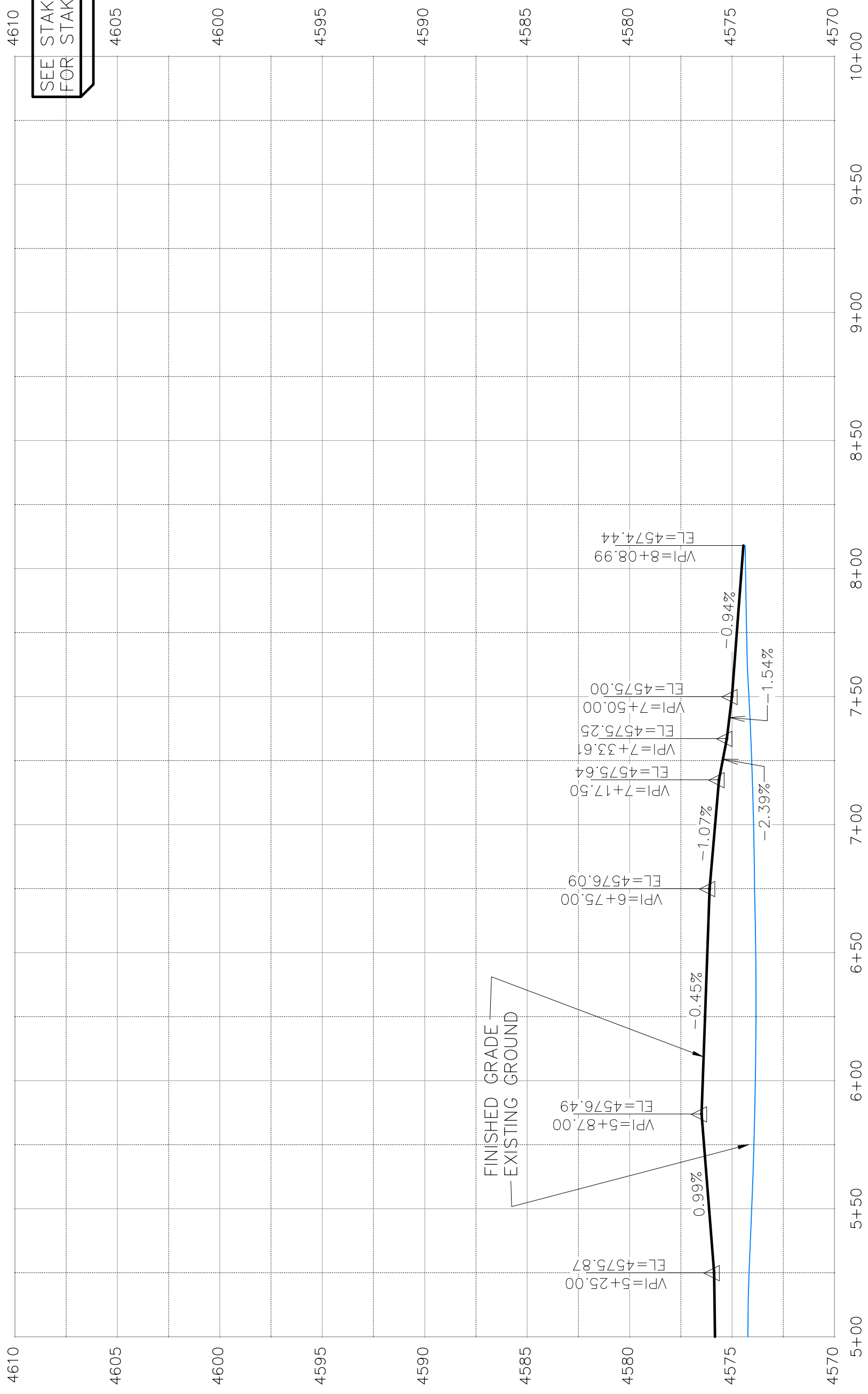
SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE

SEE STAKING PLANS
FOR STAKING DATA



PLAZA PARKING LOT VIEW 2

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

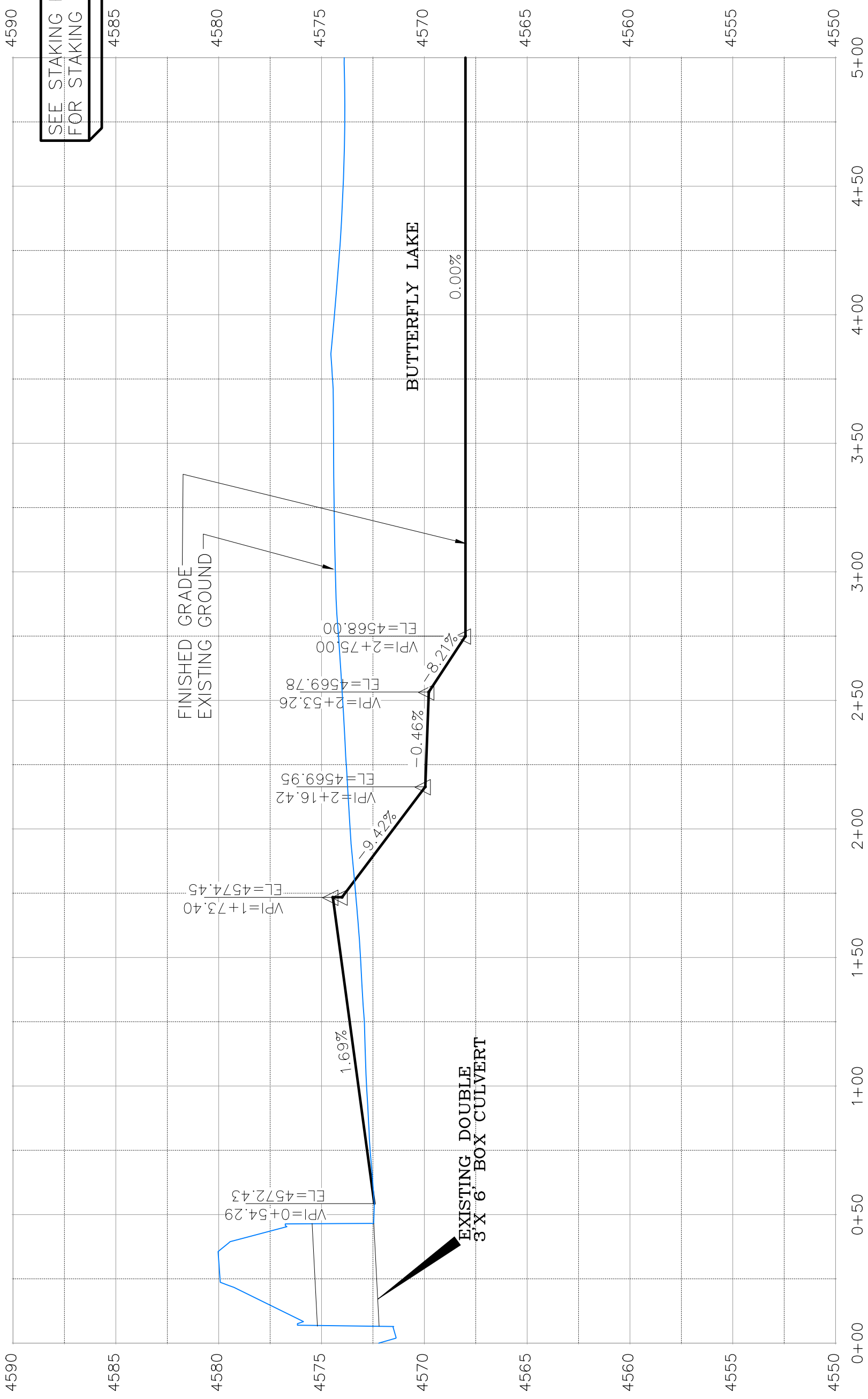
SCALE:	PLAN & PROFILE
0	10
0	1.25
0	1.25
0	1.25



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE

N:\landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\SITE PROFILE PH II.dwg, (002), 7/3/2018 6:29:48 AM



SEE STAKING PLANS FOR STAKING DATA

SITE INVERT CONTROL LINE VIEW 1

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

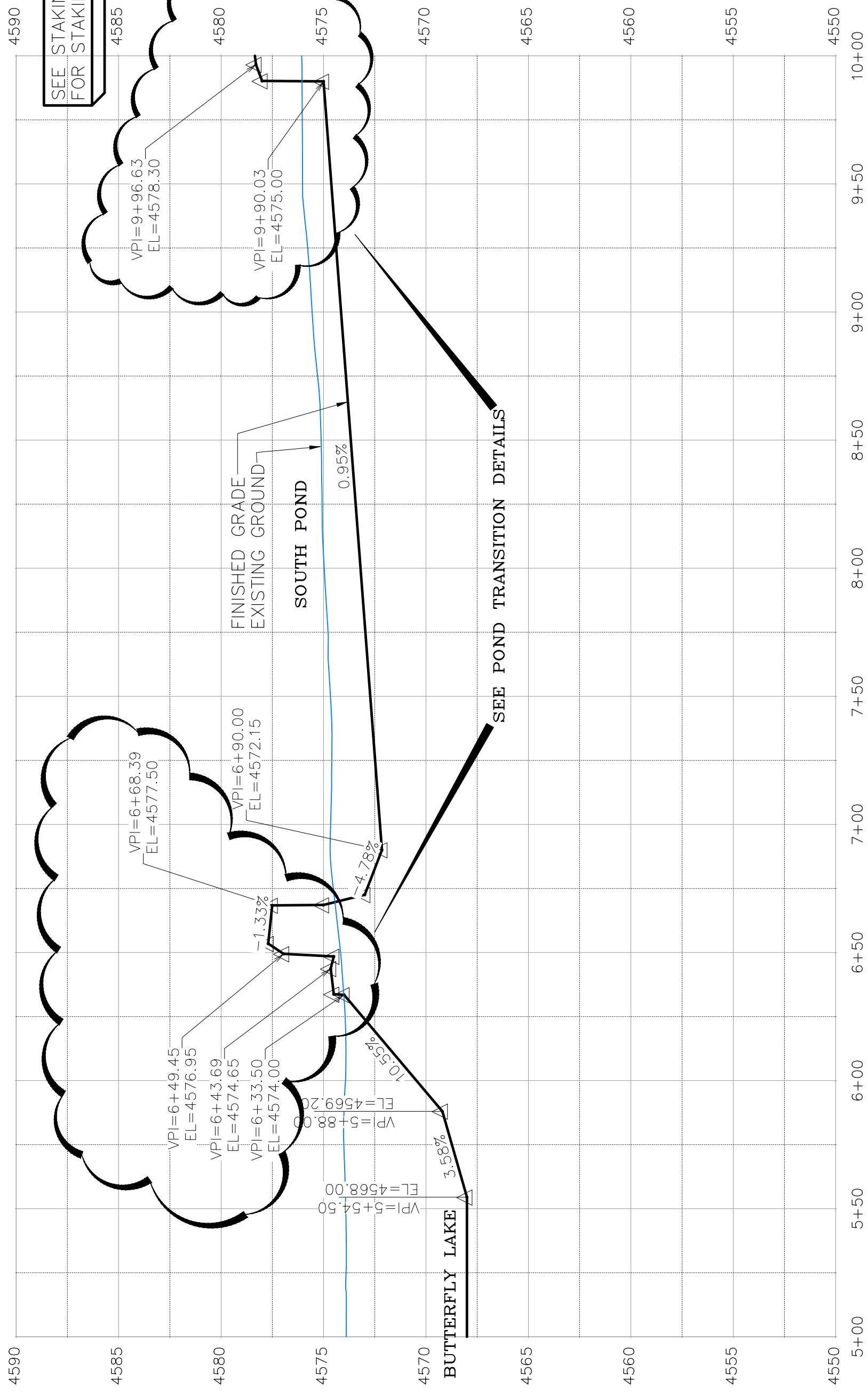
SCALE:	PLAN & PROFILE
0	1" = 20'
10	1" = 20'
0	1" = 25'
5	1" = 25'



PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II SITE PROFILE

N:\landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\SITE PROFILE PH II.dwg, (003), 7/3/2018 6:29:52 AM



SITE INVERT CONTROL LINE VIEW 2

REVISION	DATE	DESCRIPTION

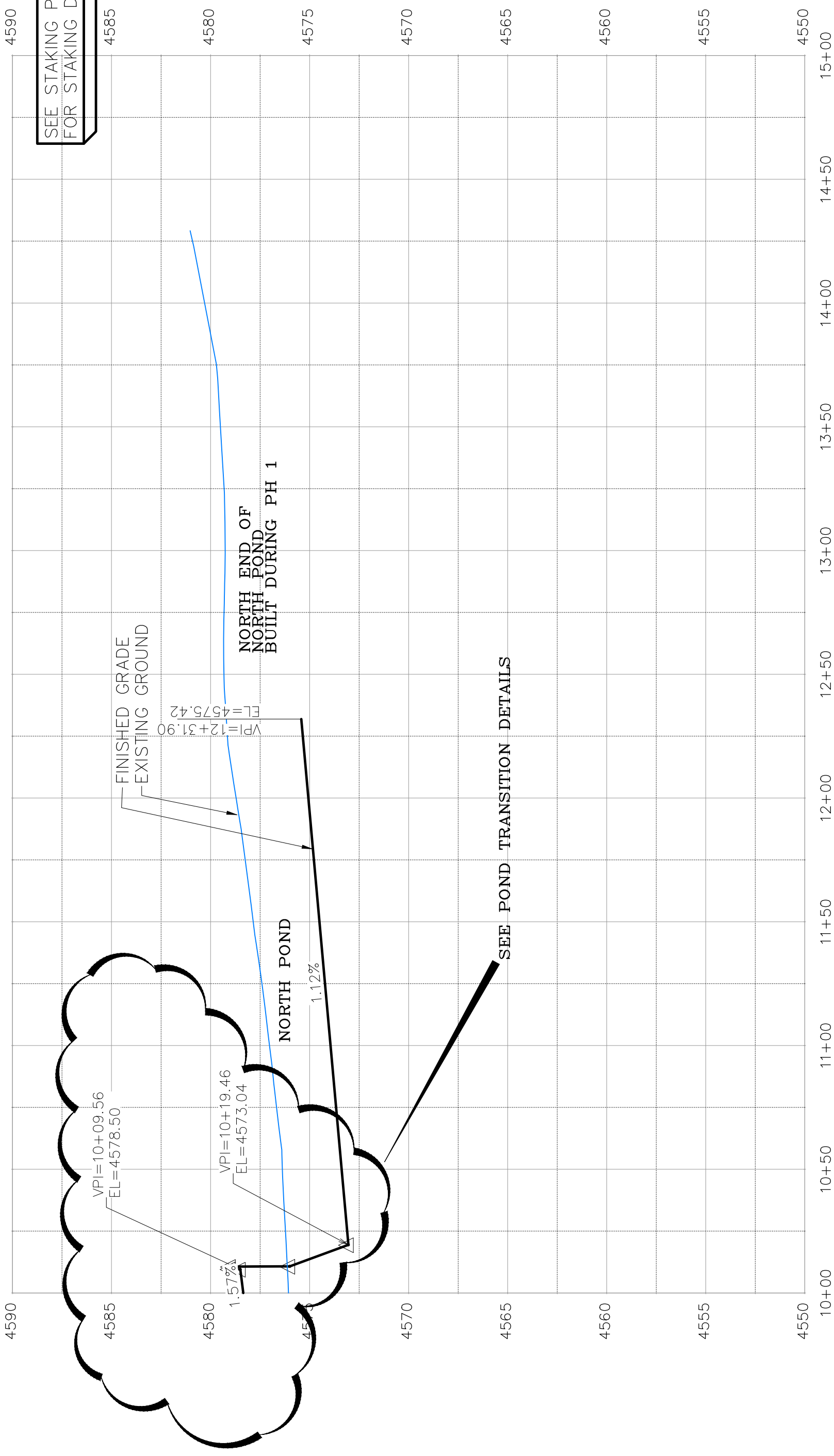
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

SCALE:	PLAN & PROFILE
0	10
0	1.25
0	5



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE



SITE INVERT CONTROL LINE VIEW 3

REVISION	DESCRIPTION	DATE

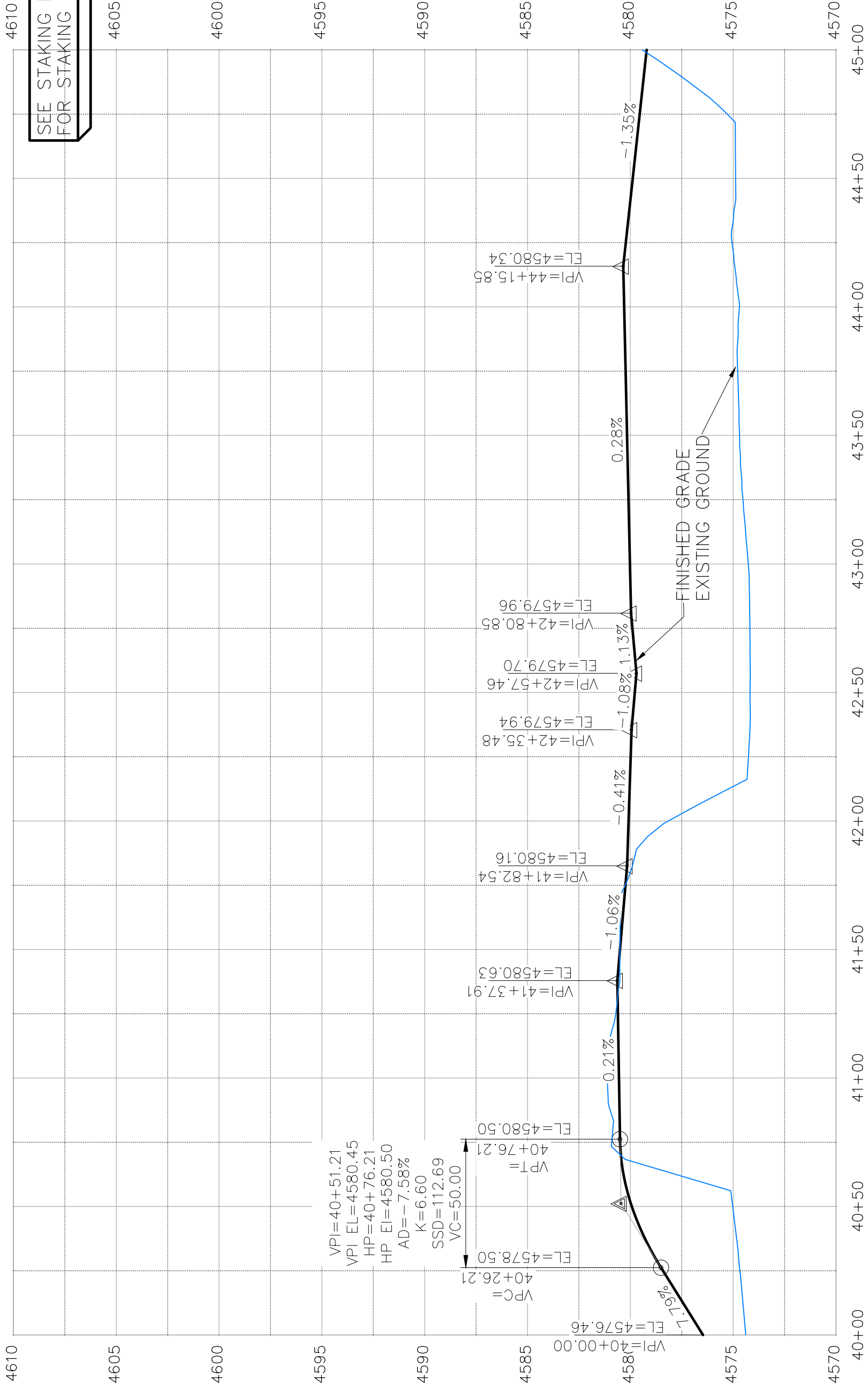
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE



SEE STAKING PLANS FOR STAKING DATA

BOAT RAMP ROAD VIEW 1

REVISION	DESCRIPTION	DATE

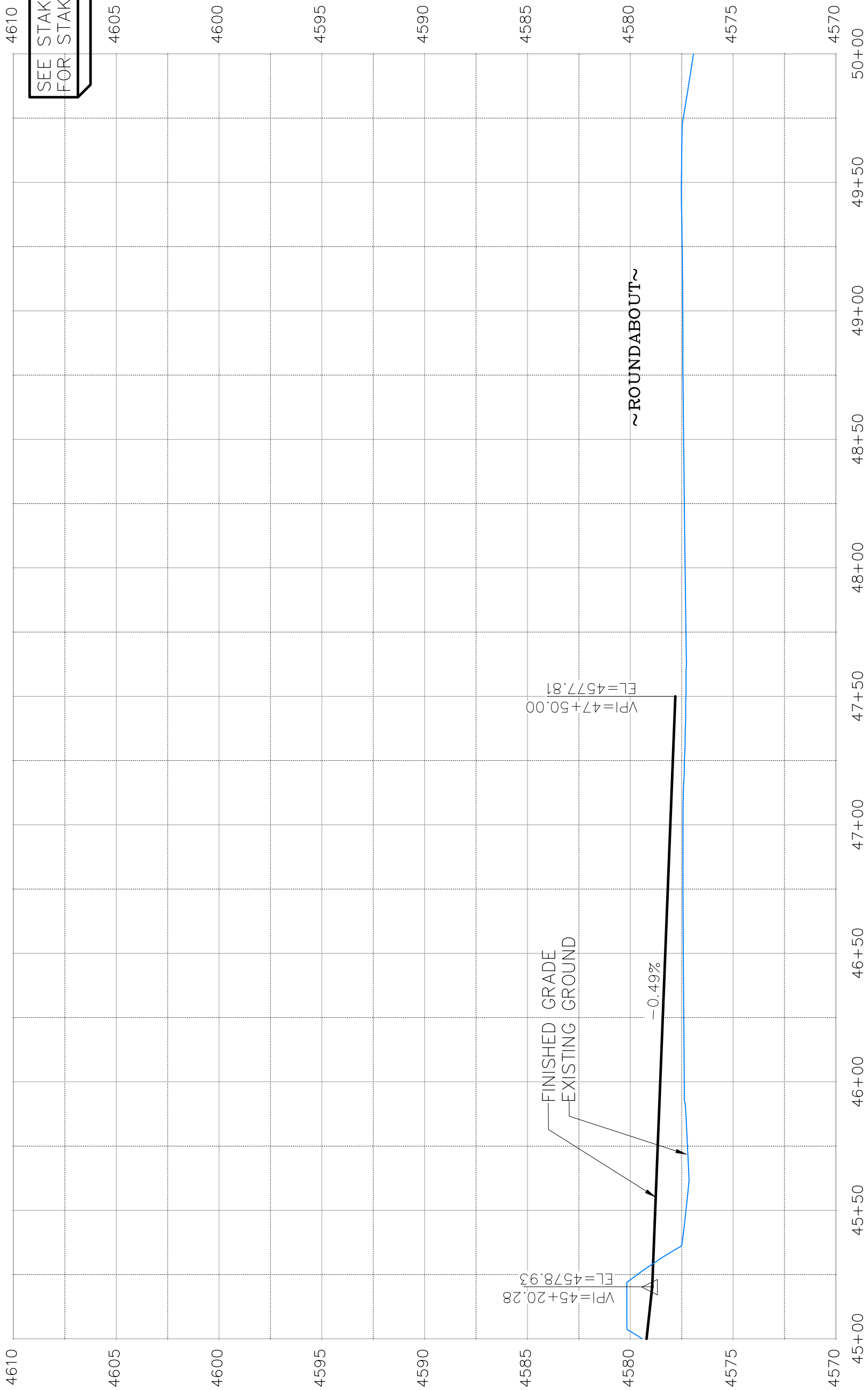
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE



BOAT RAMP ROAD VIEW 2

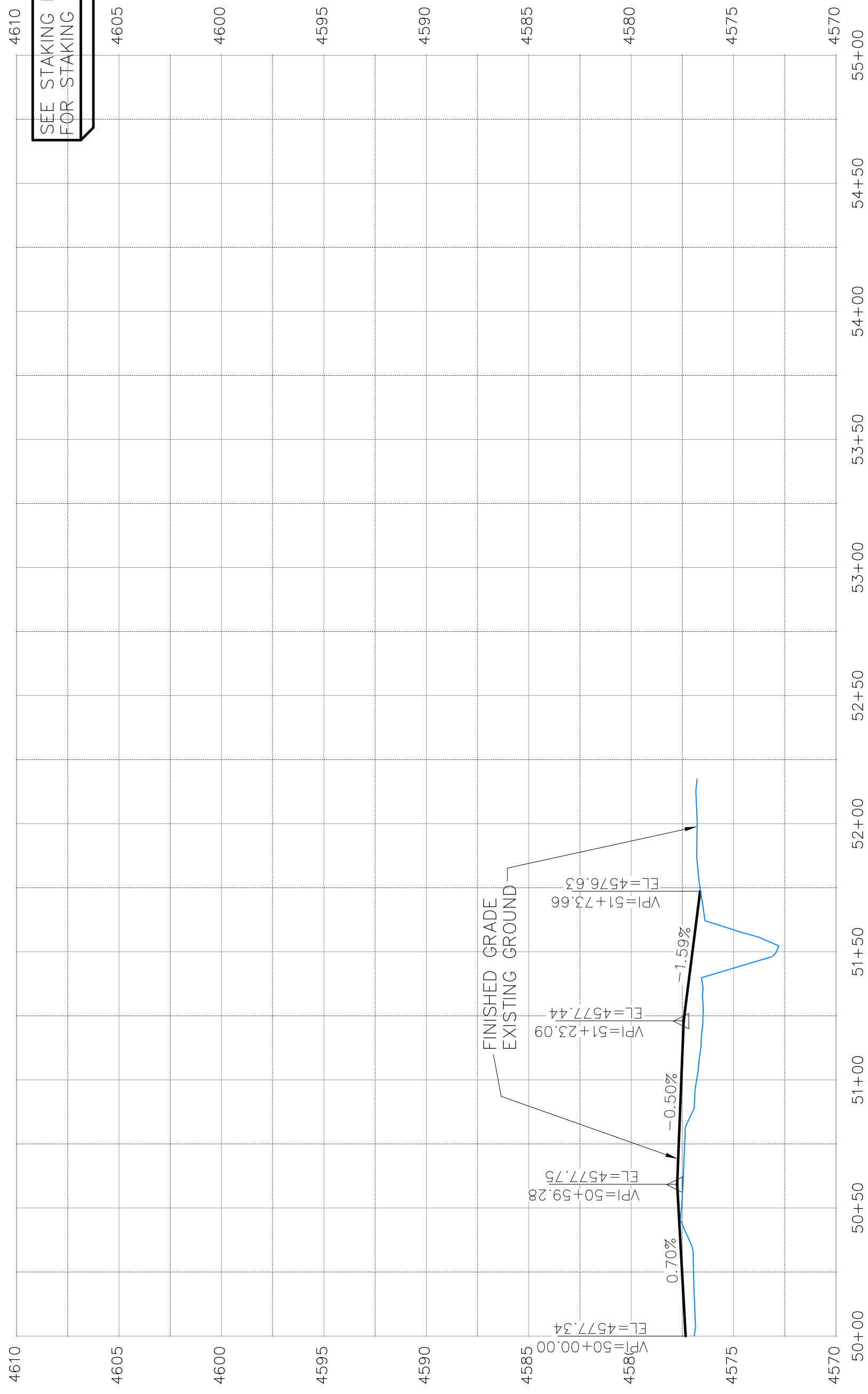
REVISION	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018
REVISION			DESIGNED BY	JCS	DATE	2018
REVISION			CHECKED BY	TOP	DATE	2018
REVISION			APPROVED BY	TOP	DATE	2018

SCALES:	PLAN & PROFILE
0 10 20	HORIZONTAL
0 1.25 2.5 5	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE



SEE STAKING PLANS FOR STAKING DATA

BOAT RAMP ROAD VIEW 3

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

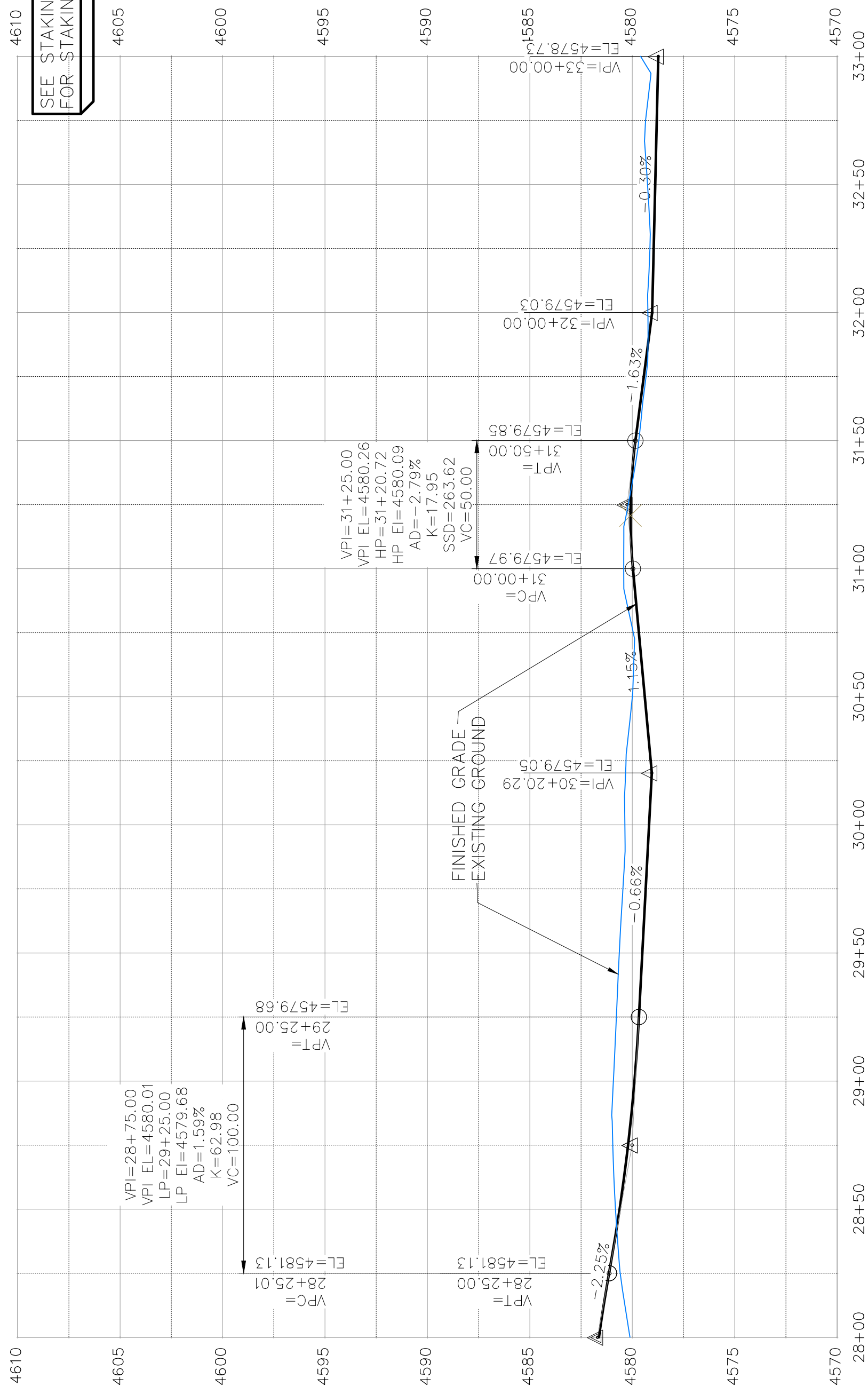
SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE

SEE STAKING PLANS
FOR STAKING DATA



SECONDARY ROAD VIEW 1

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

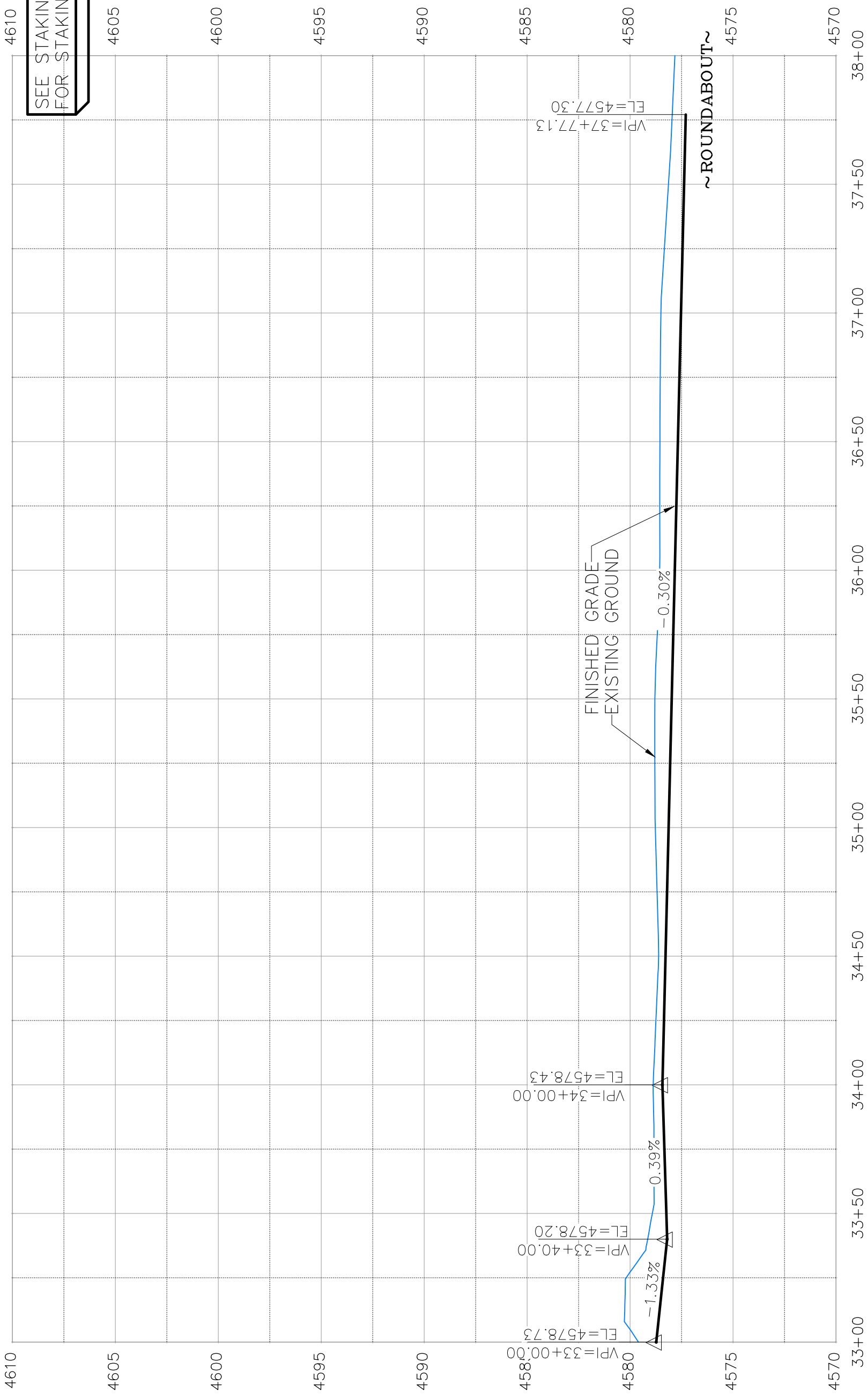
SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 100'
VERTICAL	1" = 5'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE

N:\landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\SITE PROFILE PH II.dwg, (009), 7/3/2018 6:30:12 AM



SECONDARY ROAD VIEW 2

REVISION	DESCRIPTION	DATE

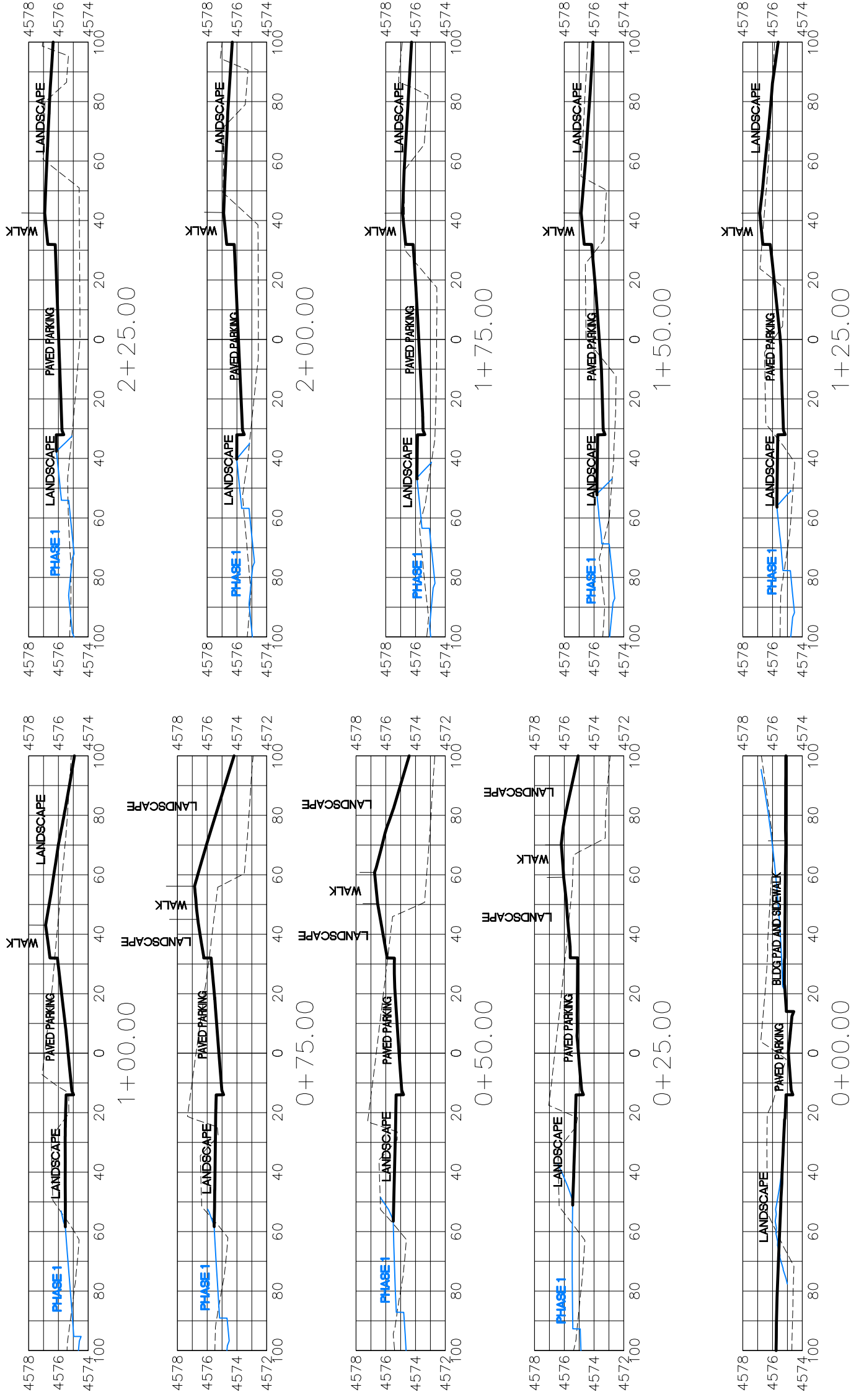
SCALE	DATE
PLAN & PROFILE	2018
HORIZONTAL	2018
VERTICAL	2018

DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
JCS	JCS	TOP	TOP



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE II
SITE PROFILE



WESTLERLY PARKING LOT

REVISION	DATE

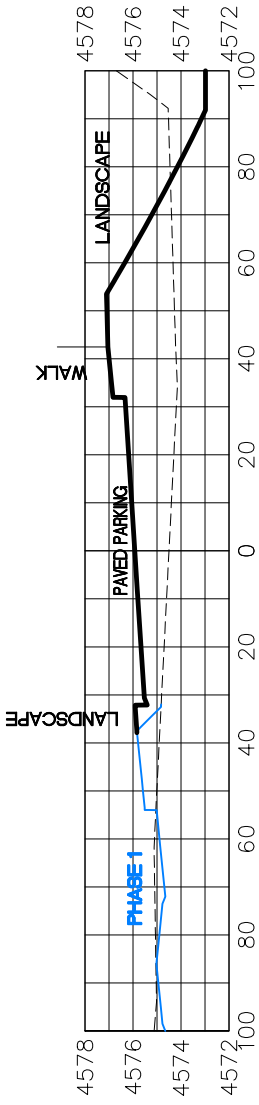
DESCRIPTION	DATE

SCALE:	PLAN & PROFILE
0	HORIZONTAL
20	VERTICAL

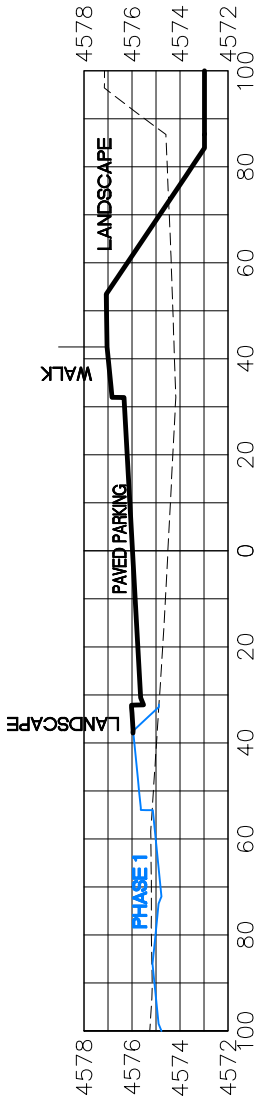


PUBLIC WORKS
ENGINEERING DIVISION

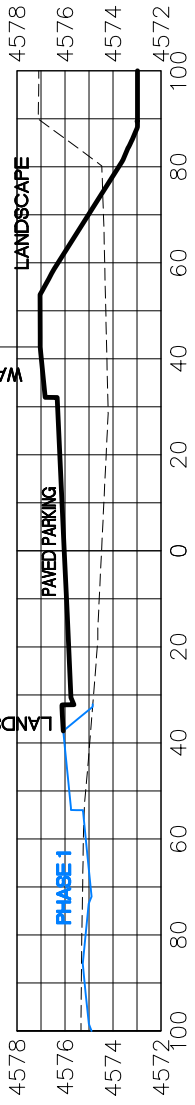
LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



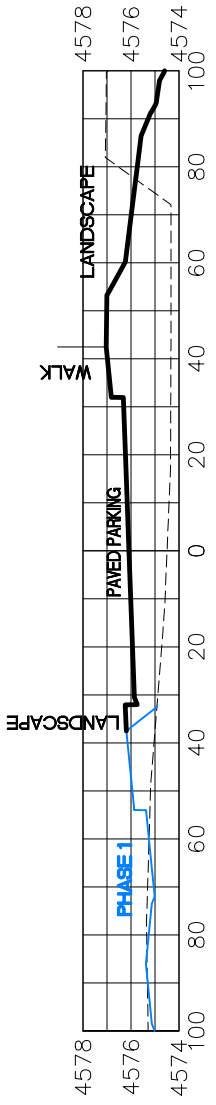
3+50.00



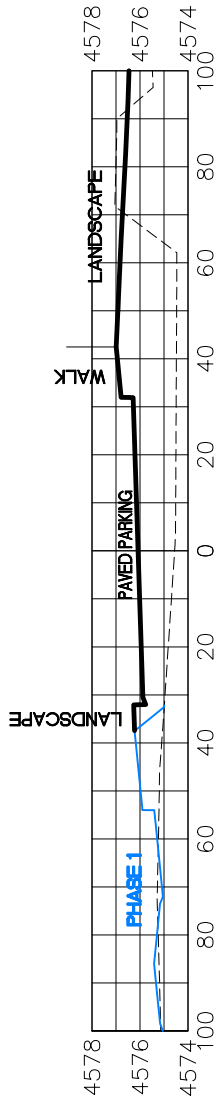
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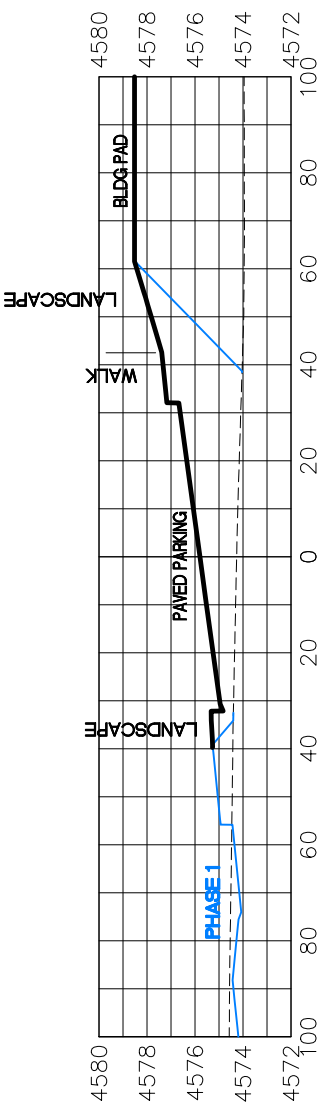
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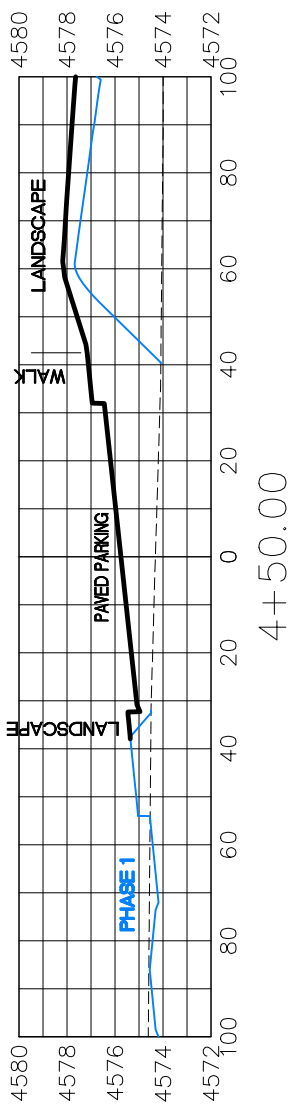
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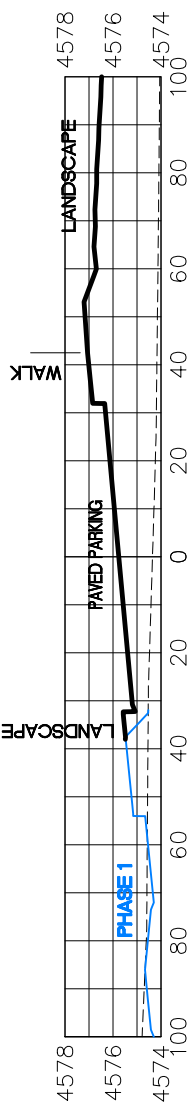
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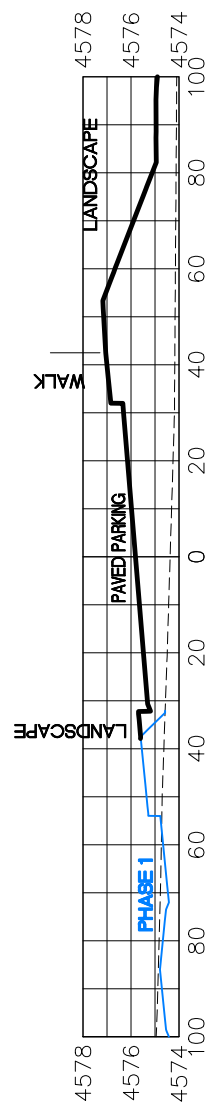
4+75.00



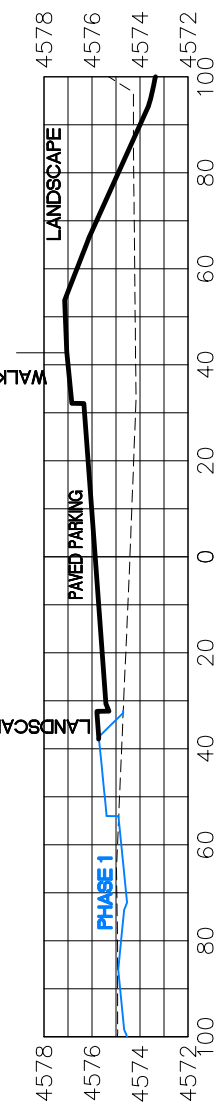
4+50.00



4+25.00



4+00.00



3+75.00

WESTERLY PARKING LOT

REVISION	DESCRIPTION	DATE

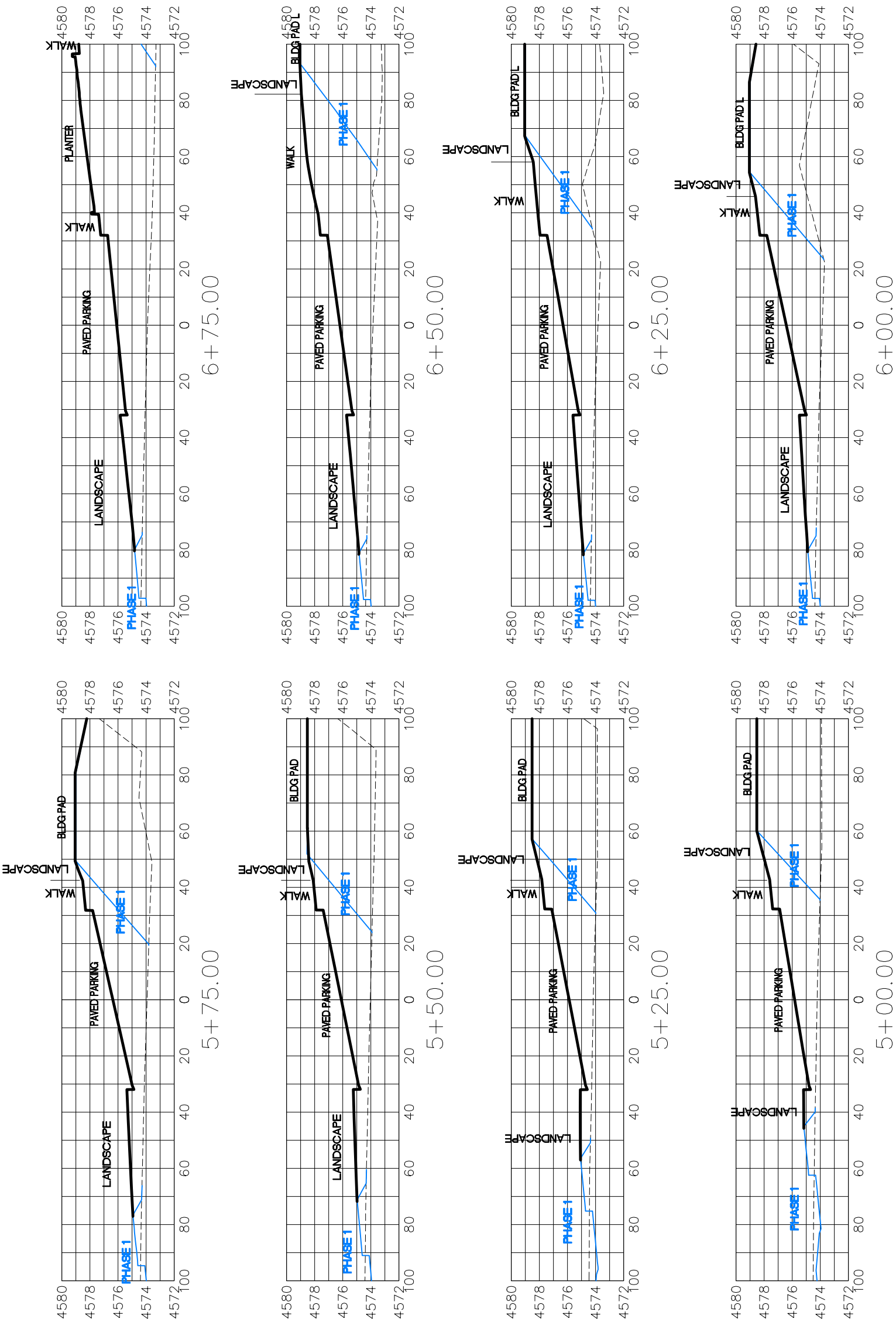
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



WESTLERLY PARKING LOT

REVISION	DATE
REVISION	
REVISION	
REVISION	

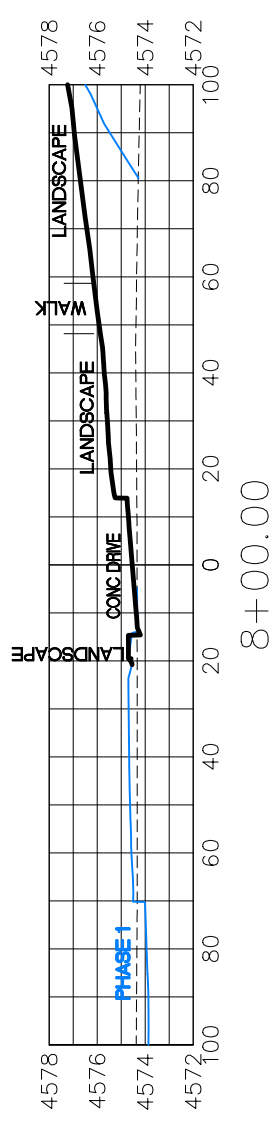
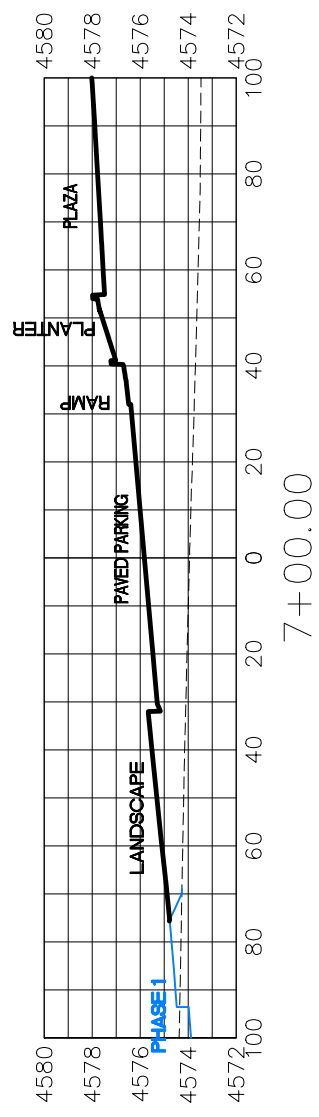
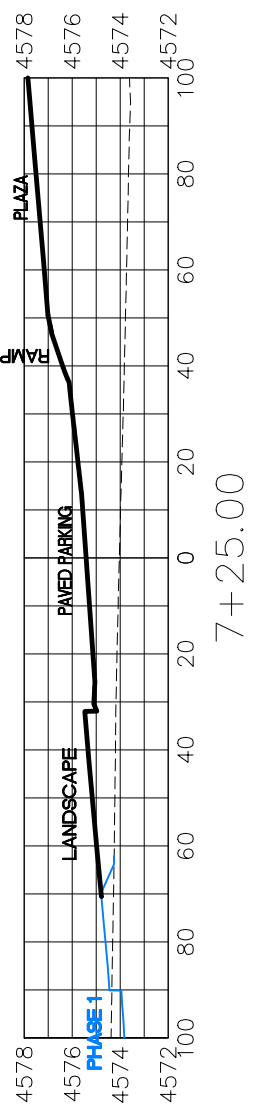
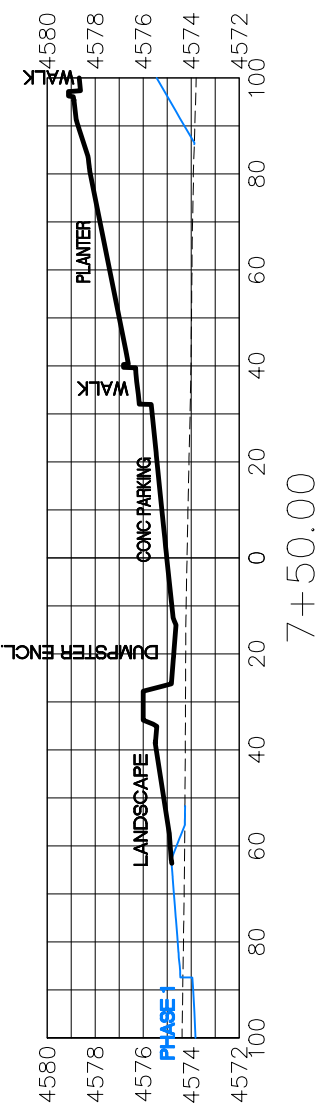
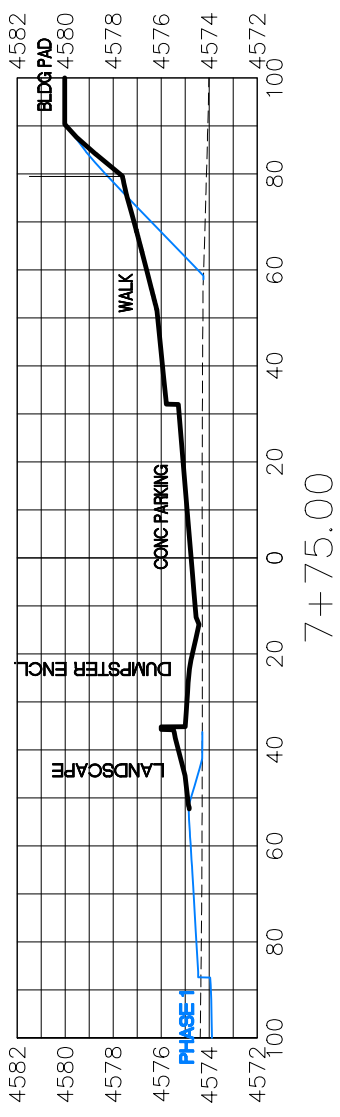
DESCRIPTION	DATE

SCALE:	DATE
PLAN & PROFILE	2018
HORIZONTAL	2018
VERTICAL	2018



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



WESTERLY PARKING LOT

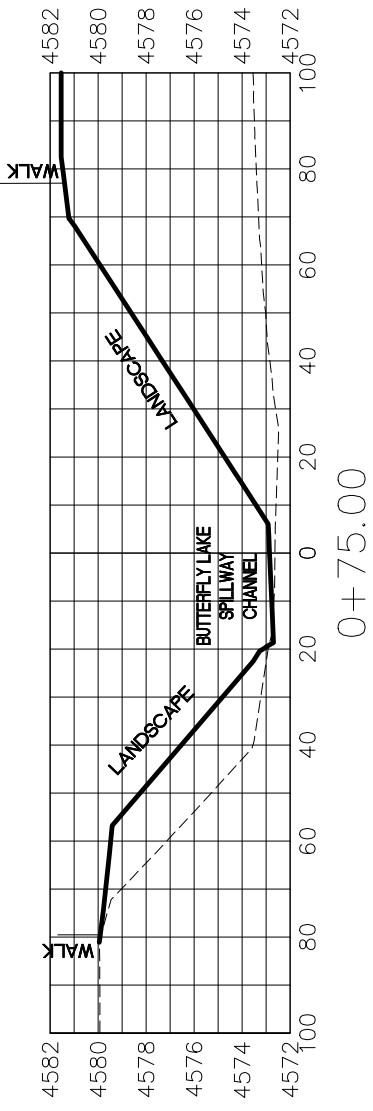
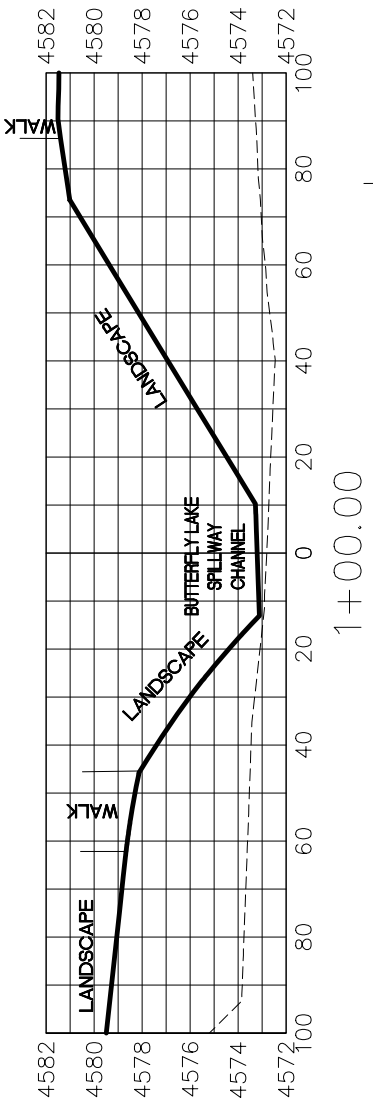
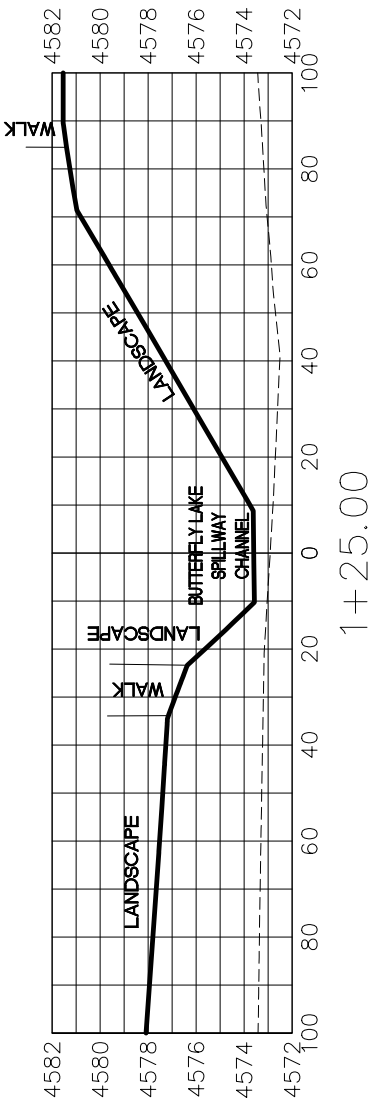
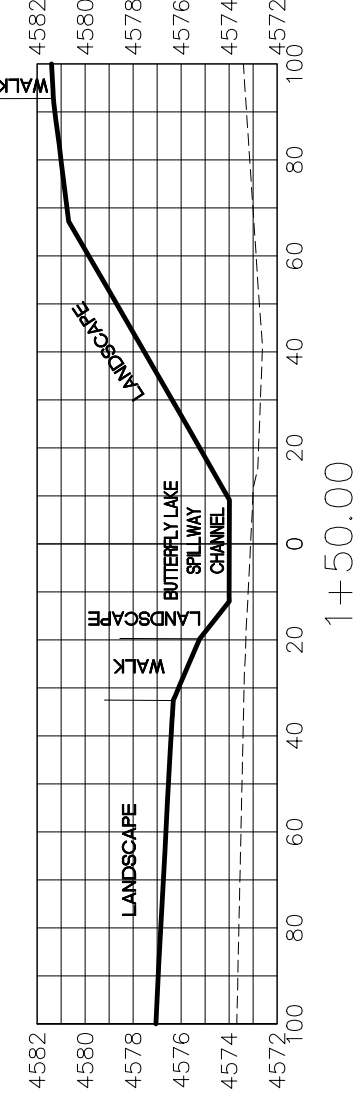
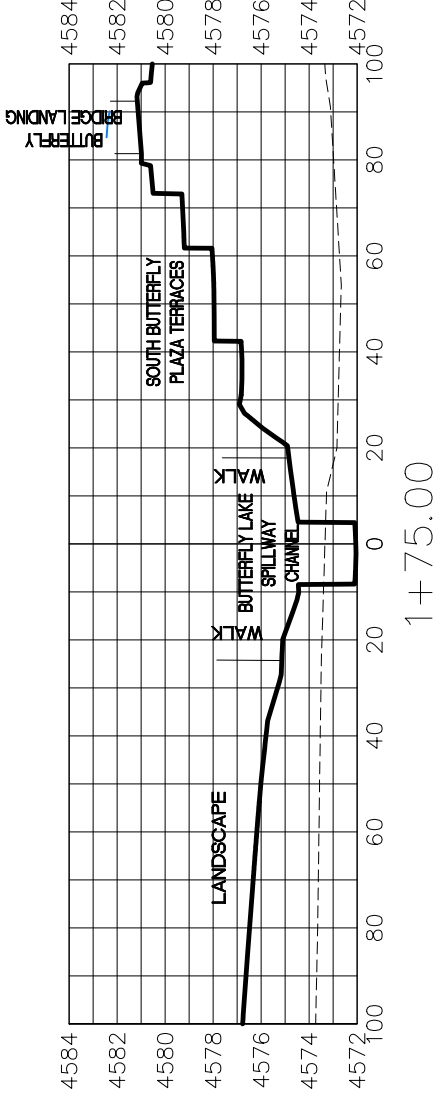
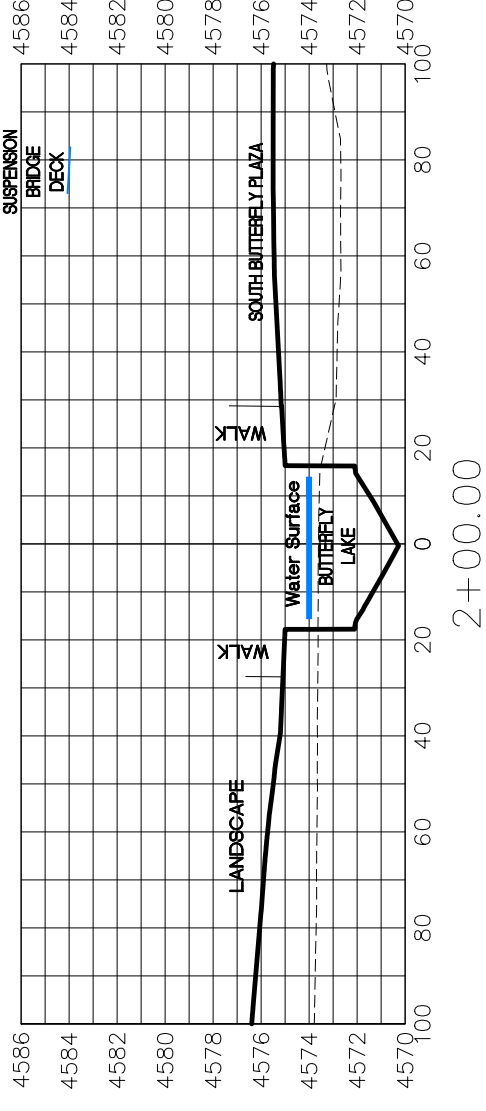
REVISION	DATE

DESCRIPTION	DATE

SCALE	DATE

PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

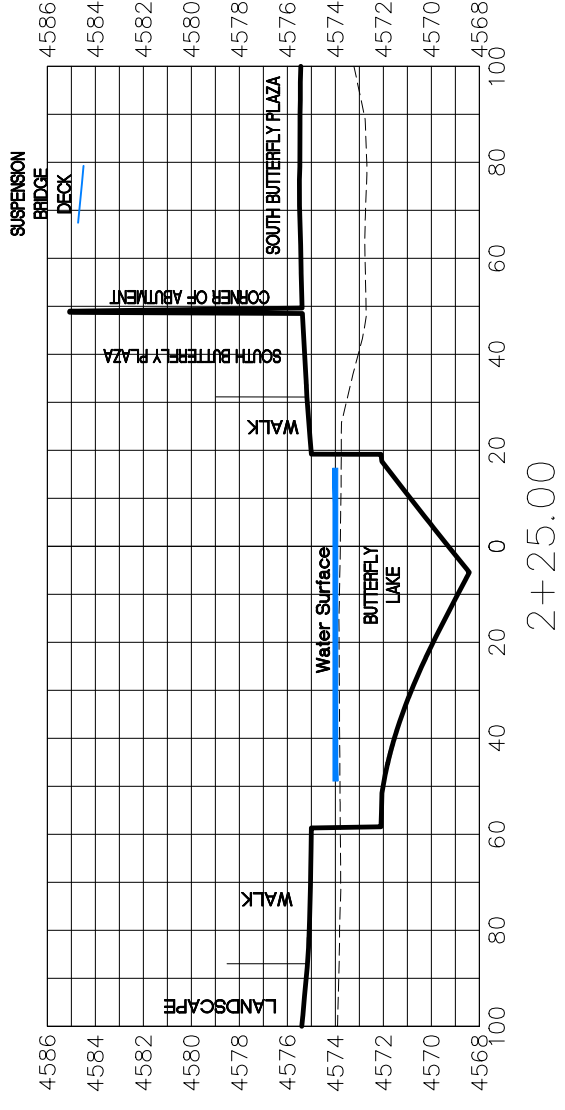
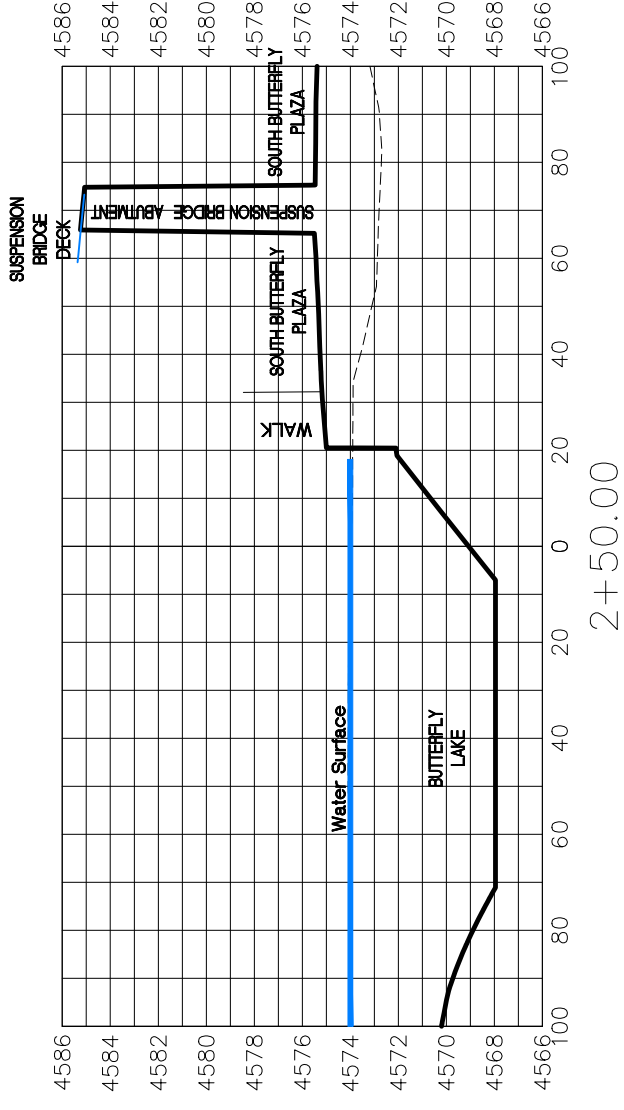
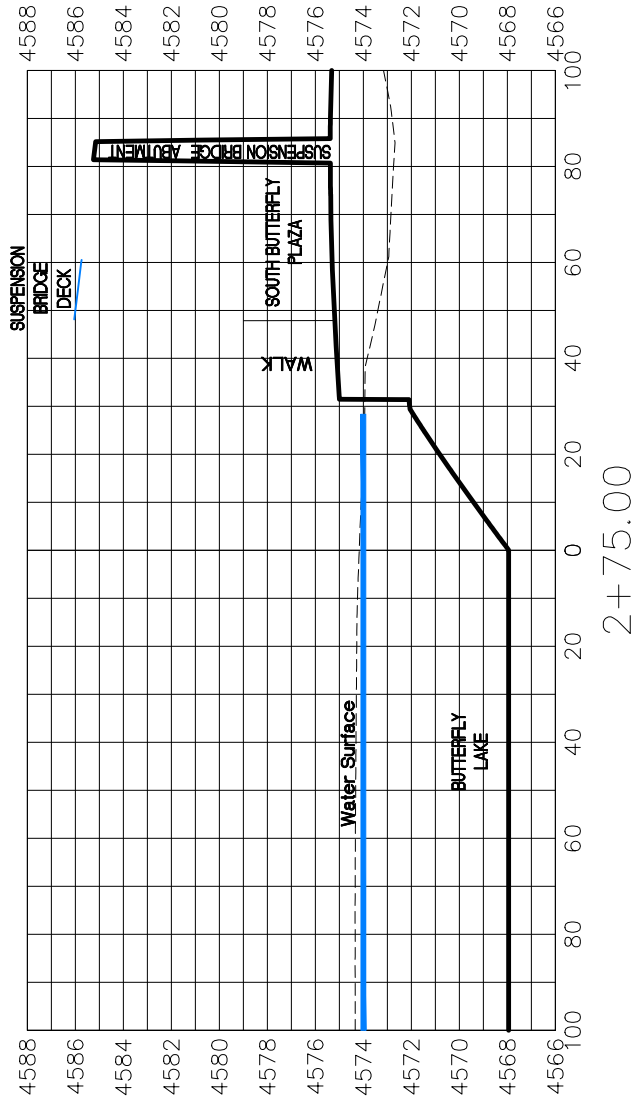
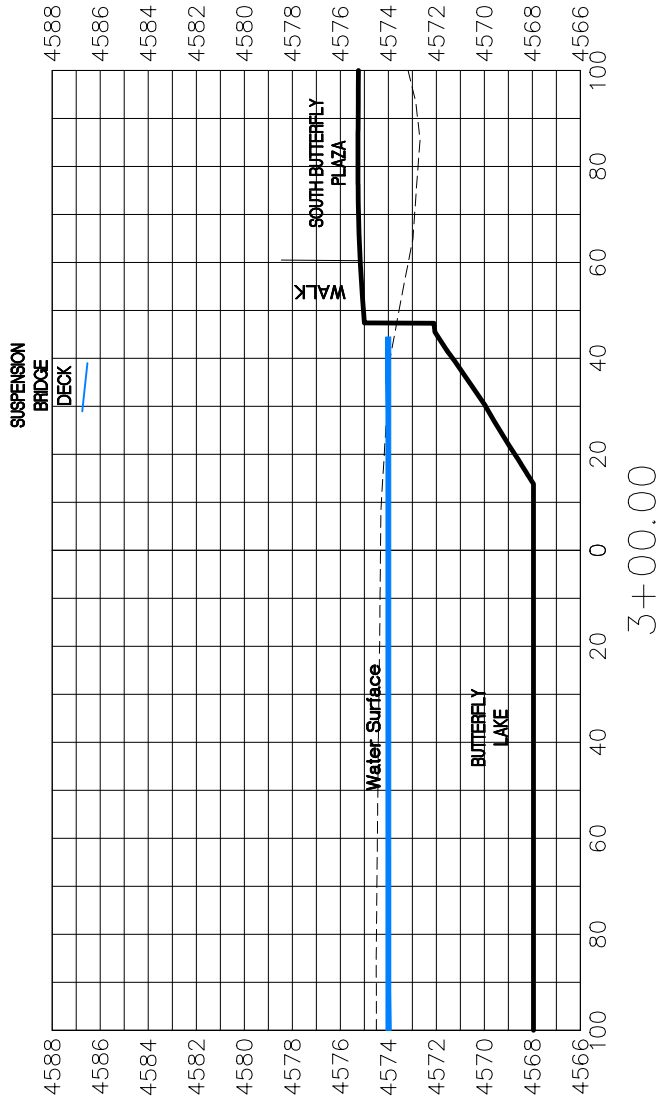
DRAWN BY JCS DATE 2018
 DESIGNED BY JCS DATE 2018
 CHECKED BY TCP DATE 2018
 APPROVED BY TCP DATE 2018

SCALES:
 PLAN & PROFILE
 HORIZONTAL 1"=20'
 VERTICAL 1"=4'



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

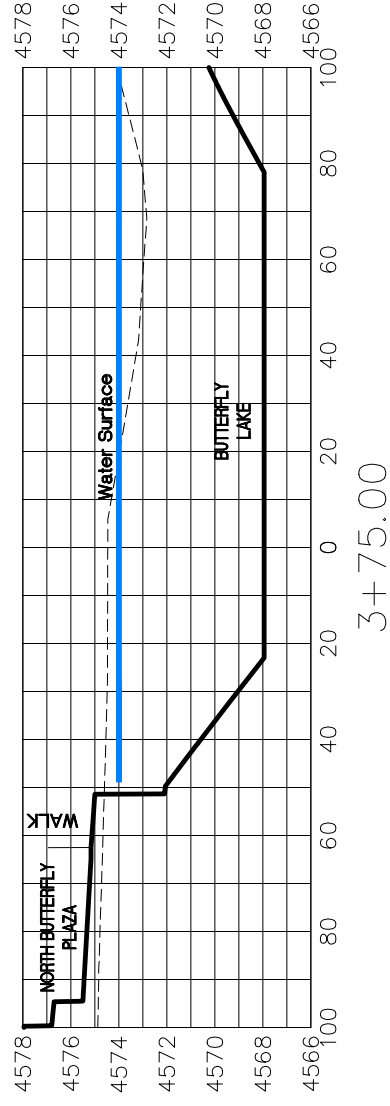
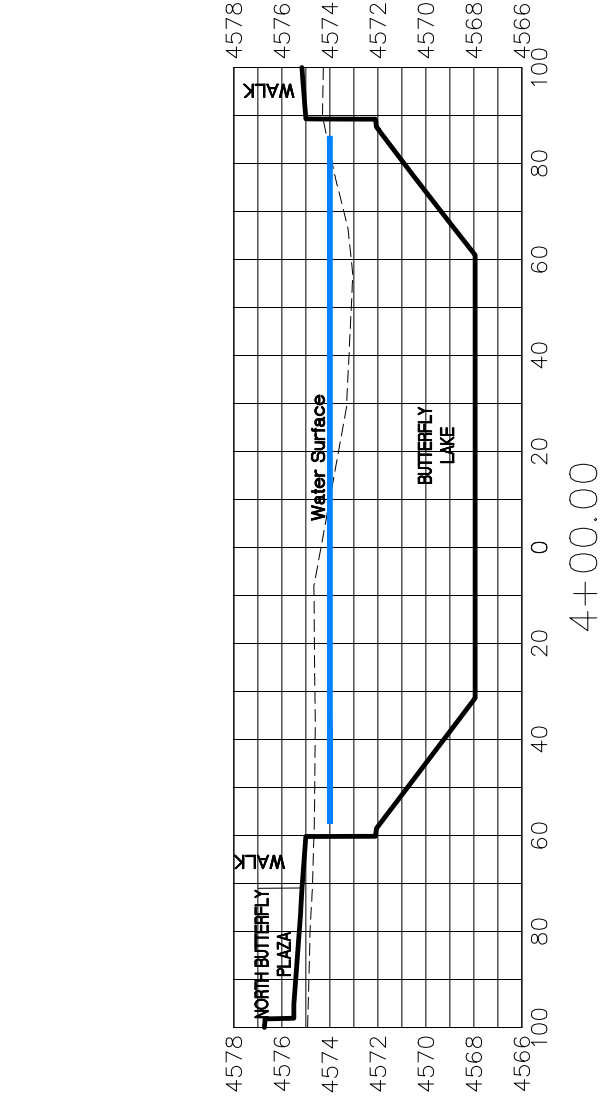
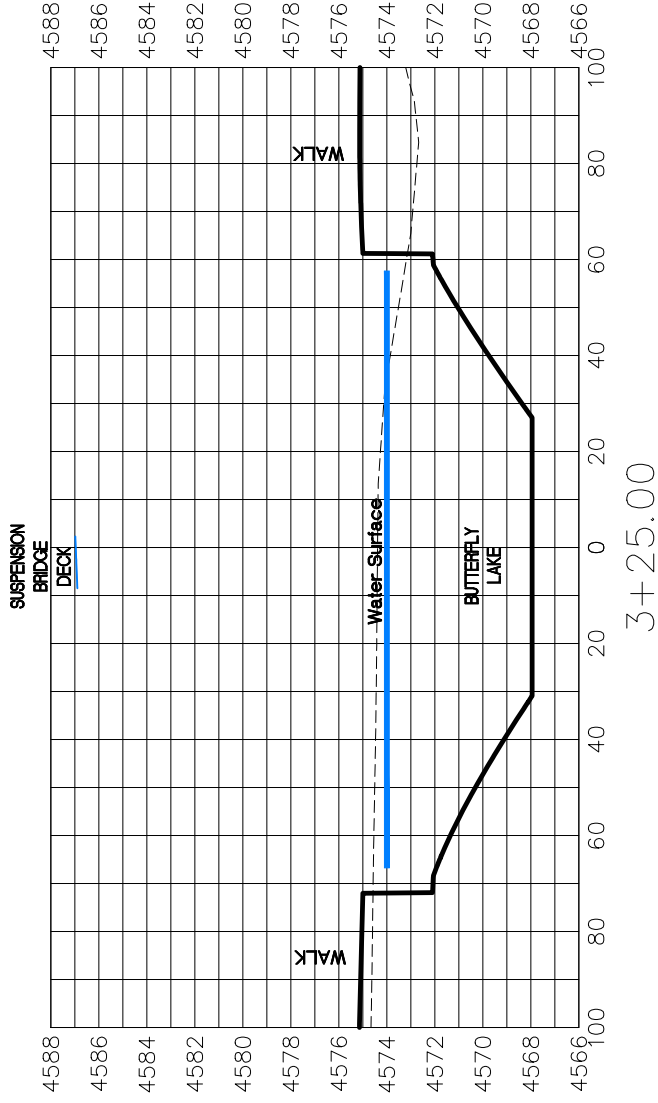
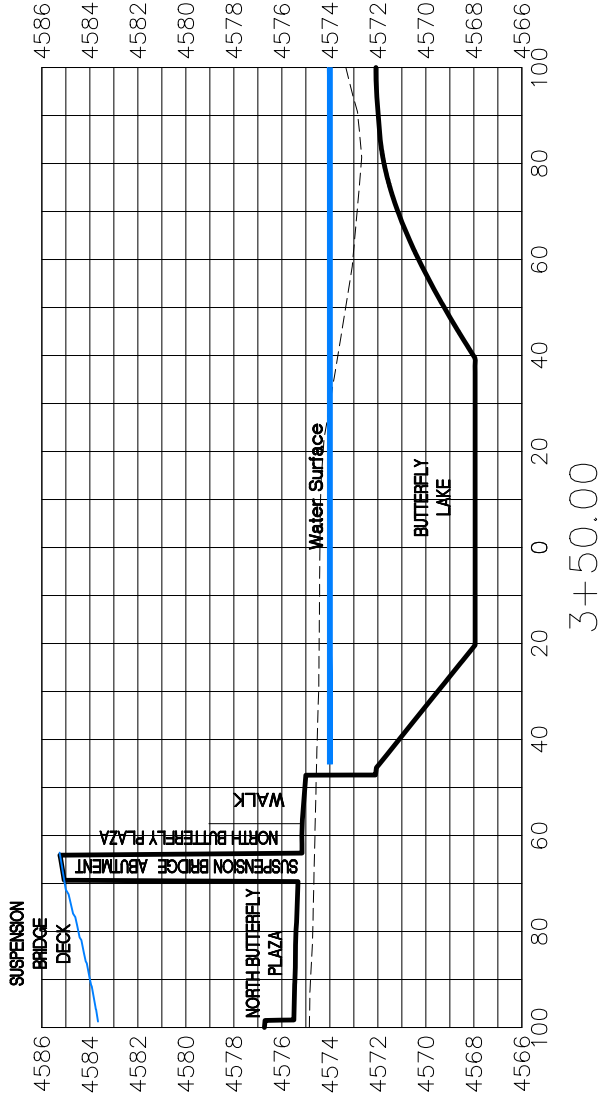
DRAWN BY JCS DATE 2018
 DESIGNED BY JCS DATE 2018
 CHECKED BY TCP DATE 2018
 APPROVED BY TCP DATE 2018

SCALES:
 PLAN & PROFILE
 HORIZONTAL 1" = 40'
 VERTICAL 1" = 4'



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

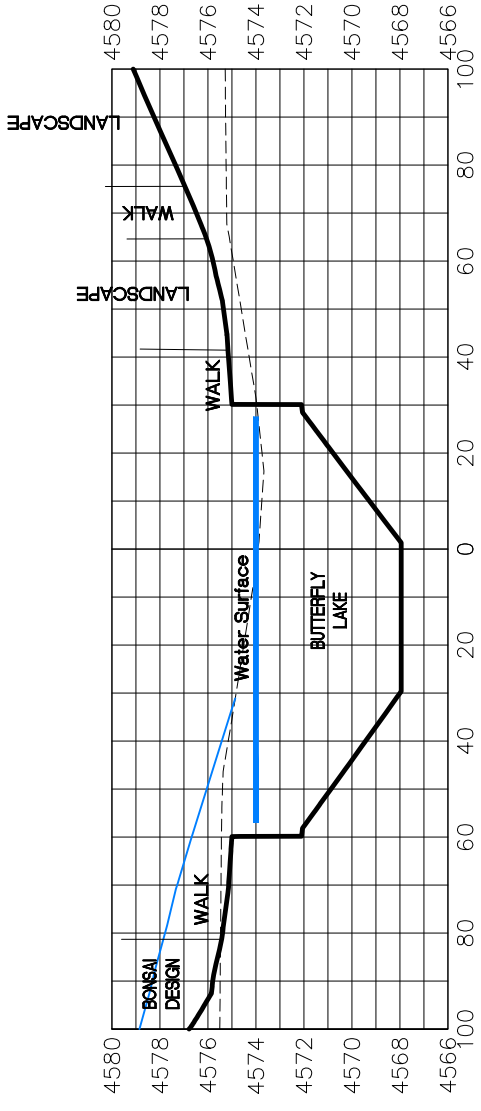
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	PLAN & PROFILE
	HORIZONTAL
	VERTICAL

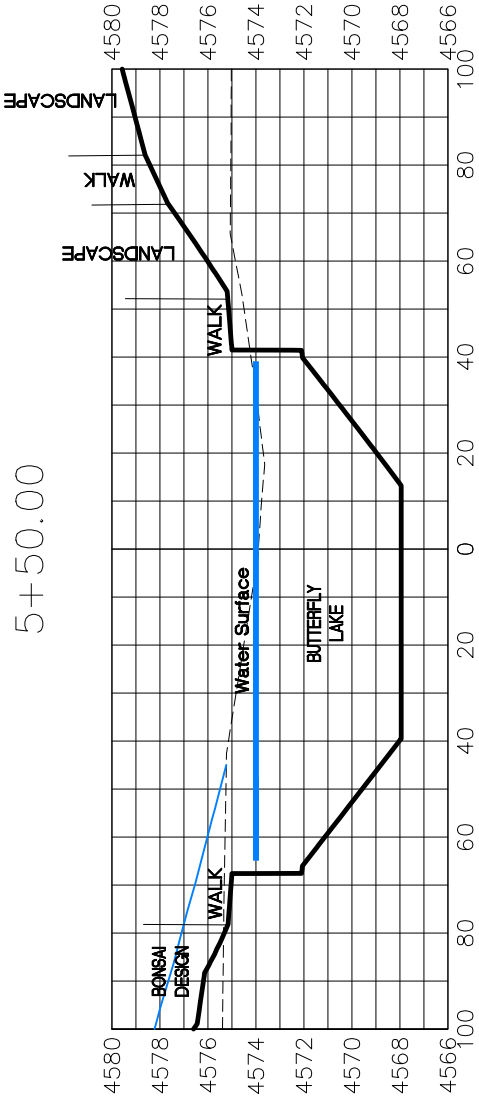


PUBLIC WORKS
ENGINEERING DIVISION

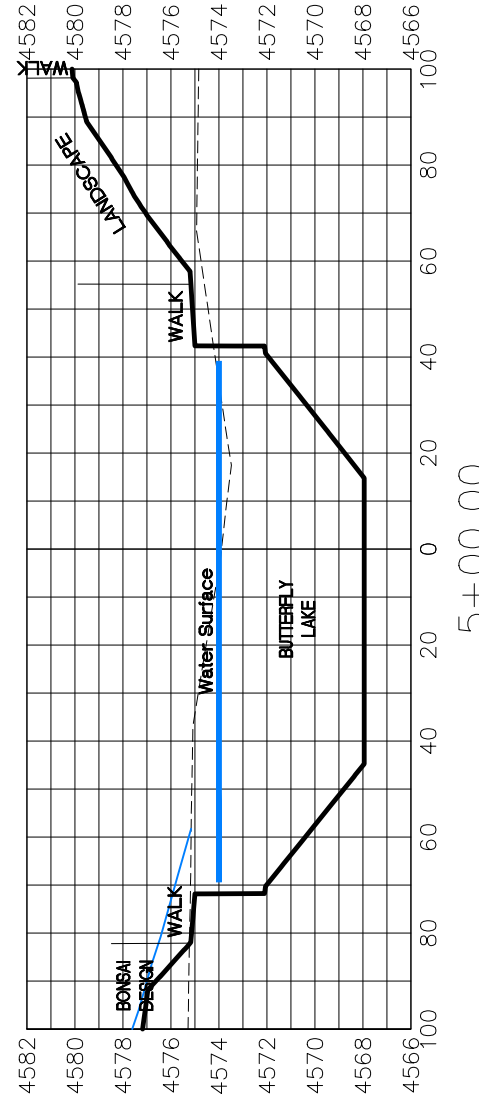
LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



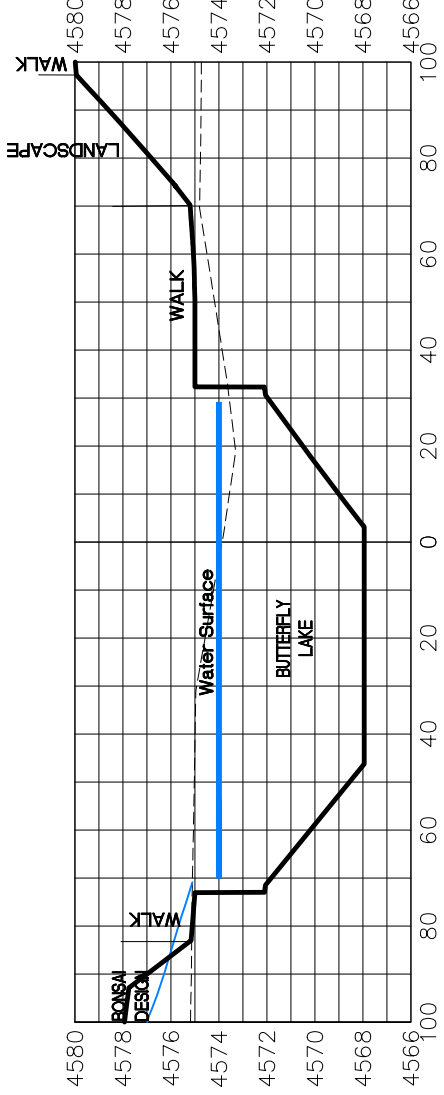
5+50.00



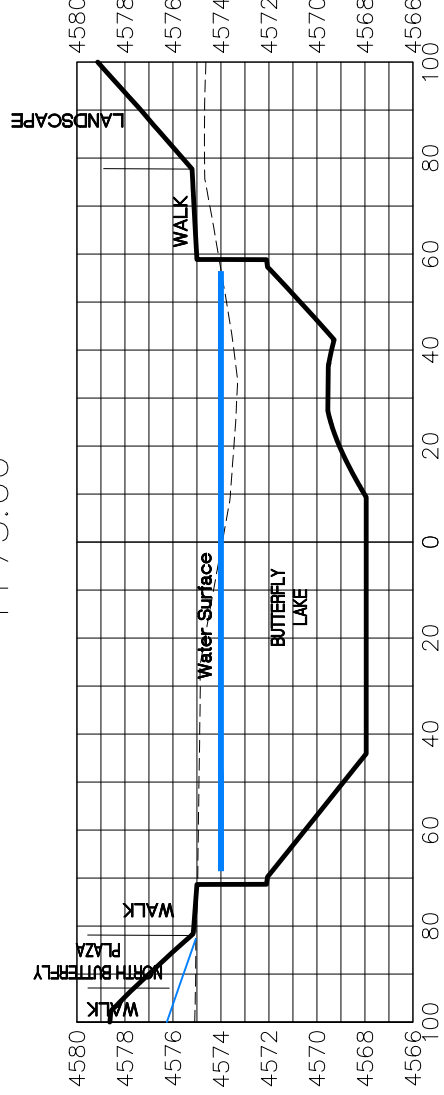
5+25.00



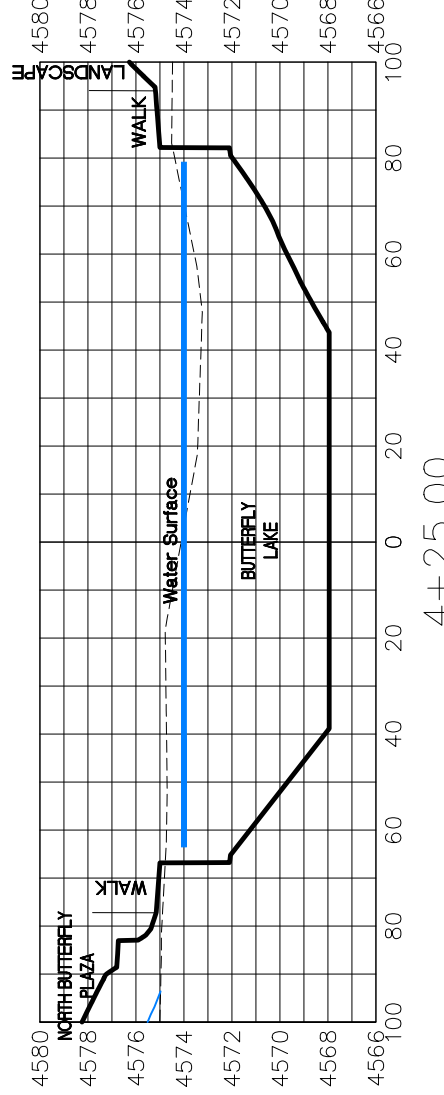
5+00.00



4+75.00



4+50.00



4+25.00

APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

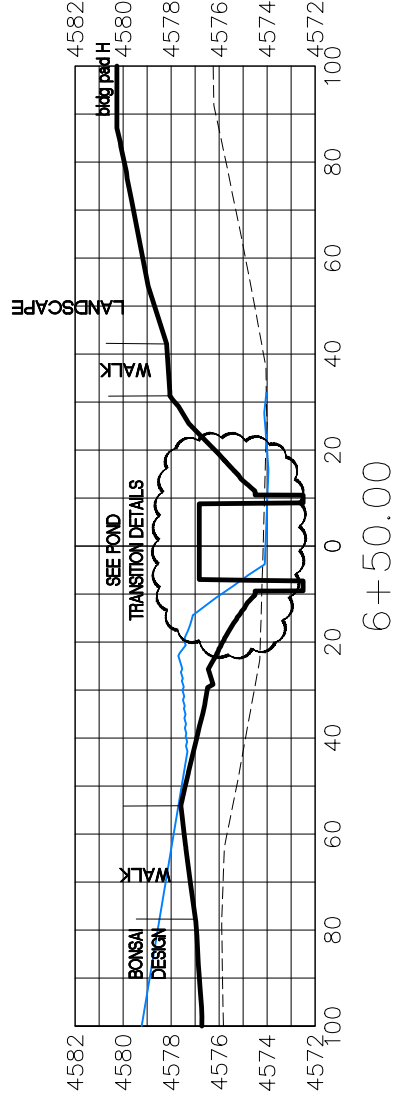
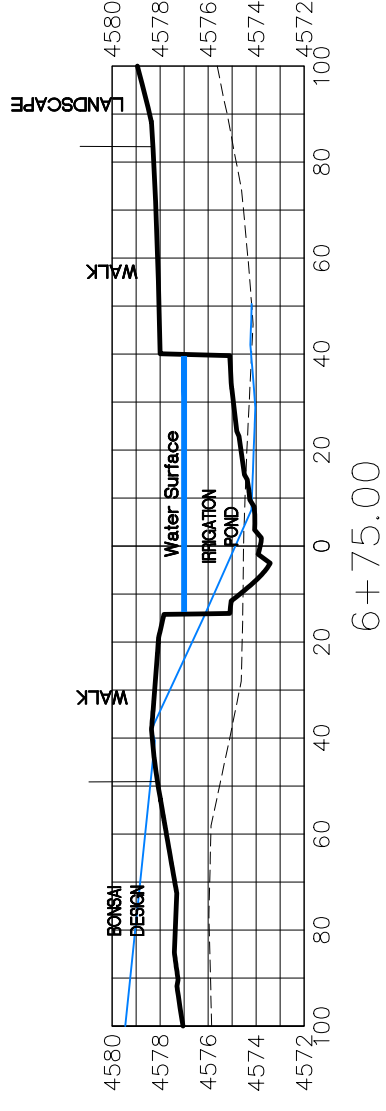
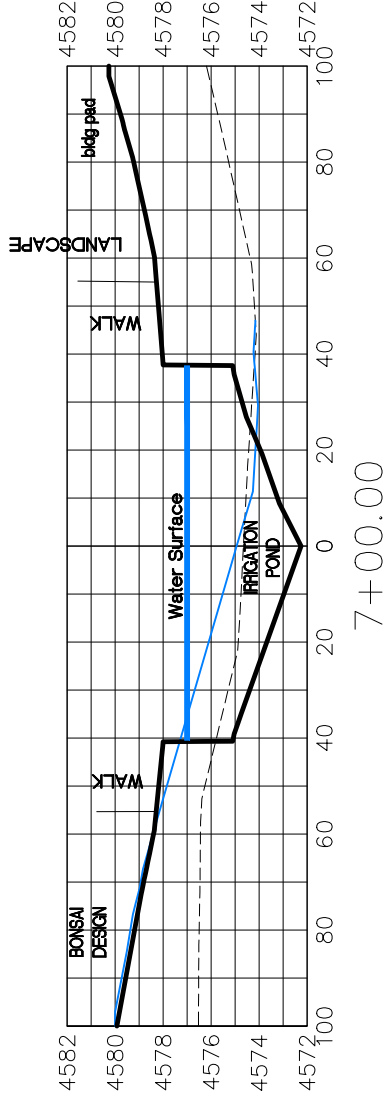
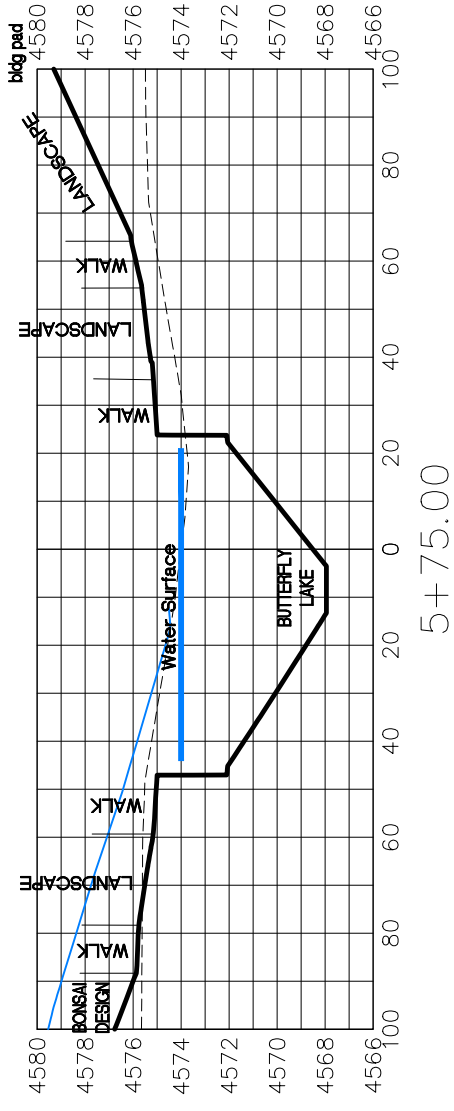
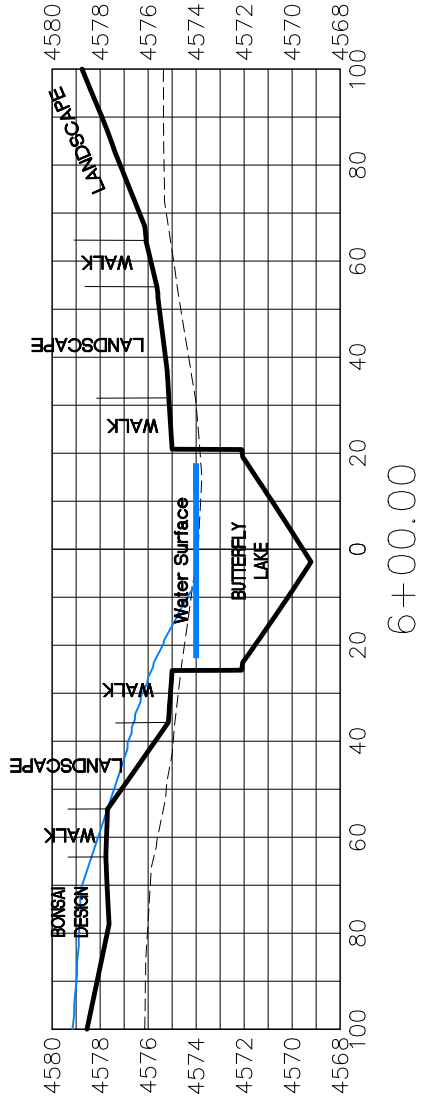
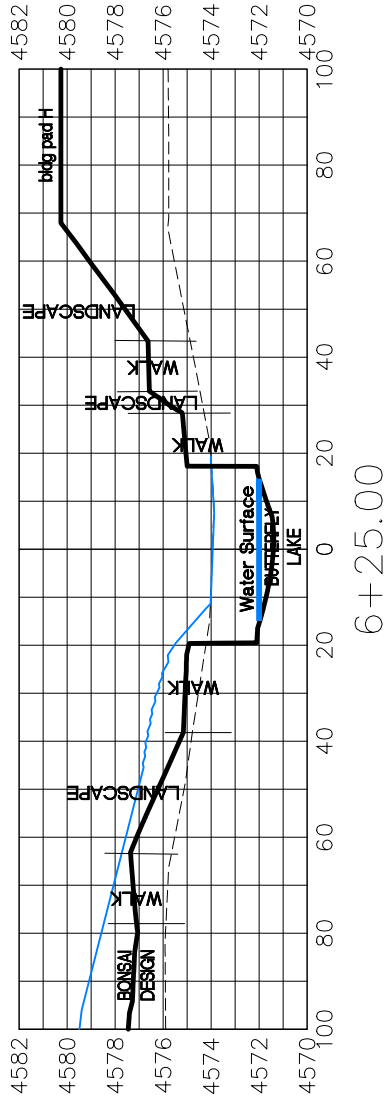
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
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APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

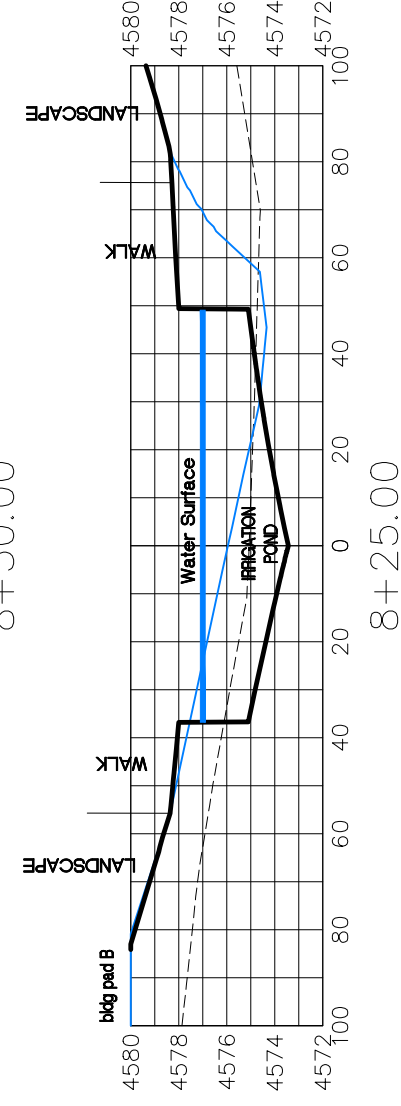
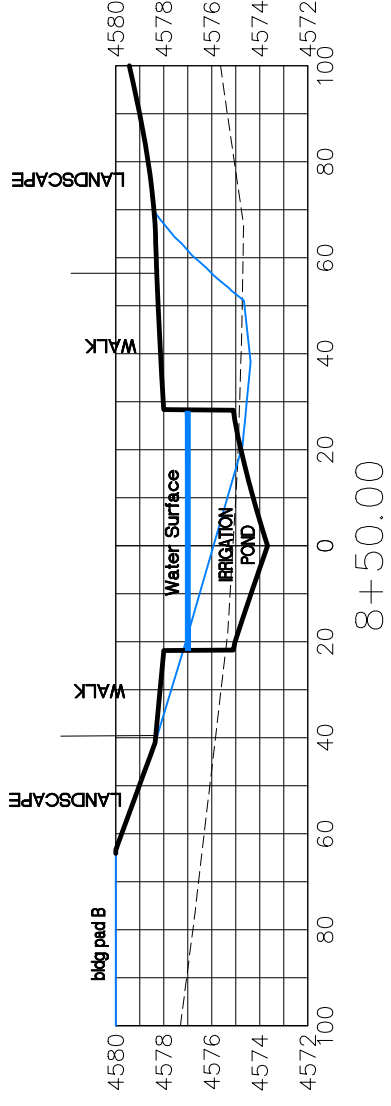
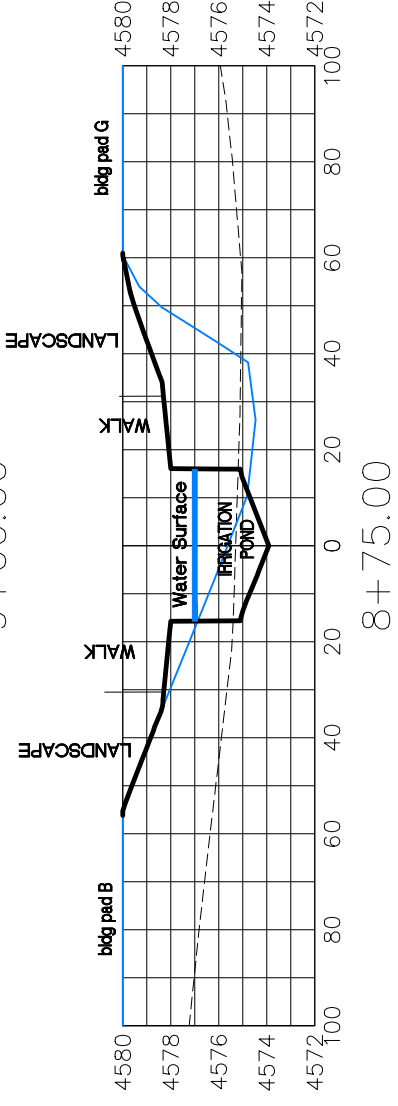
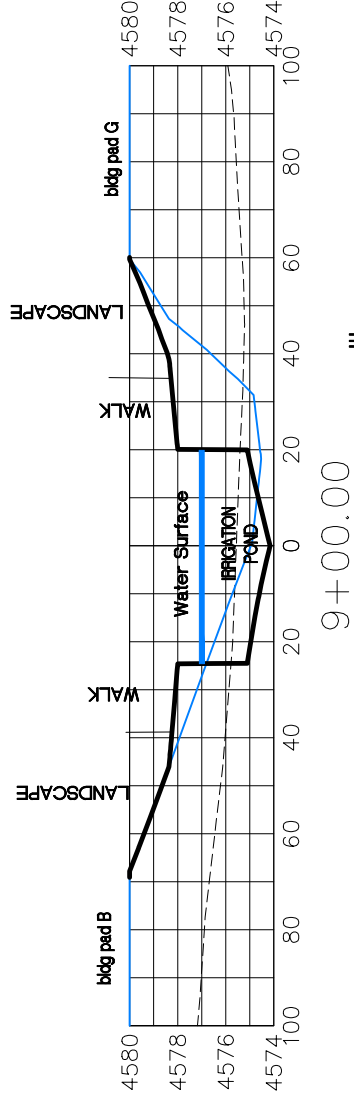
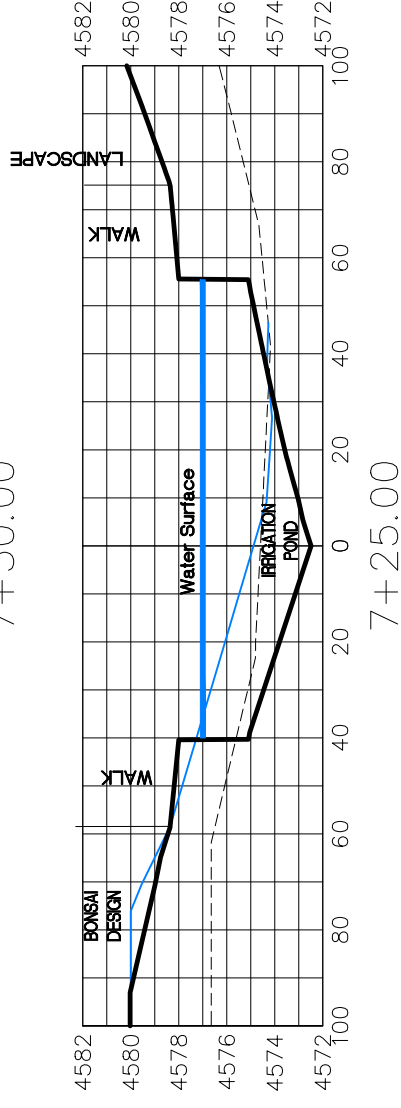
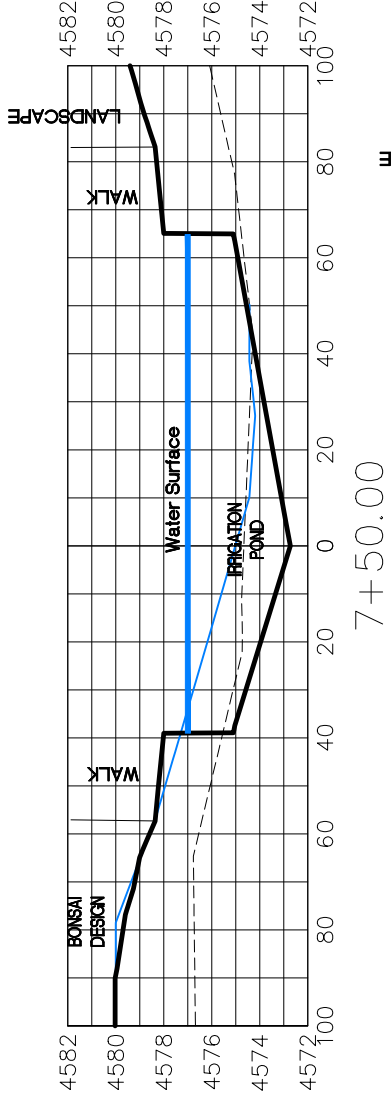
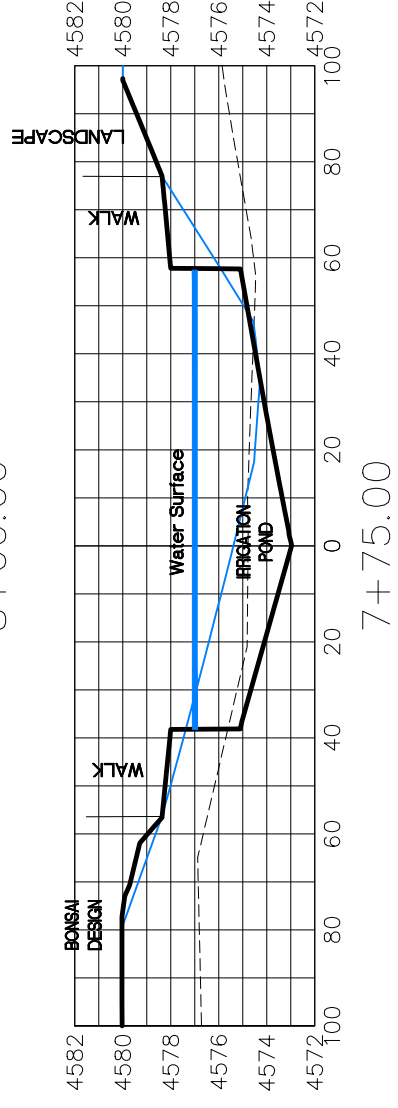
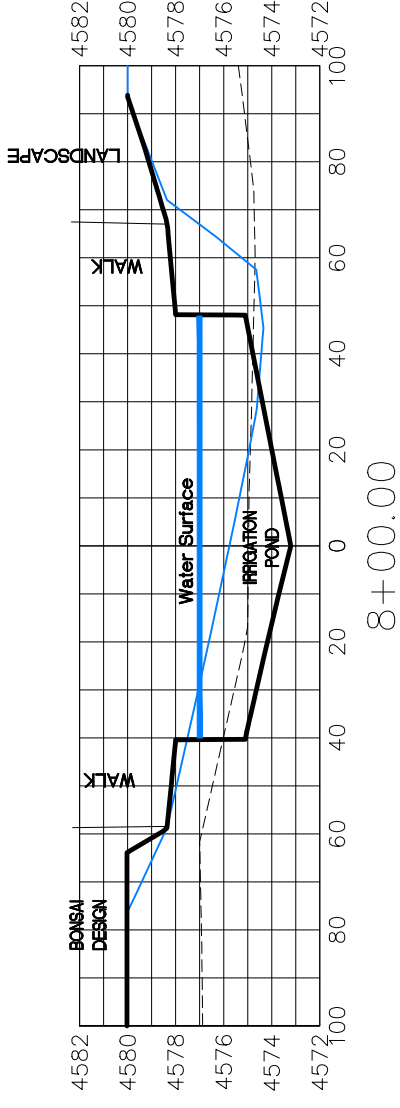
DRAWN BY JCS DATE 2018
 DESIGNED BY JCS DATE 2018
 CHECKED BY TCP DATE 2018
 APPROVED BY TCP DATE 2018

SCALES:
 PLAN & PROFILE 1"=40'
 HORIZONTAL 1"=20'
 VERTICAL 1"=4'



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE
REVISION		
REVISION		
REVISION		

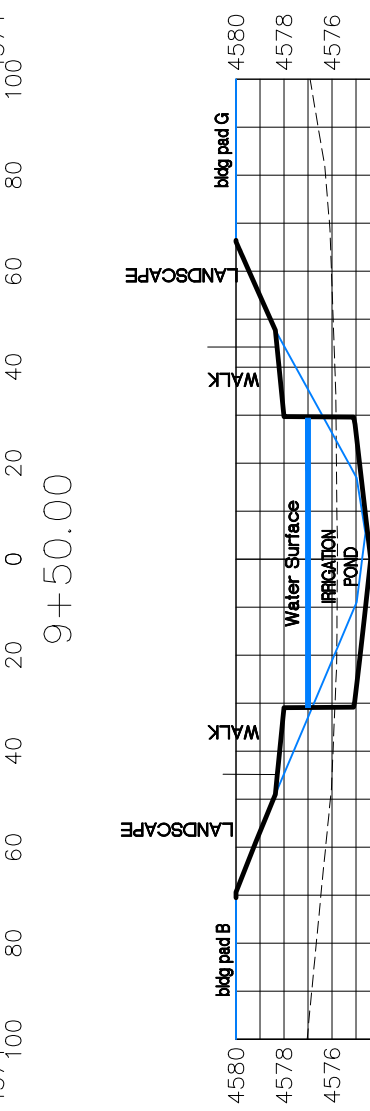
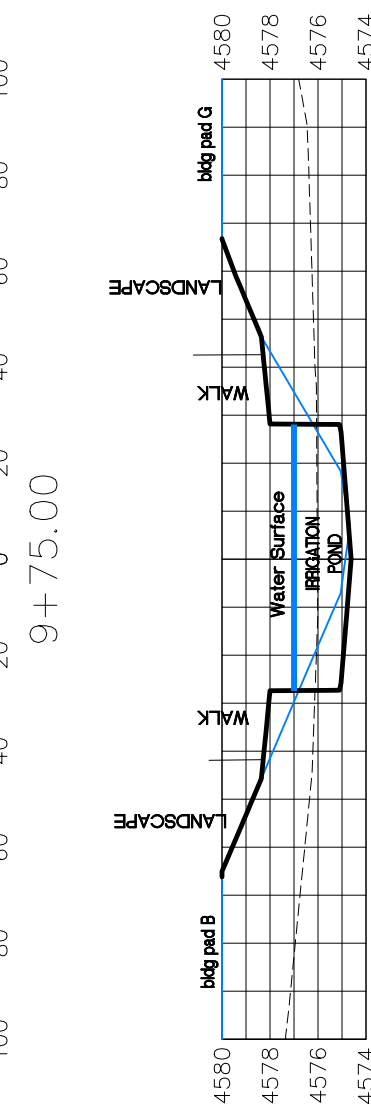
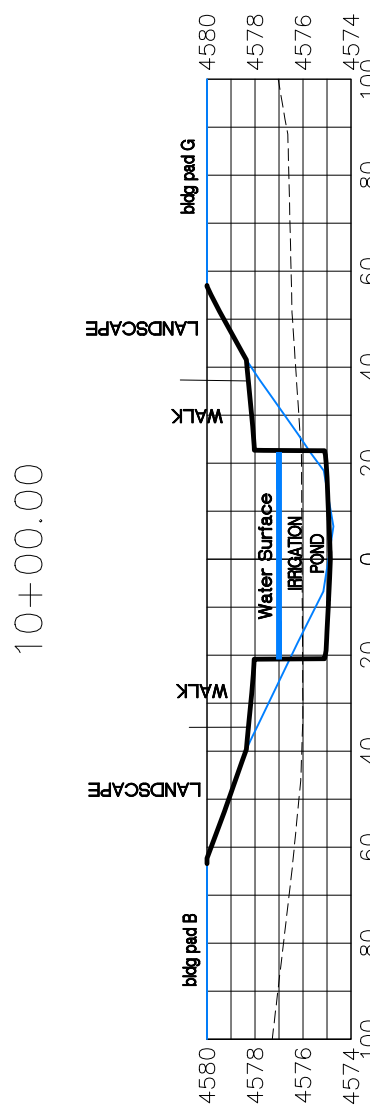
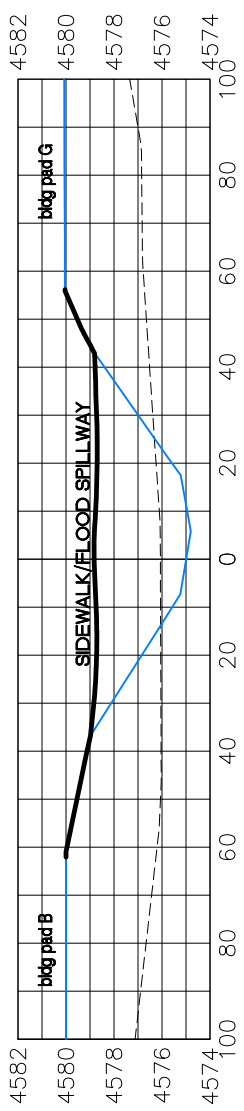
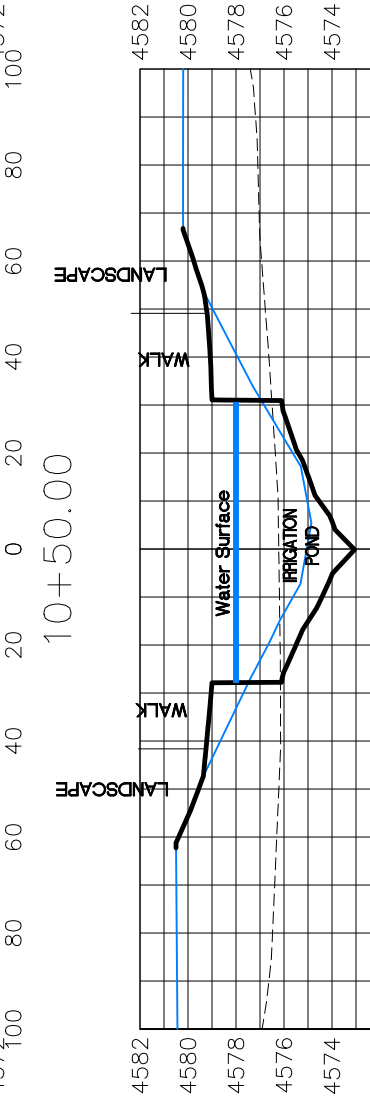
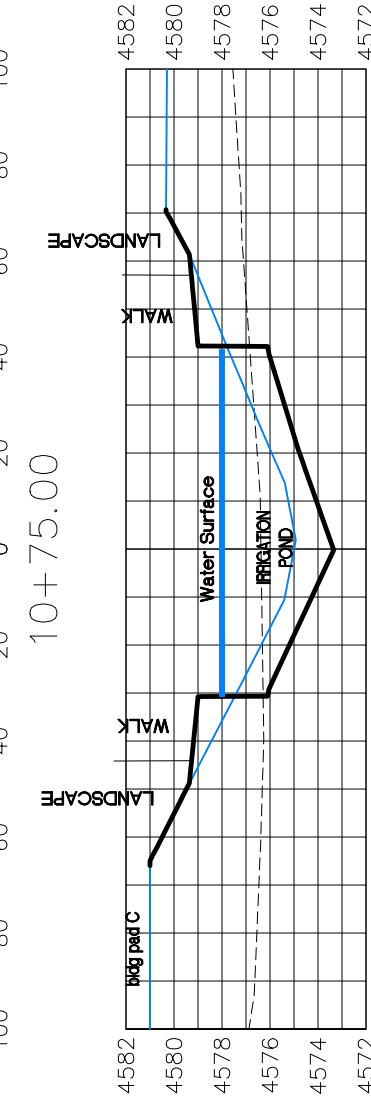
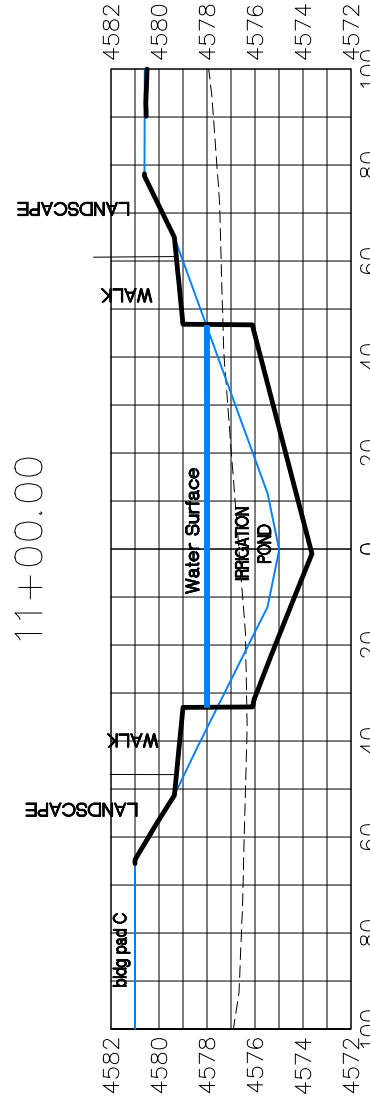
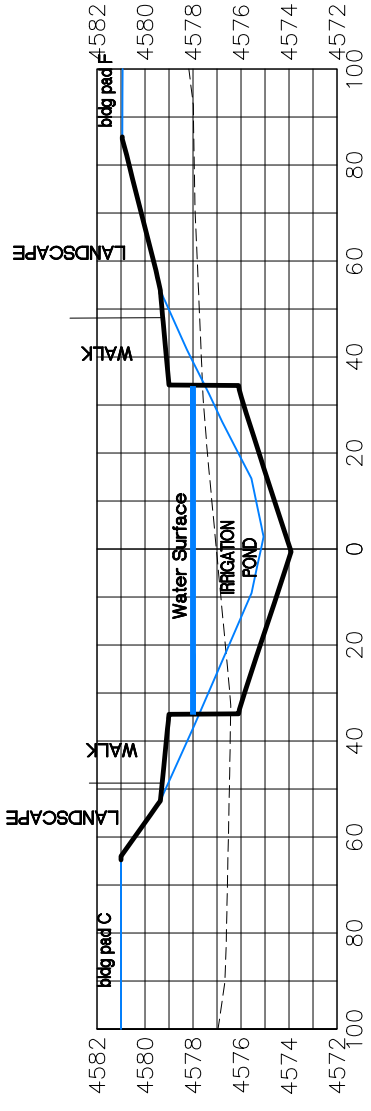
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALE:	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

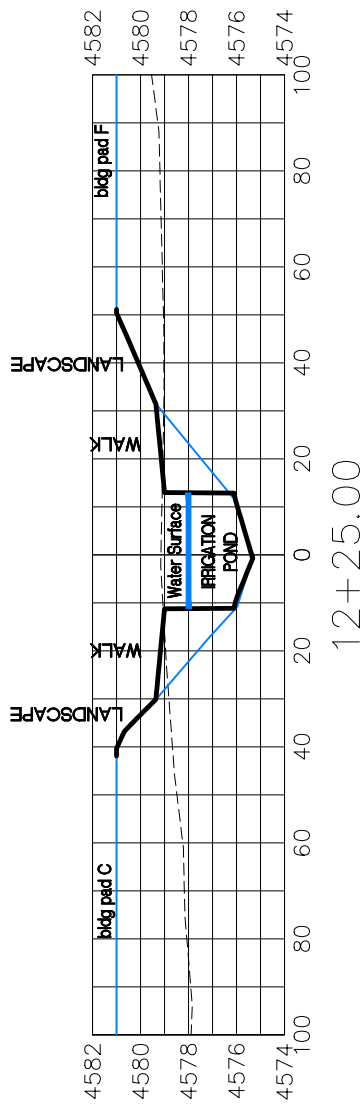
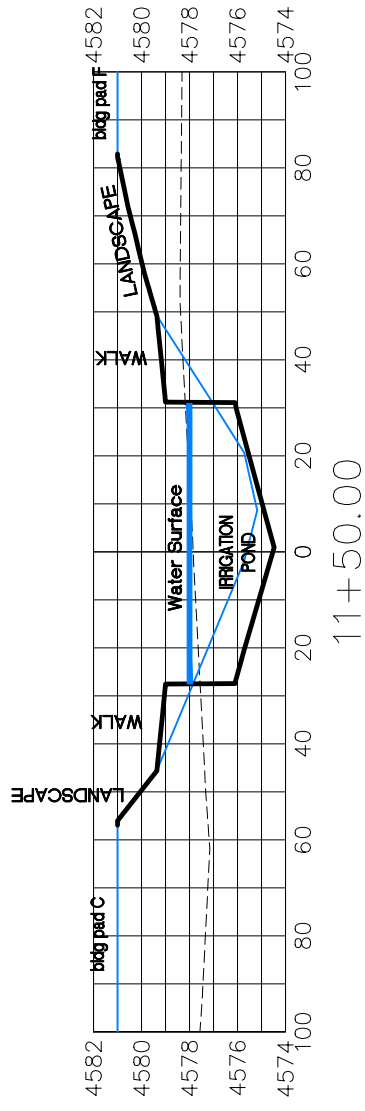
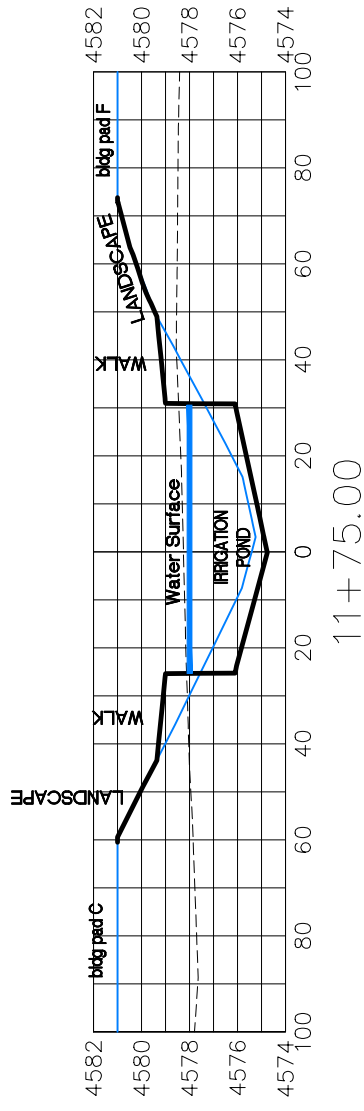
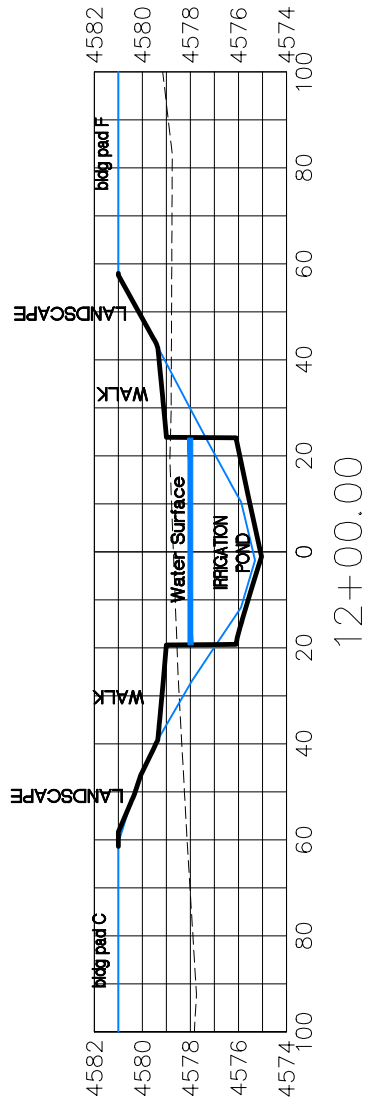
DRAWN BY JCS DATE 2018
 DESIGNED BY JCS DATE 2018
 CHECKED BY TCP DATE 2018
 APPROVED BY TCP DATE 2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS



APPROXIMATE SITE INVERT

REVISION	DESCRIPTION	DATE

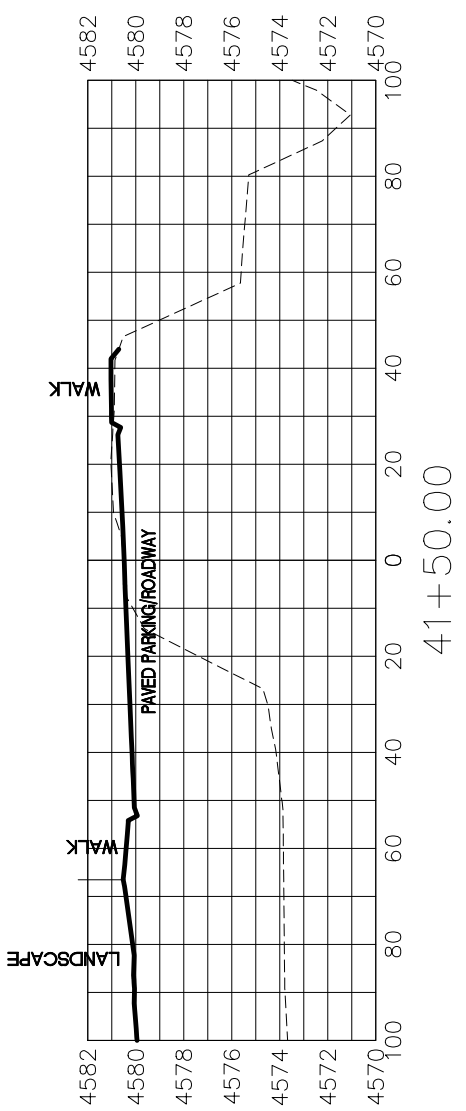
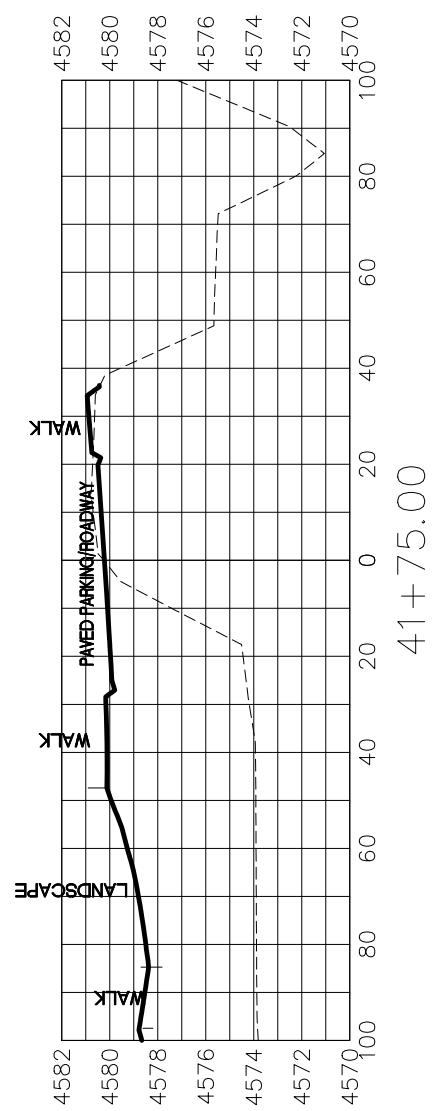
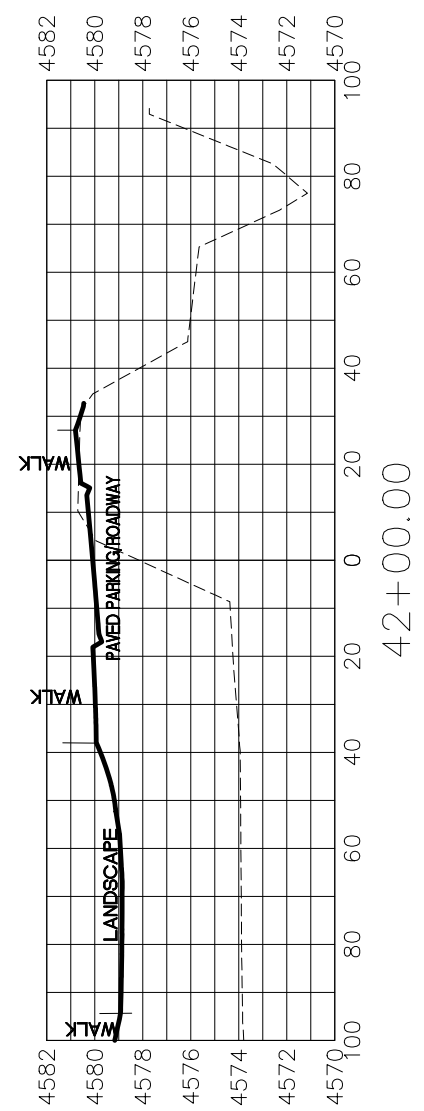
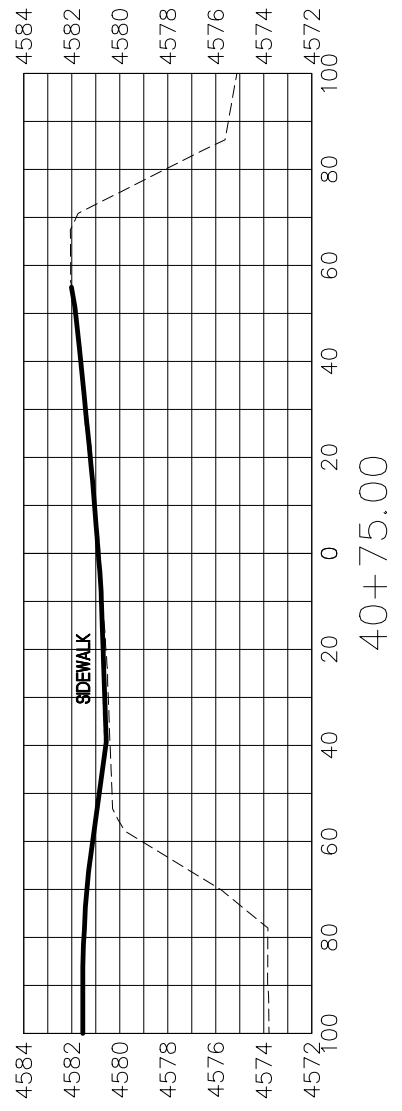
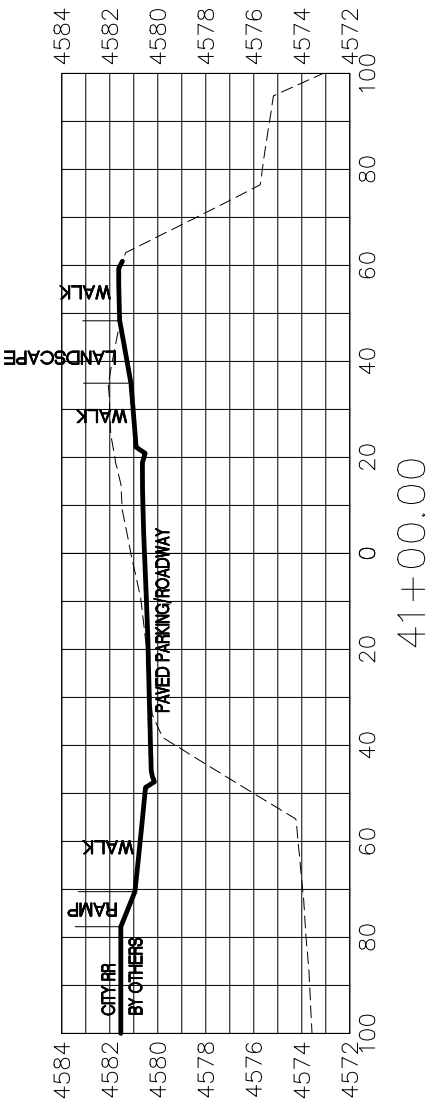
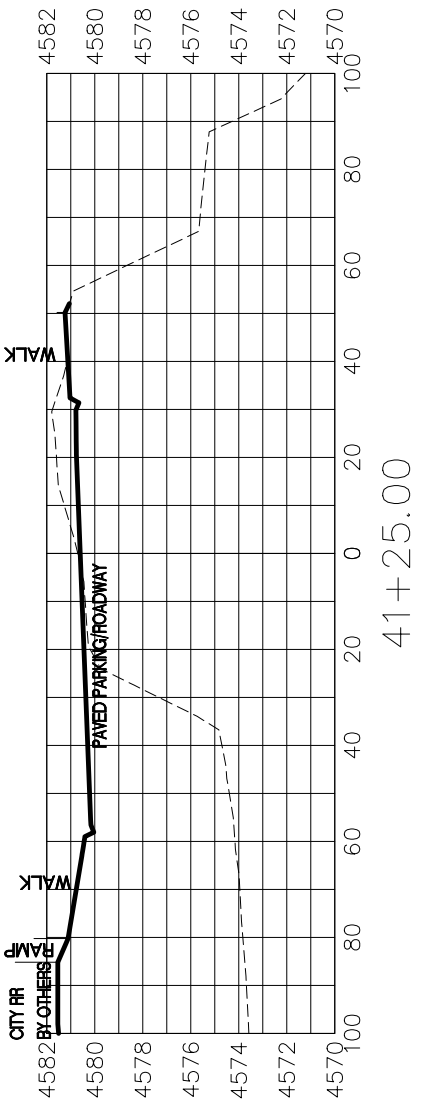
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALE:	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



BOAT RAMP ROAD

REVISION	DESCRIPTION	DATE

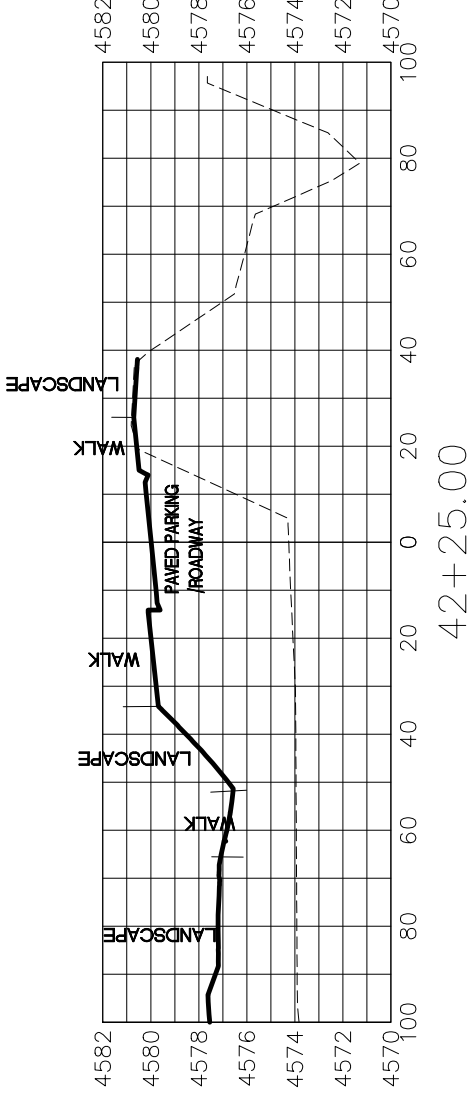
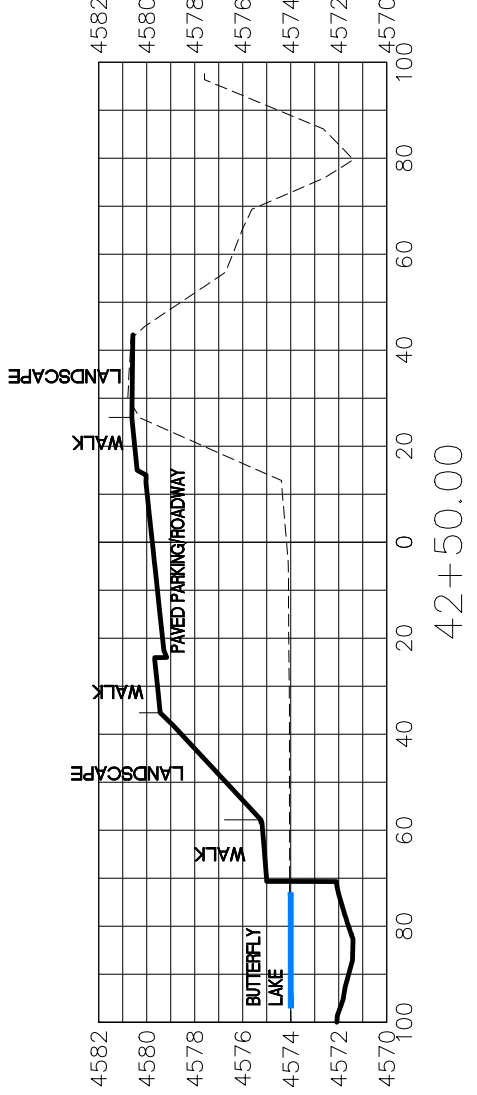
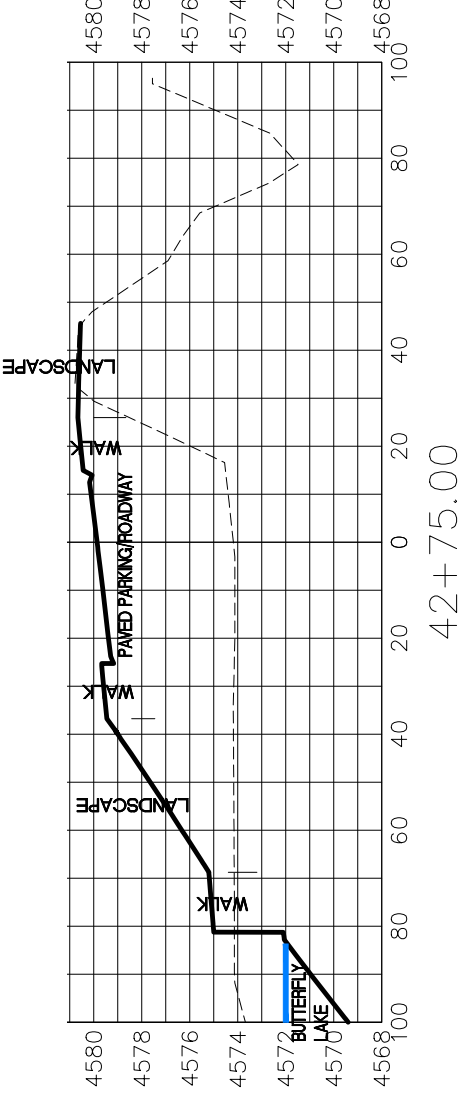
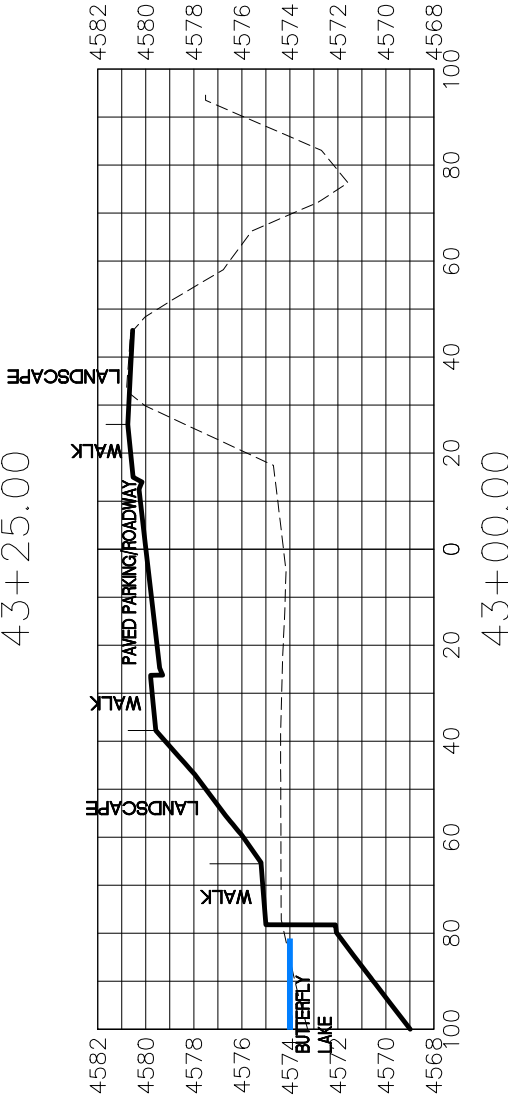
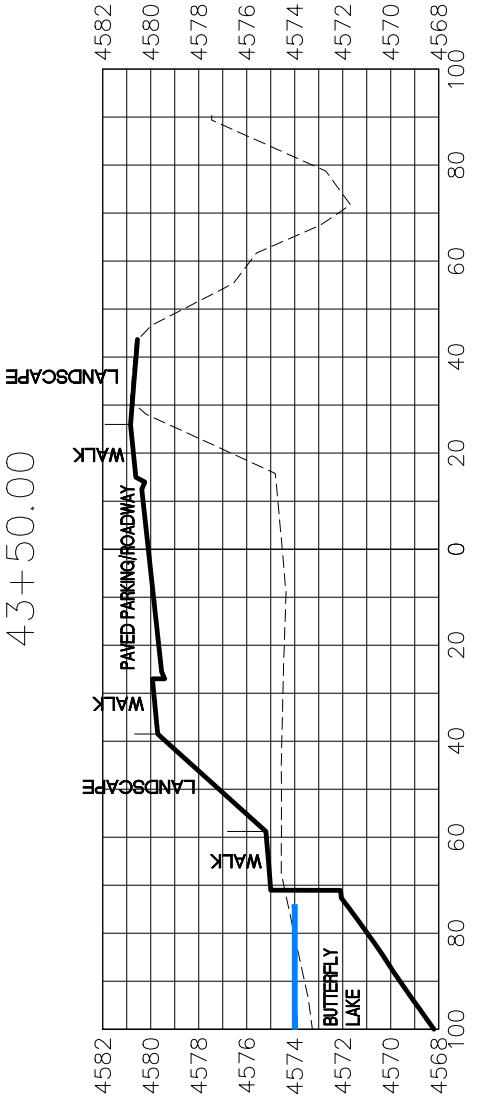
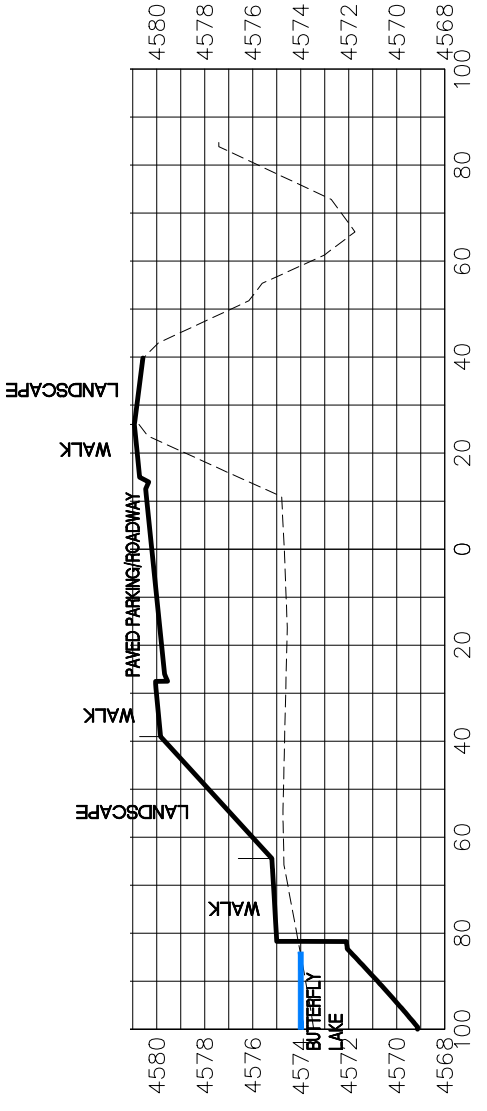
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



**PUBLIC WORKS
ENGINEERING DIVISION**

**LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS**



BOAT RAMP ROAD

REVISION	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018

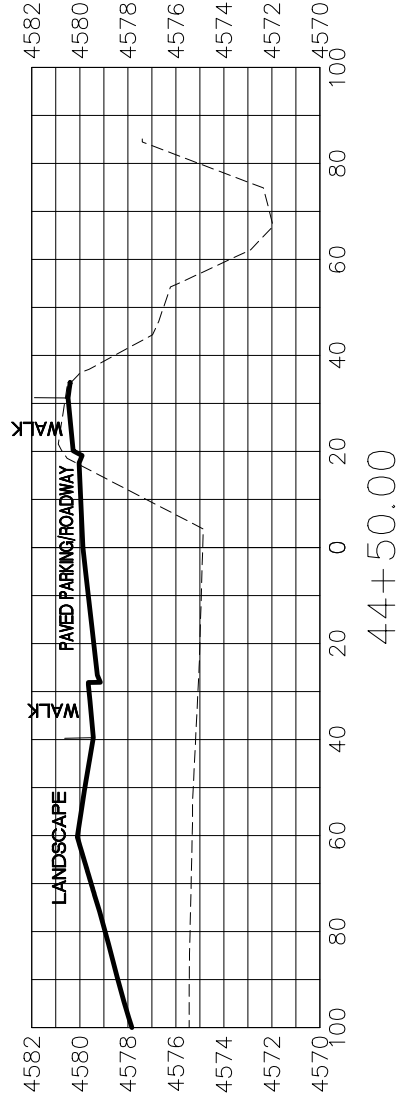
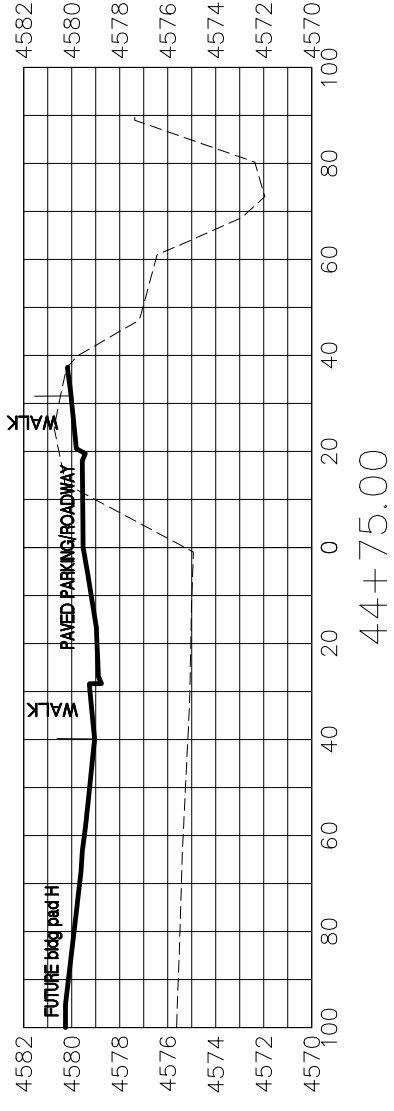
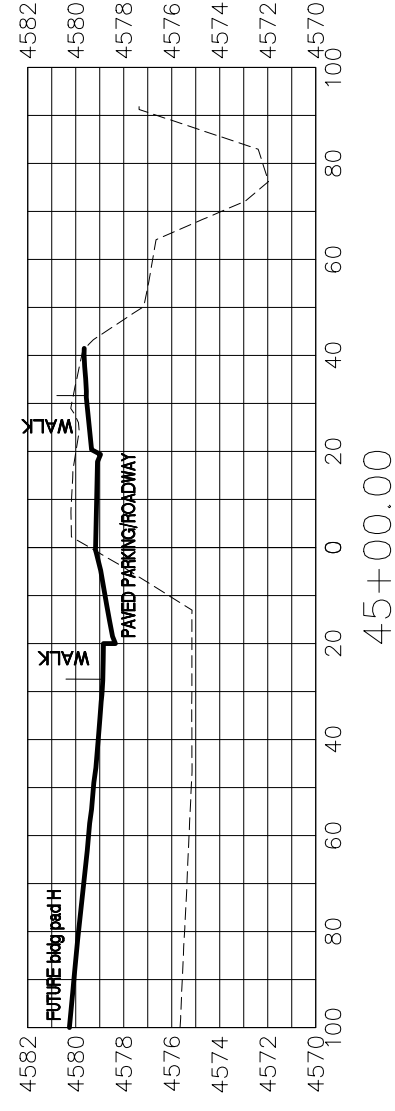
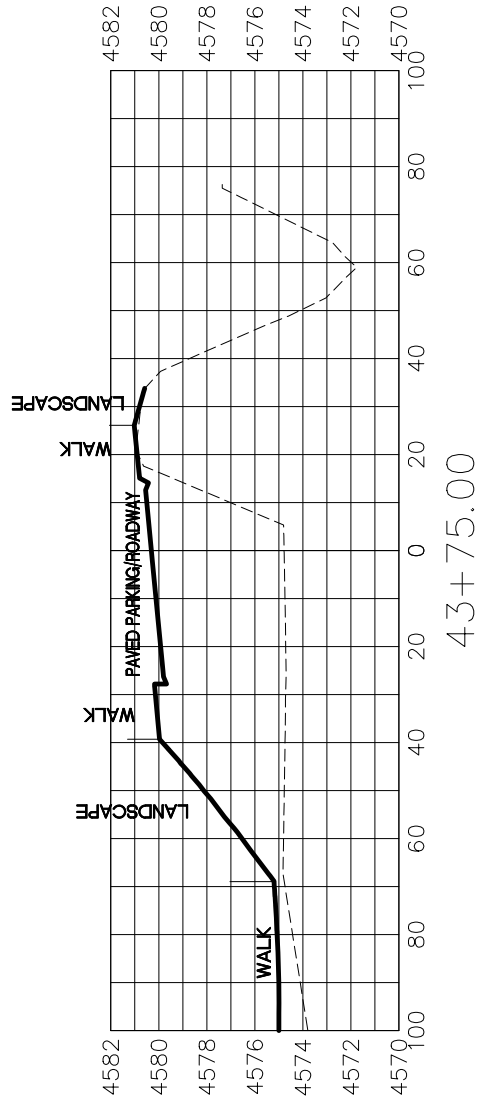
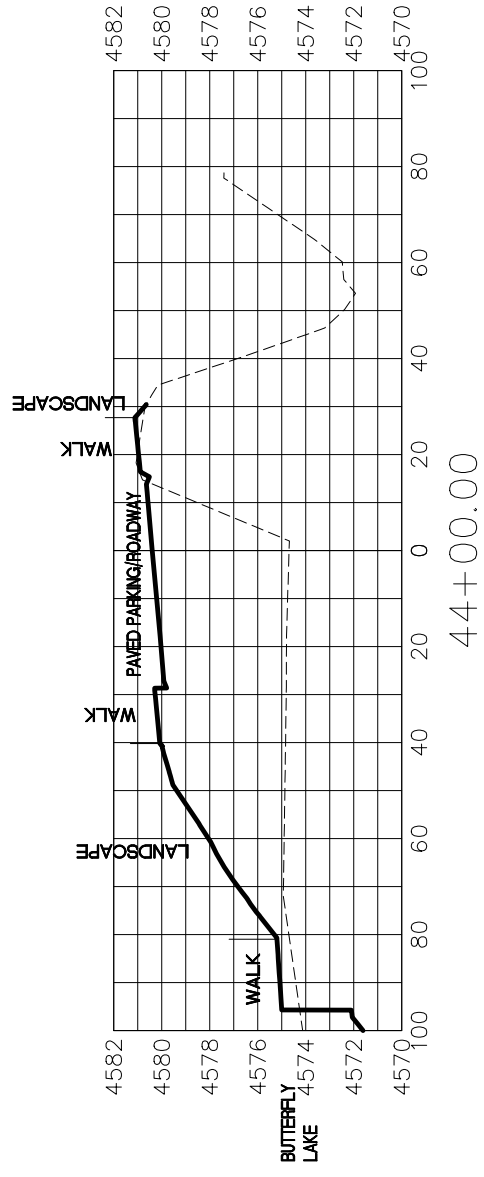
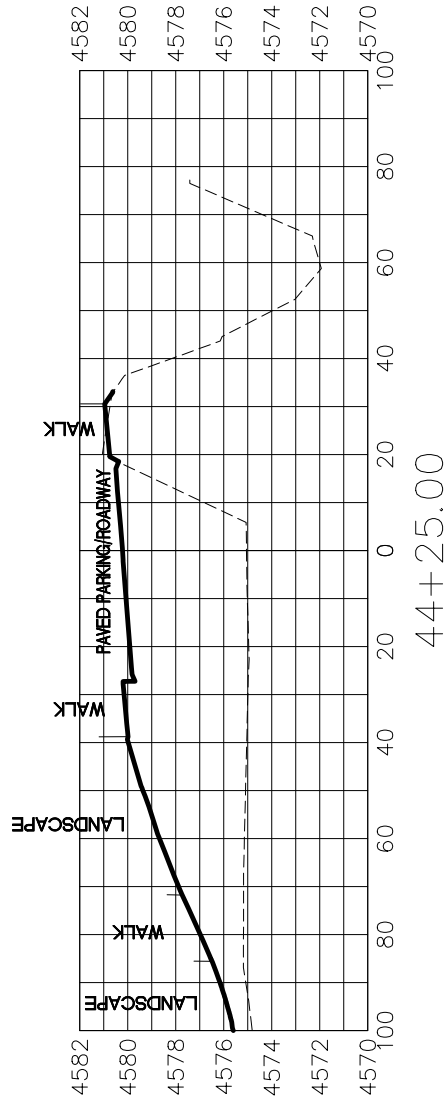
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



BOAT RAMP ROAD

REVISION	DESCRIPTION	DATE

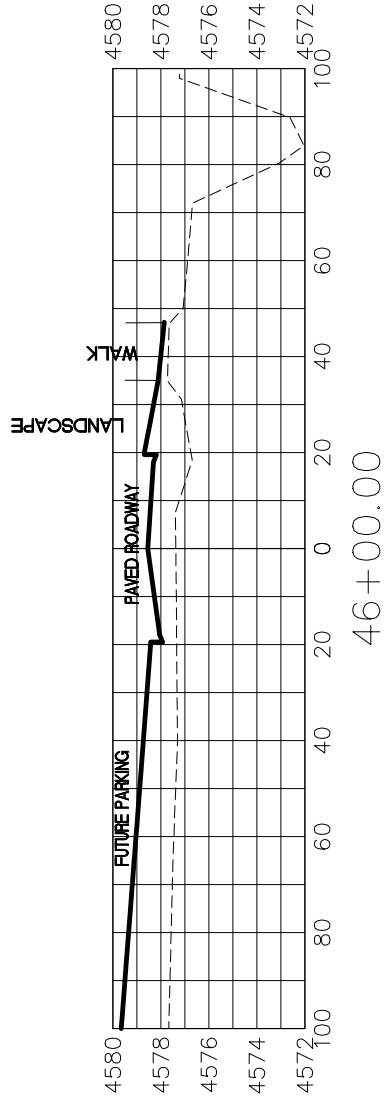
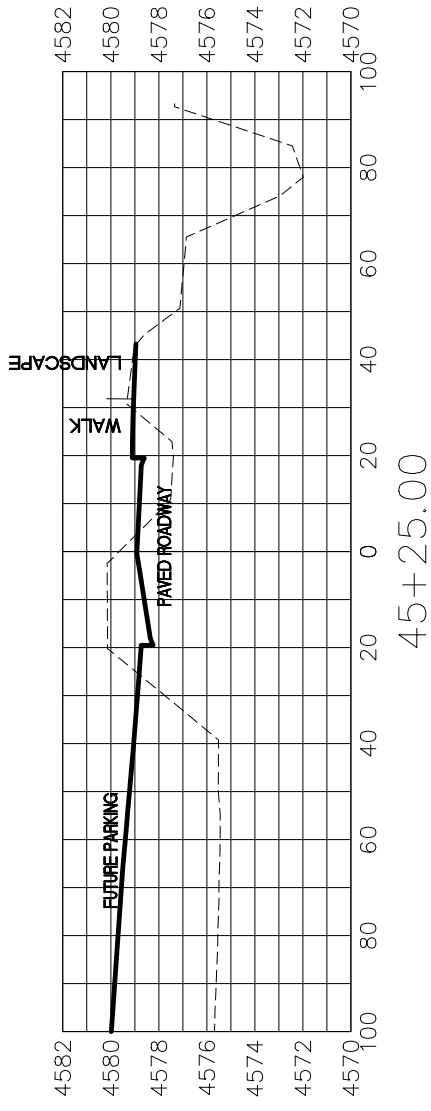
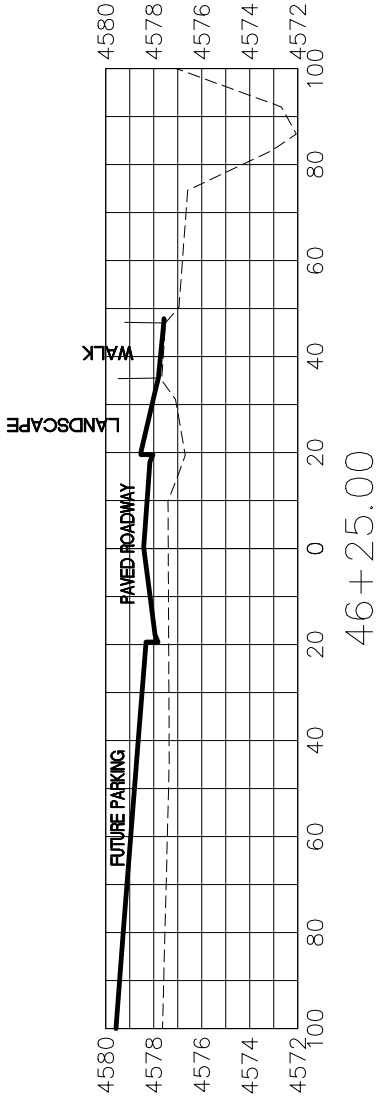
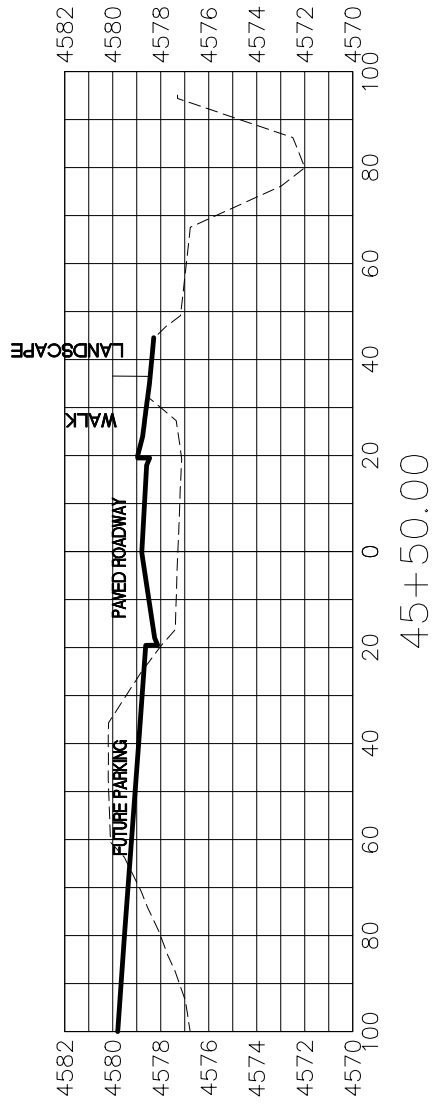
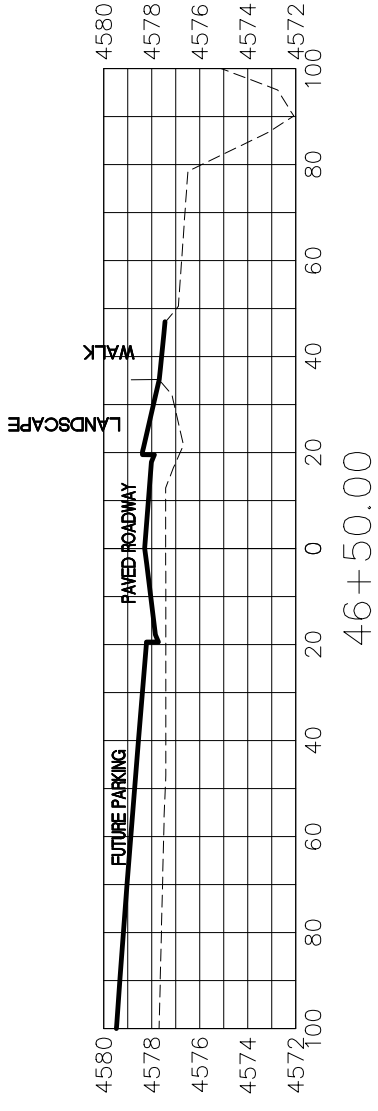
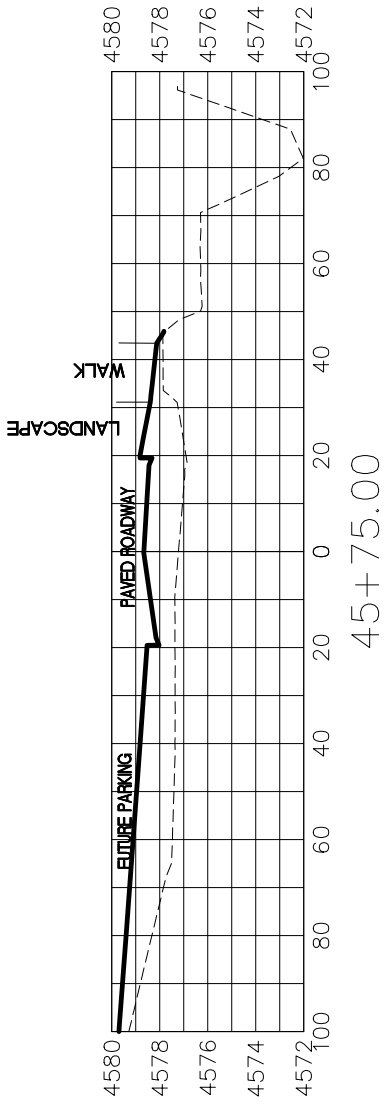
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
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VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



BOAT RAMP ROAD

REVISION	DESCRIPTION	DATE

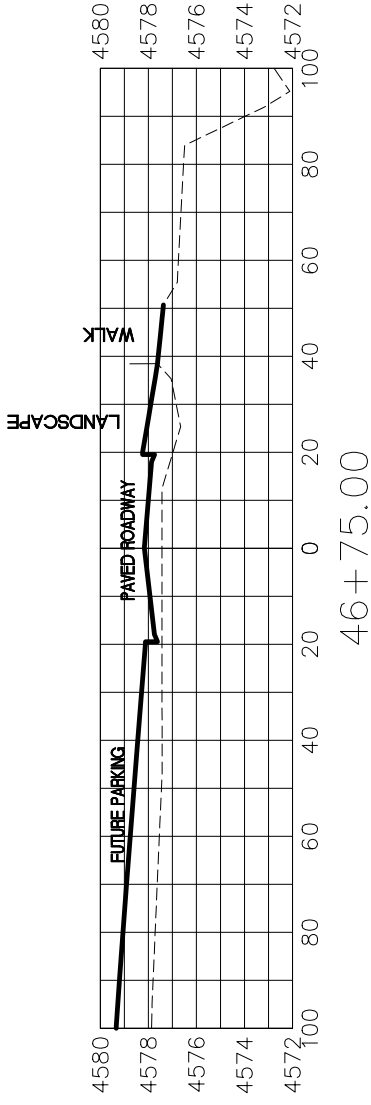
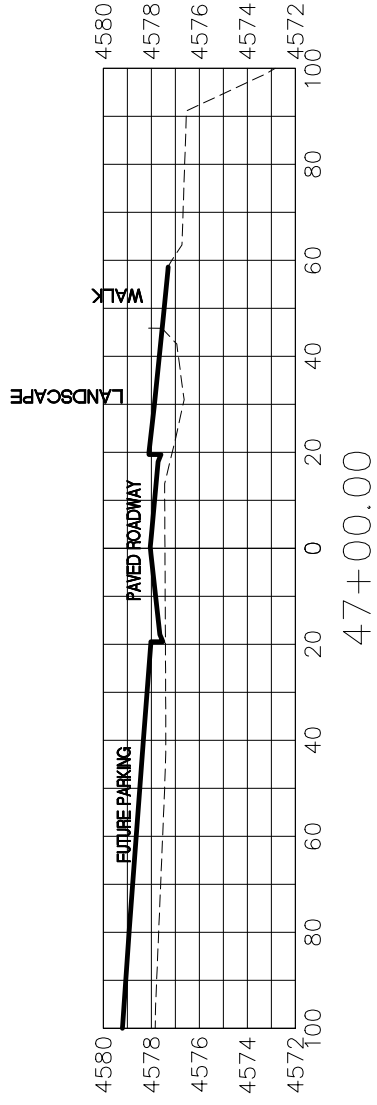
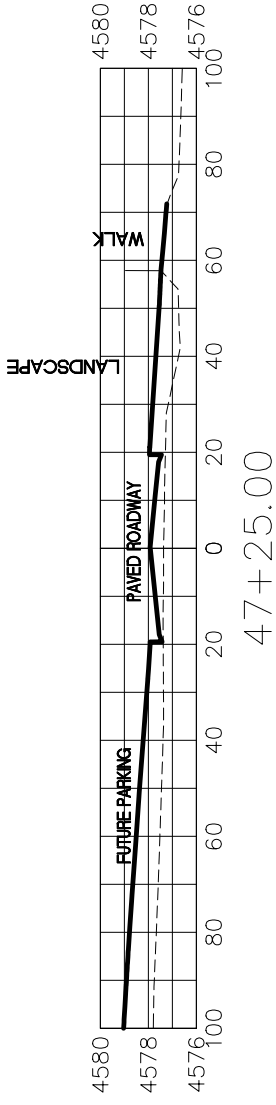
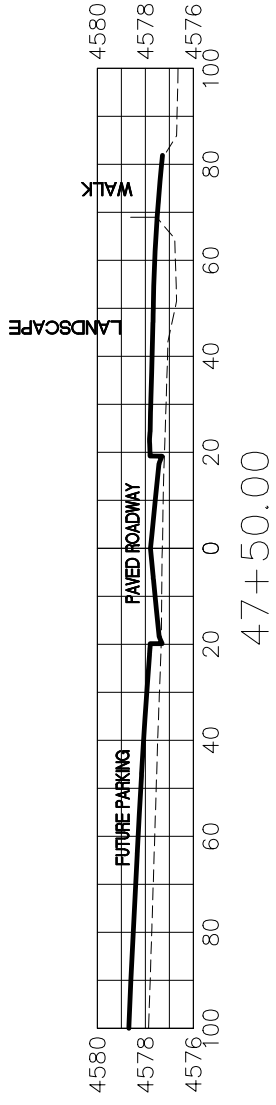
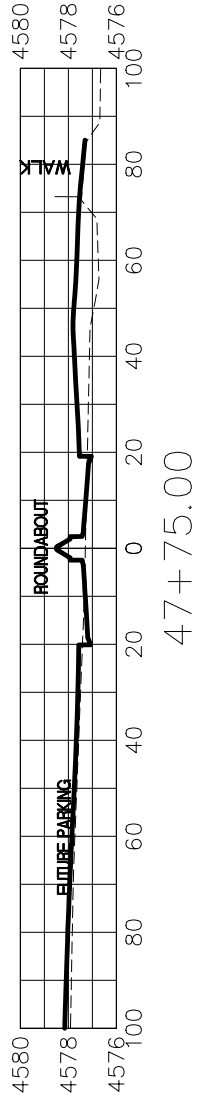
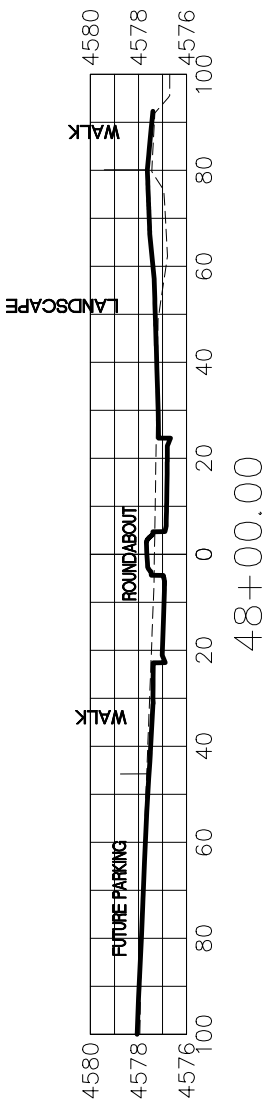
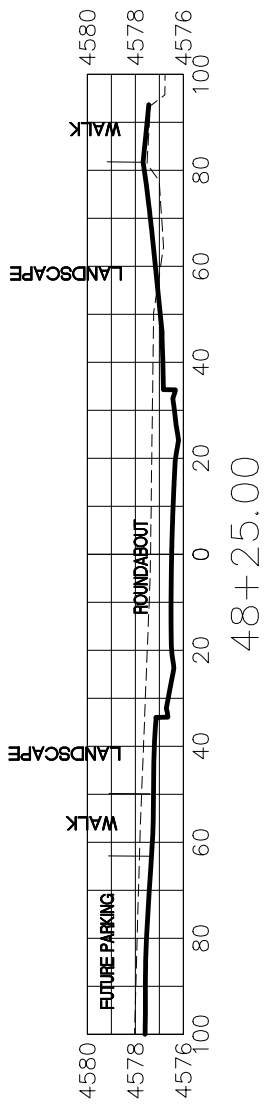
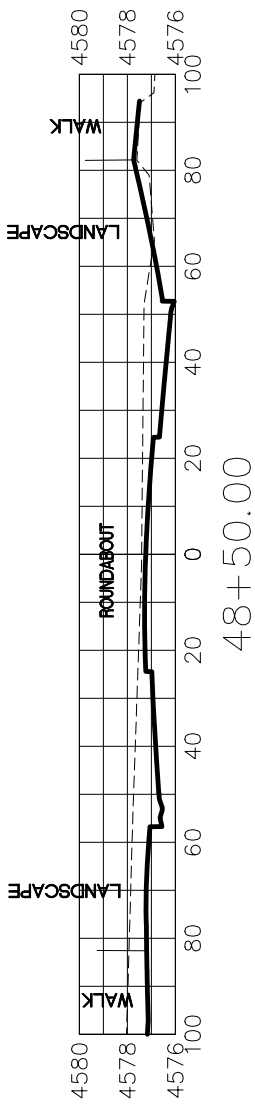
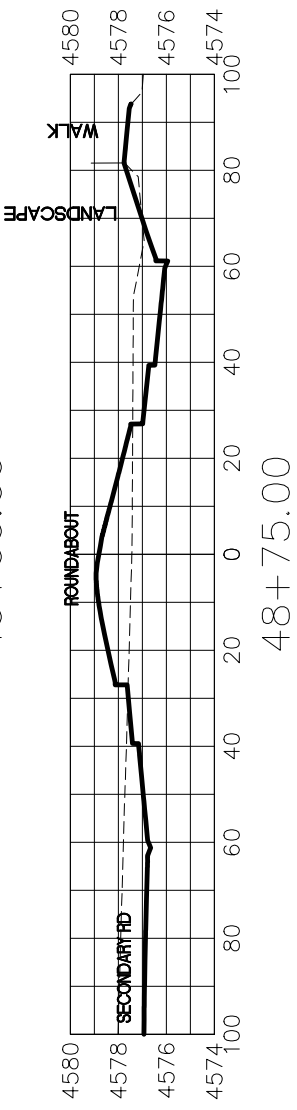
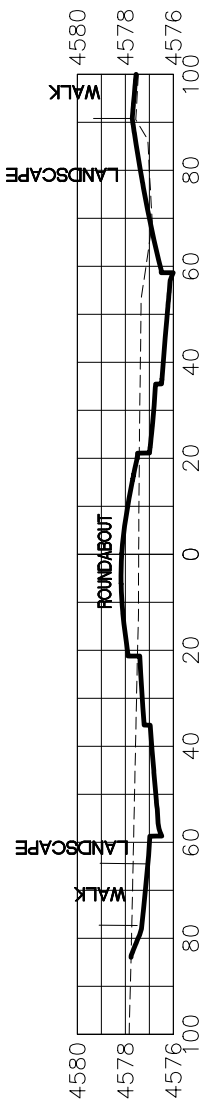
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



BOAT RAMP ROAD

REVISION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS

REVISION	DATE	DESCRIPTION

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

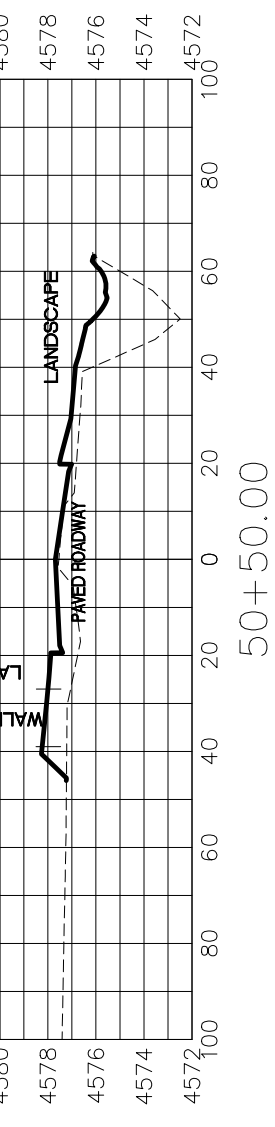
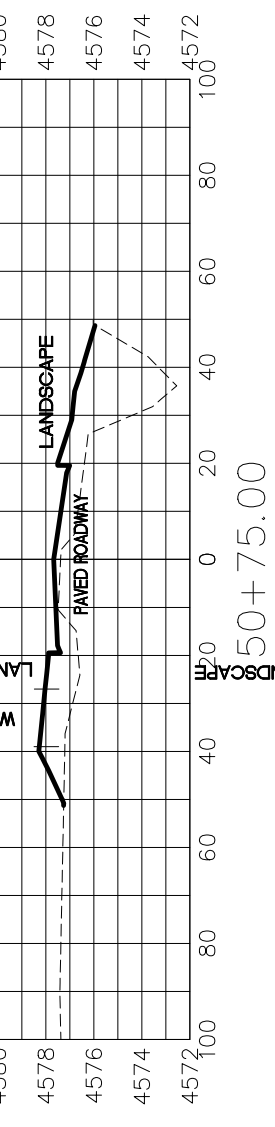
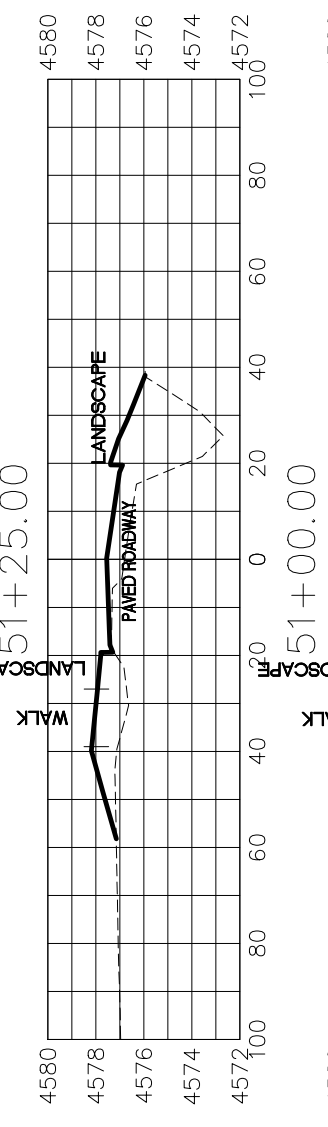
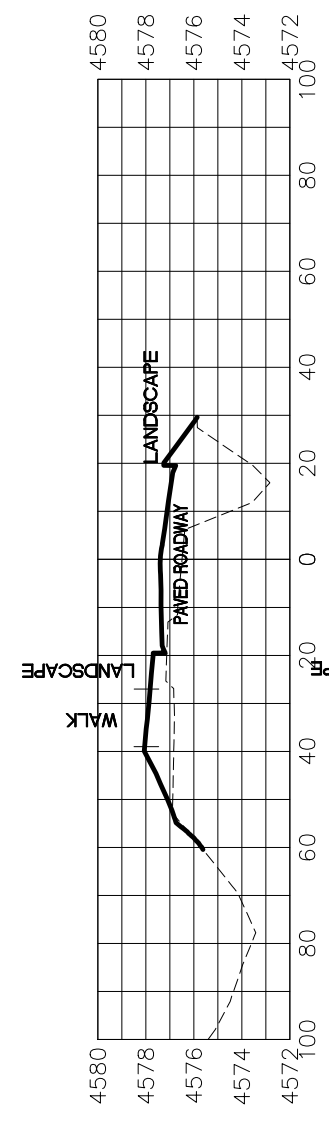
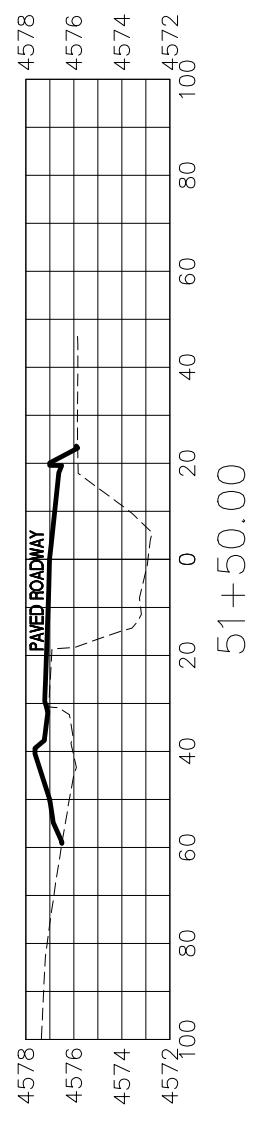
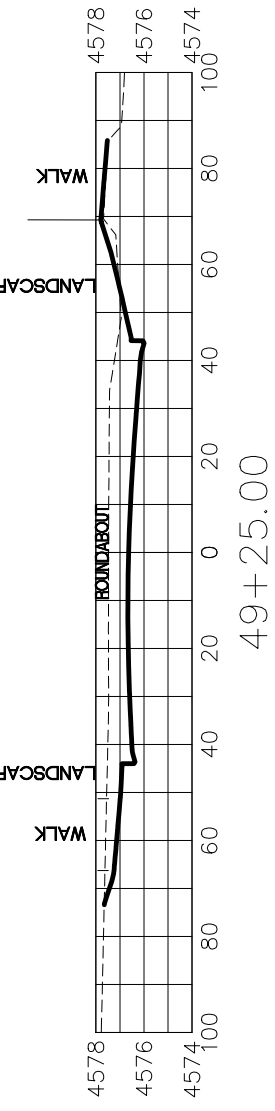
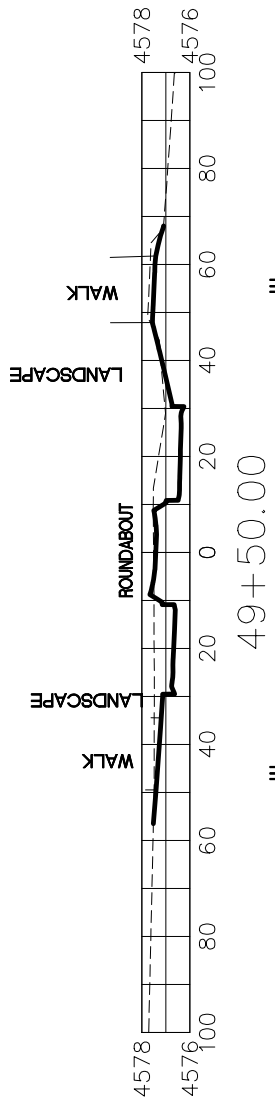
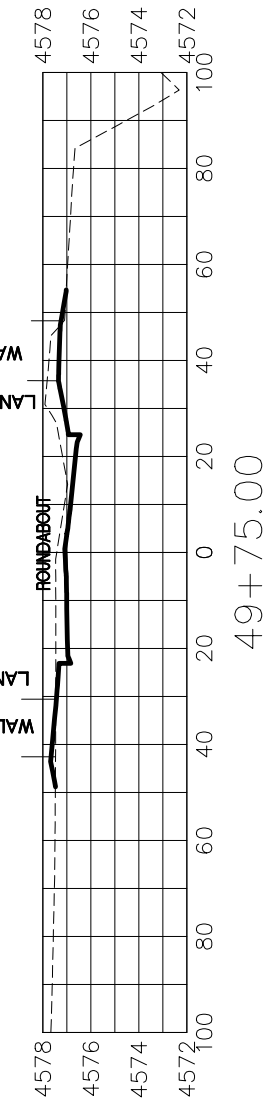
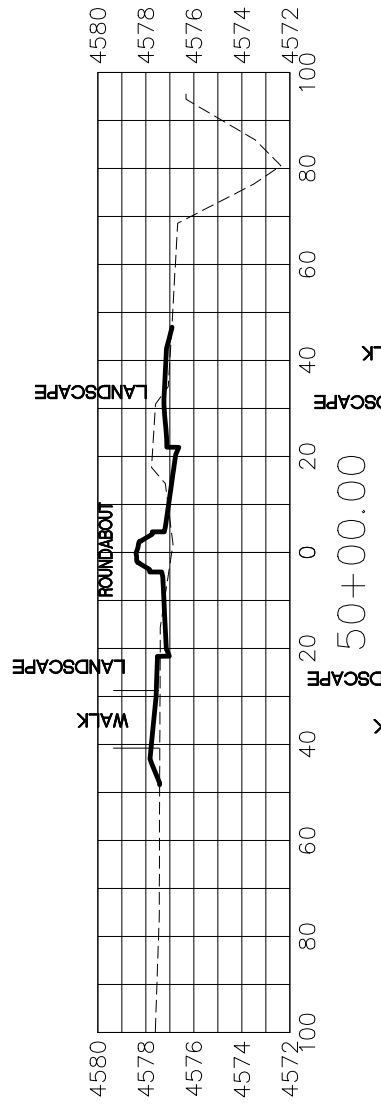
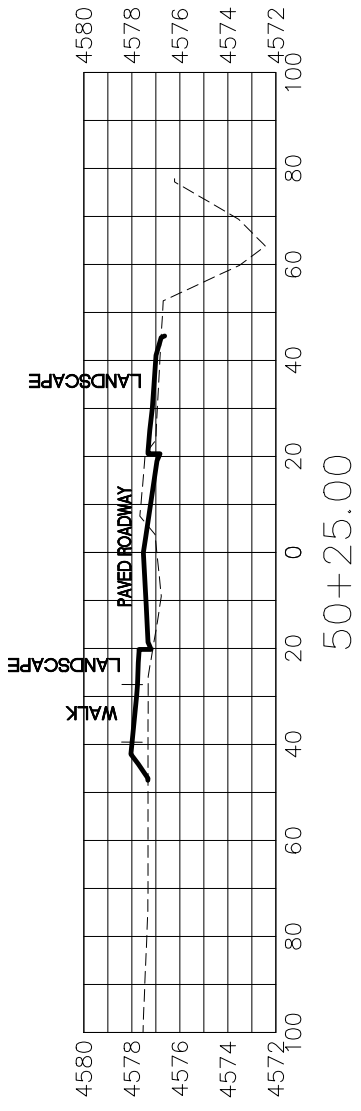
SCALE:	PLAN & PROFILE
0	HORIZONTAL
20	VERTICAL

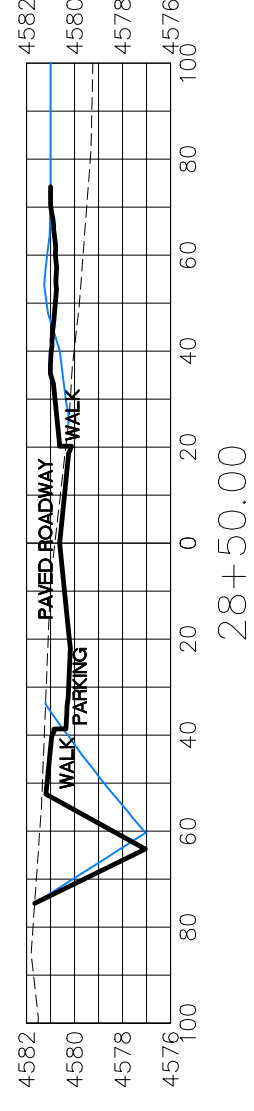
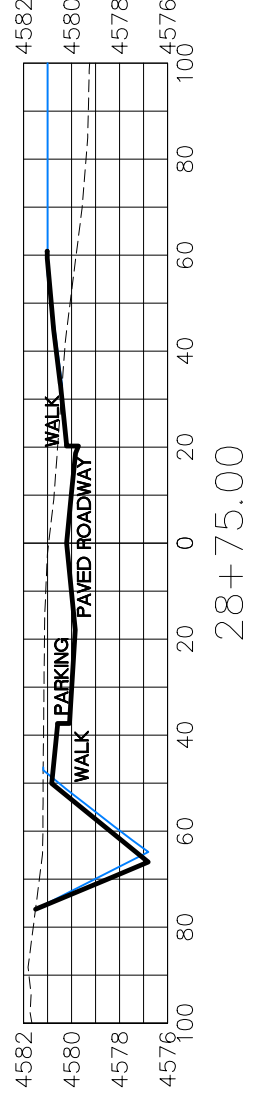
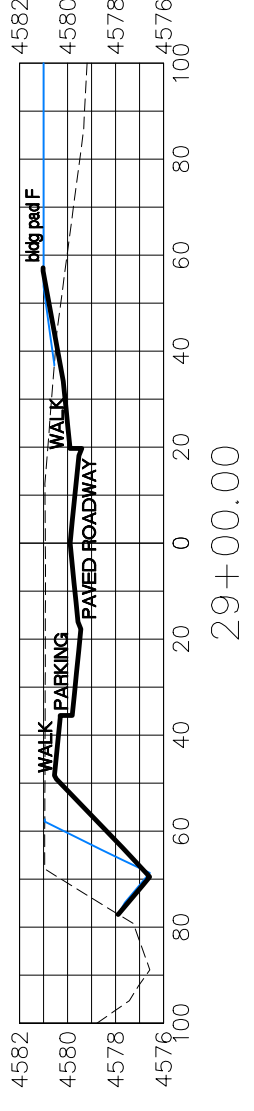
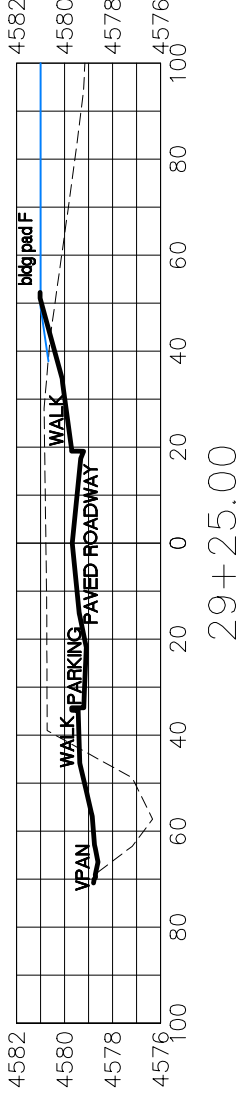
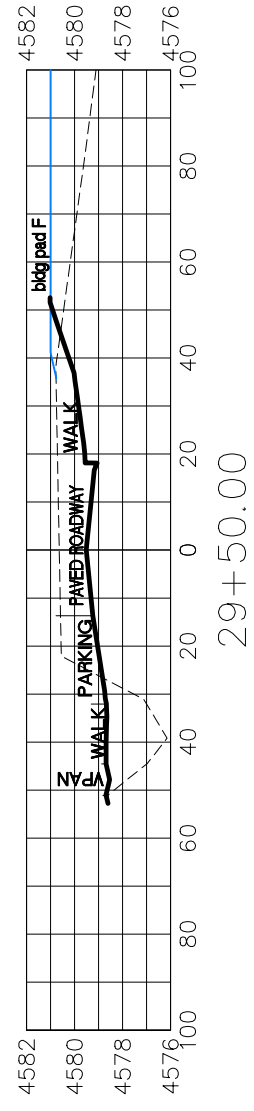
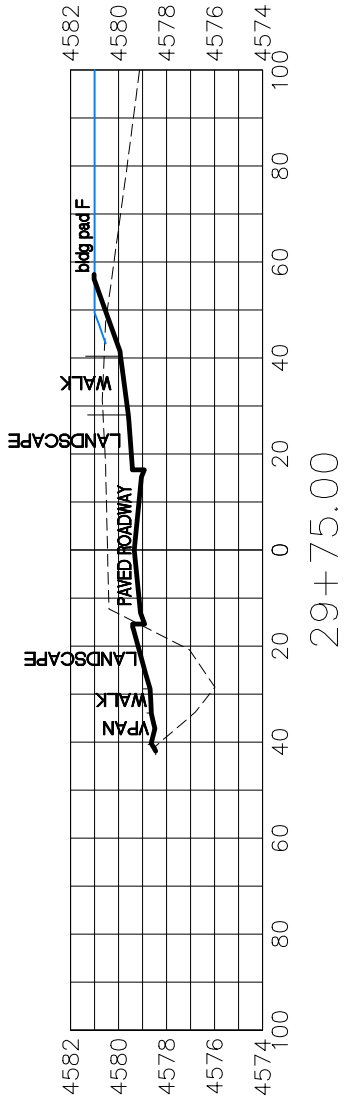
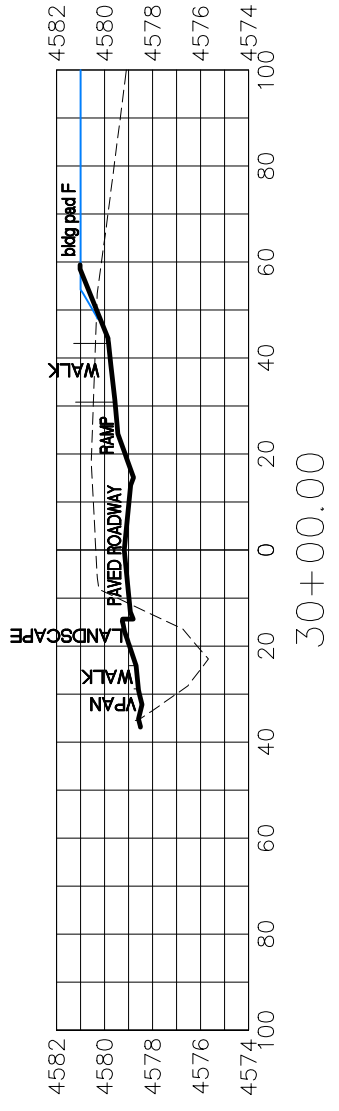
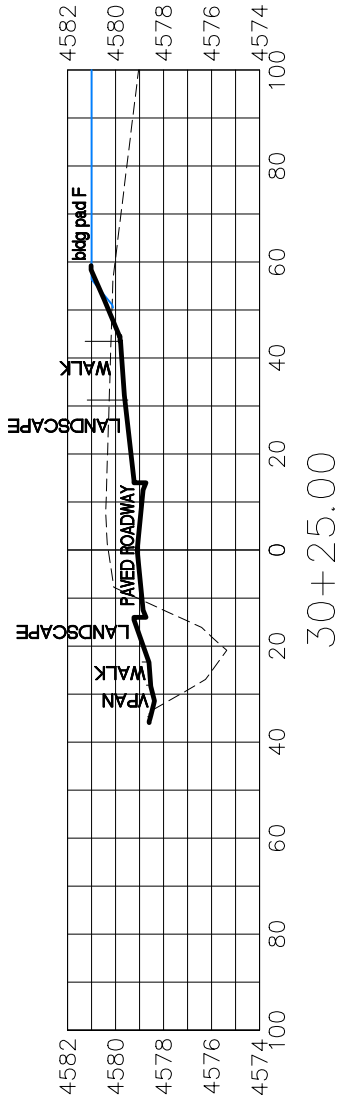


PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 SITE CROSS SECTIONS

BOAT RAMP ROAD





SECONDARY ROAD

REVISION	DATE

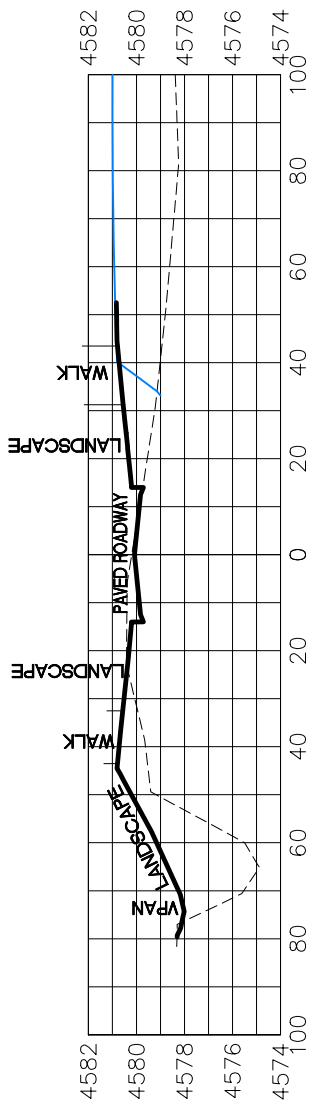
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'

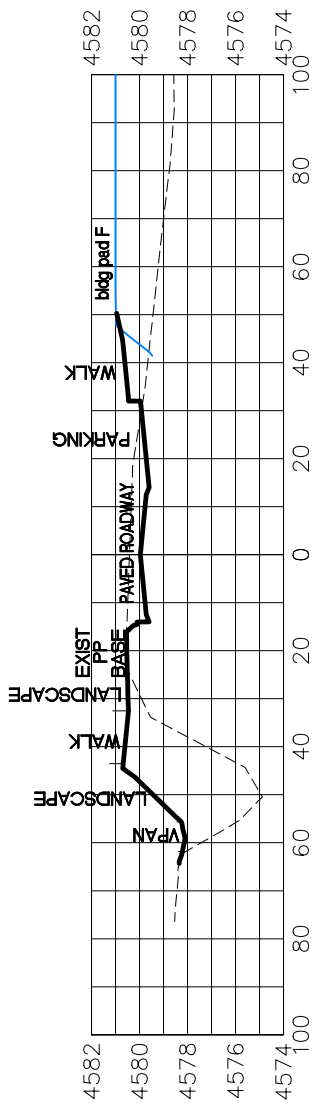


PUBLIC WORKS
ENGINEERING DIVISION

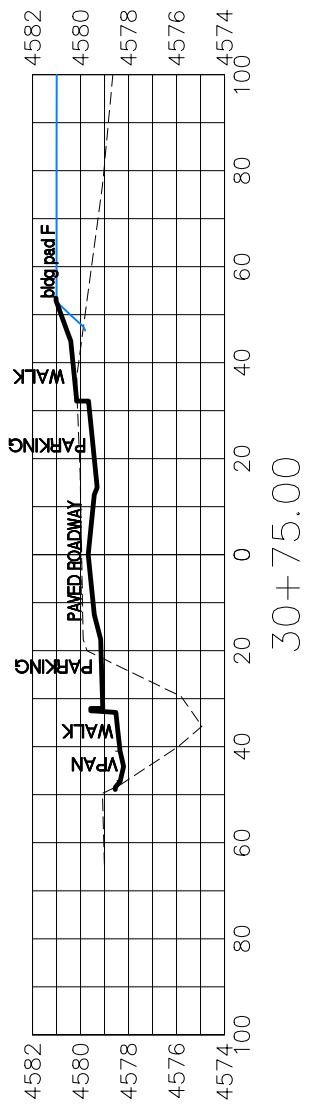
LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



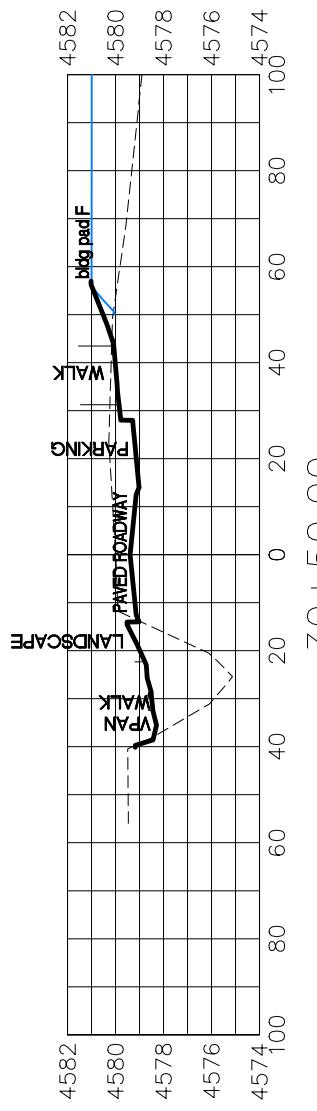
31+25.00



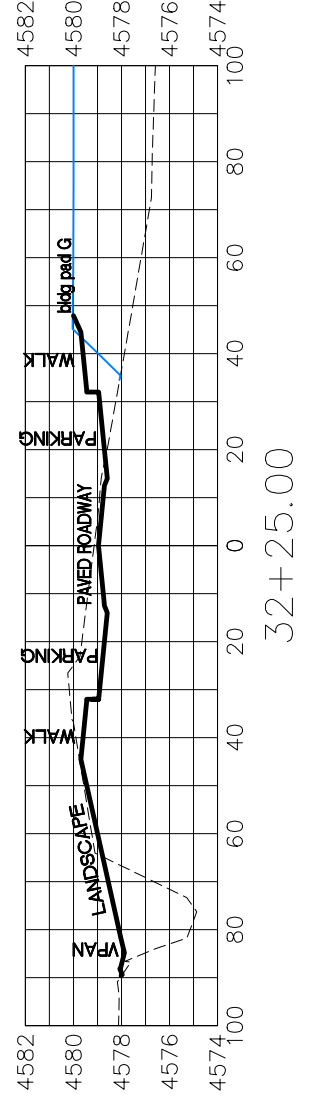
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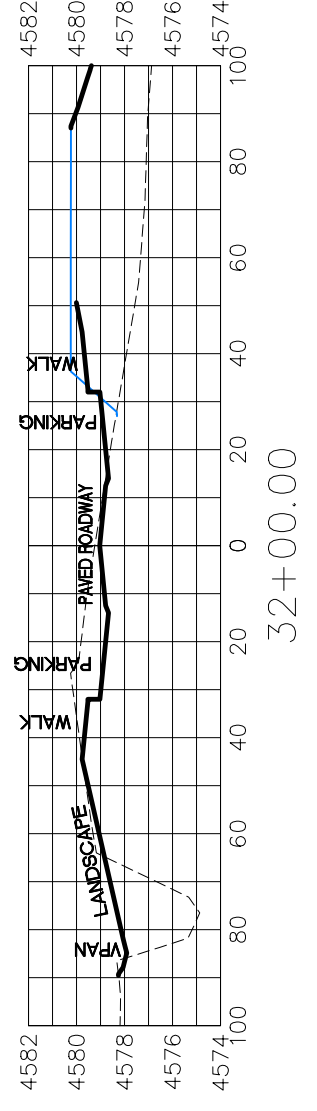
30+75.00



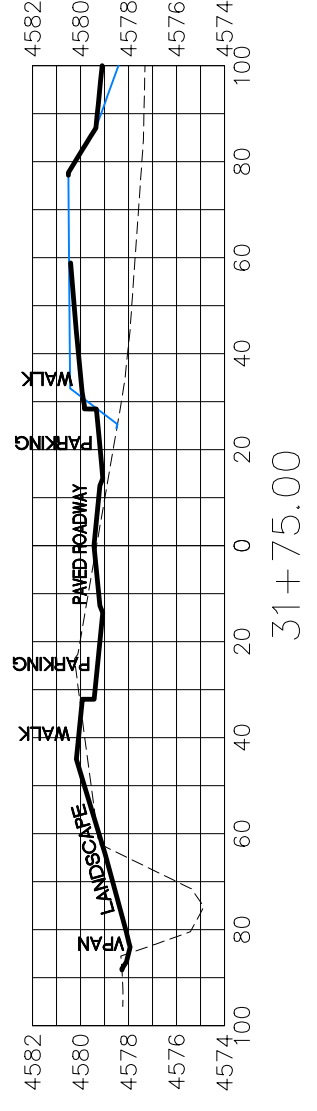
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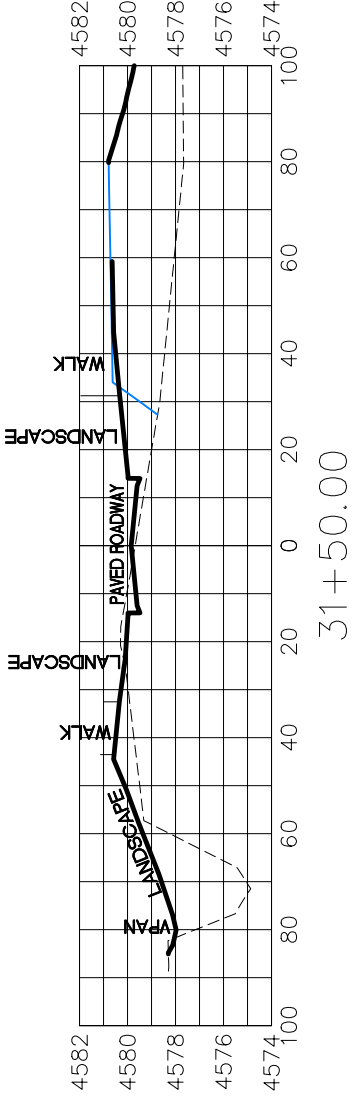
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32+00.00



31+75.00



31+50.00

SECONDARY ROAD

REVISION	DESCRIPTION	DATE

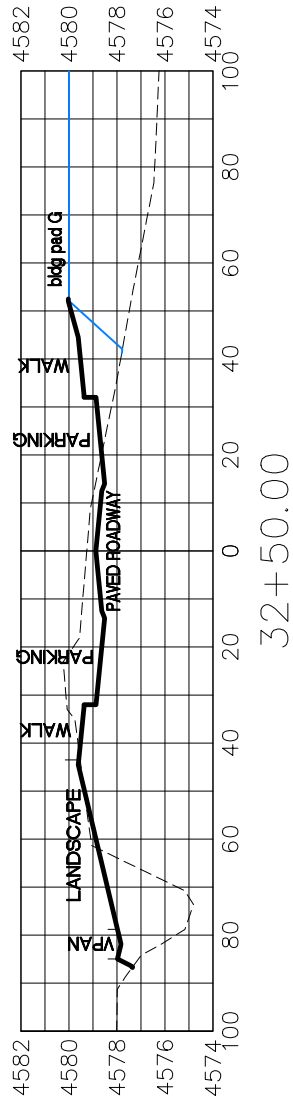
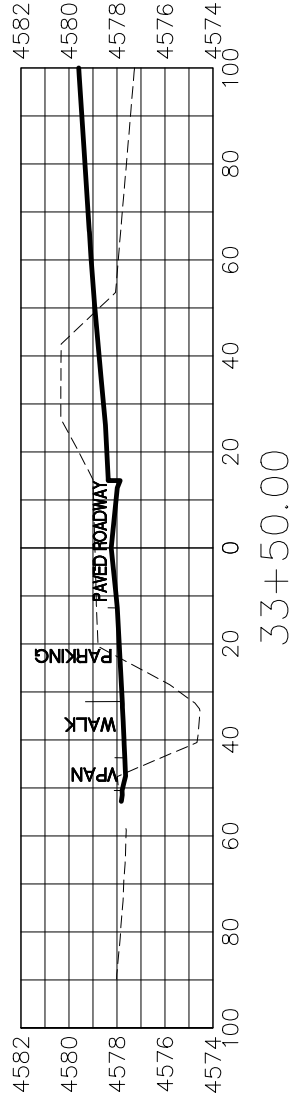
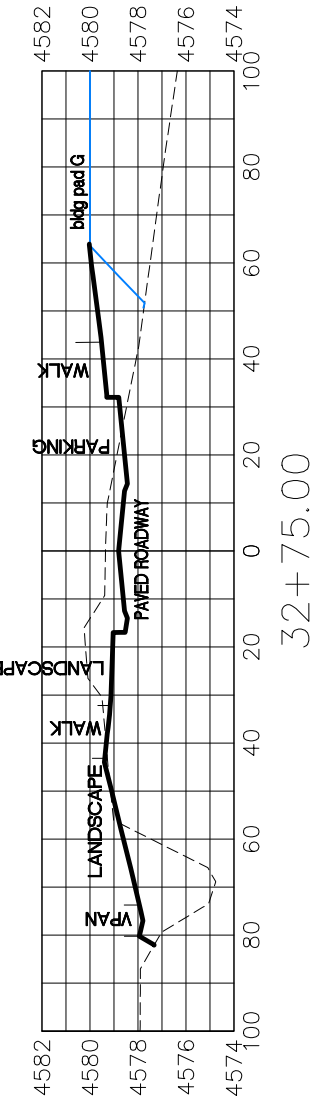
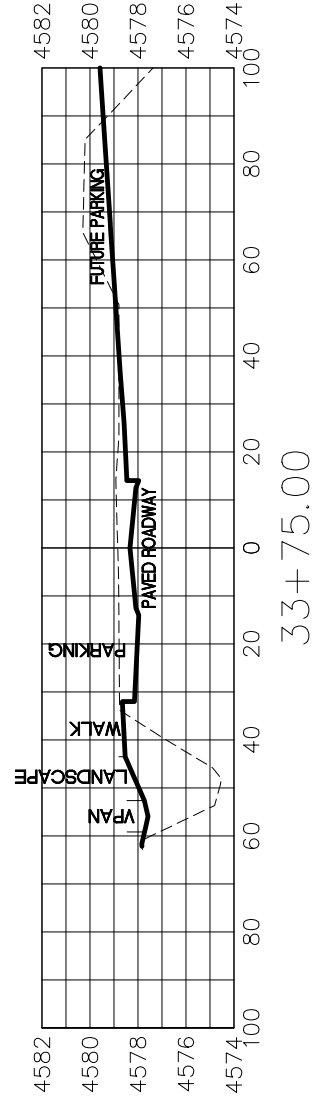
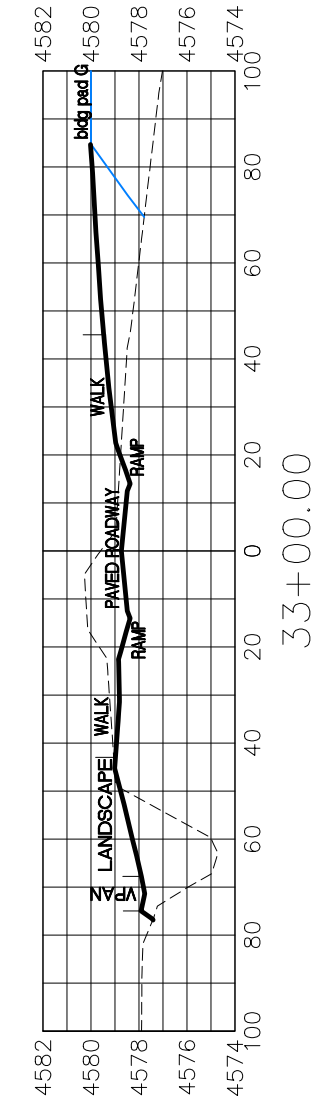
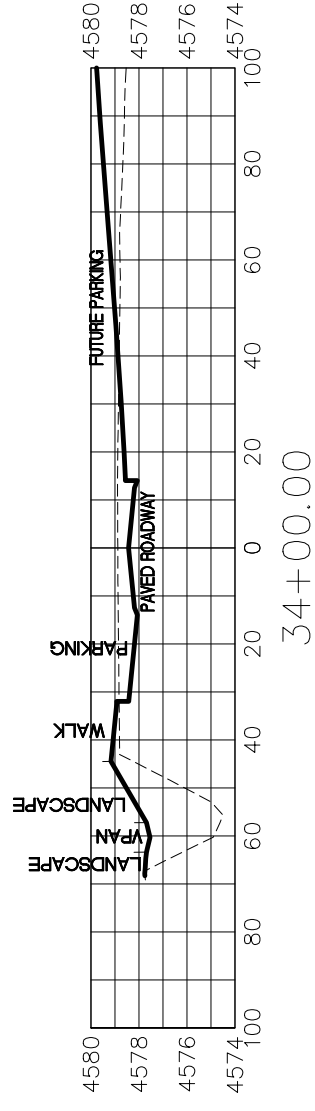
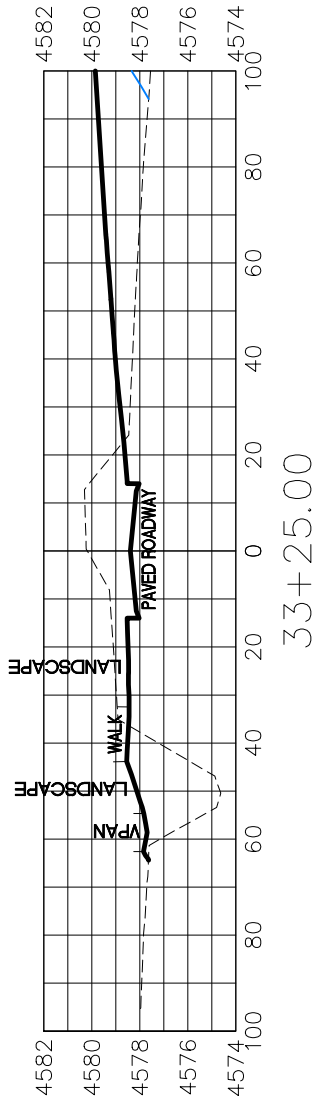
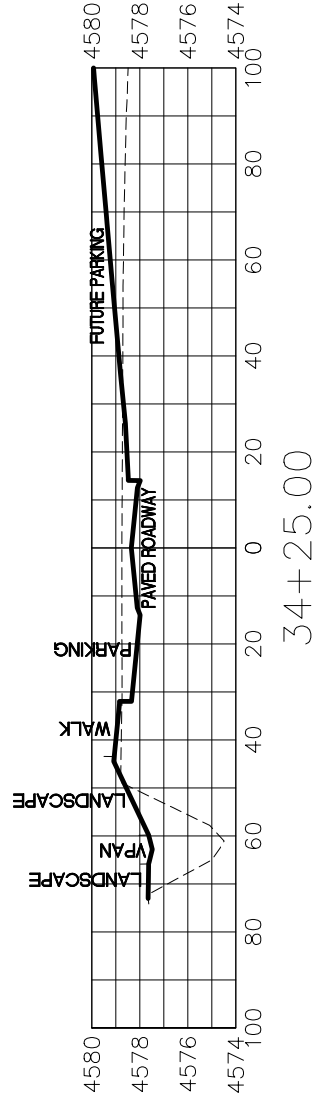
DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



SECONDARY ROAD

REVISION	DATE

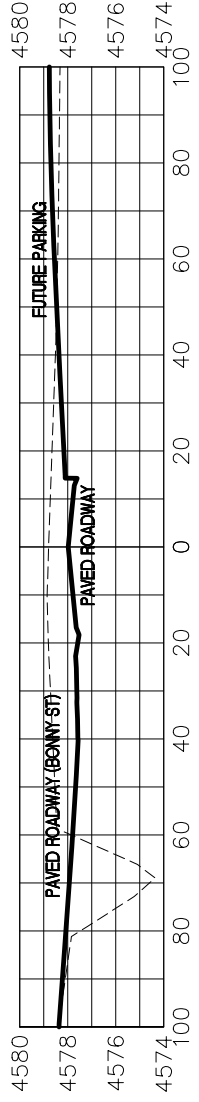
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CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	
PLAN & PROFILE	1" = 40'
HORIZONTAL	1" = 20'
VERTICAL	1" = 4'

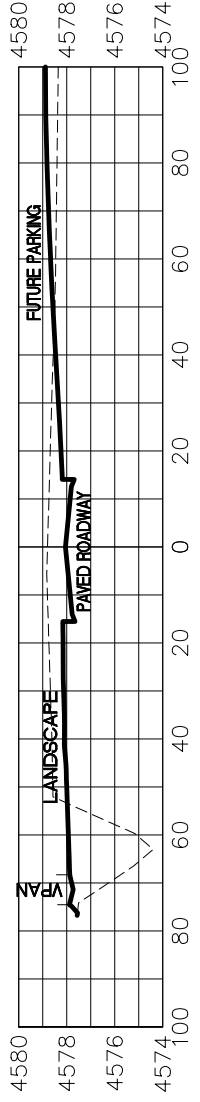


PUBLIC WORKS
ENGINEERING DIVISION

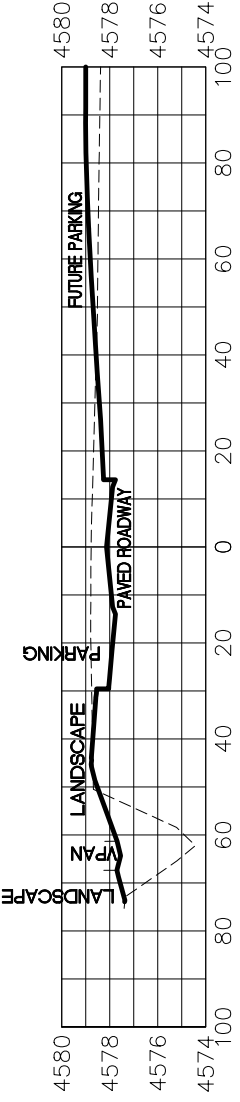
LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



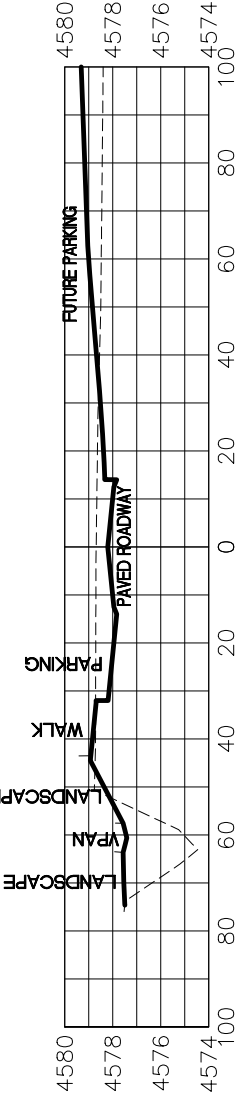
35+50.00



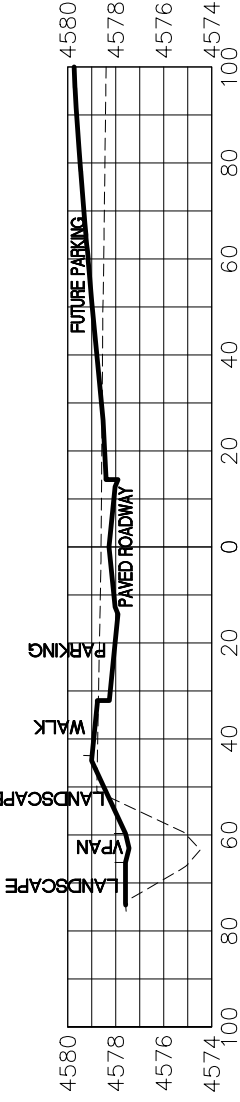
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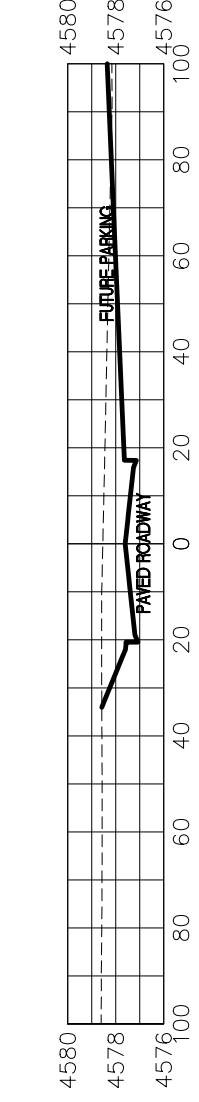
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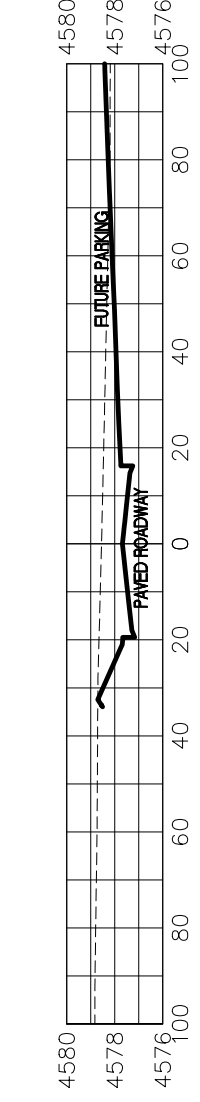
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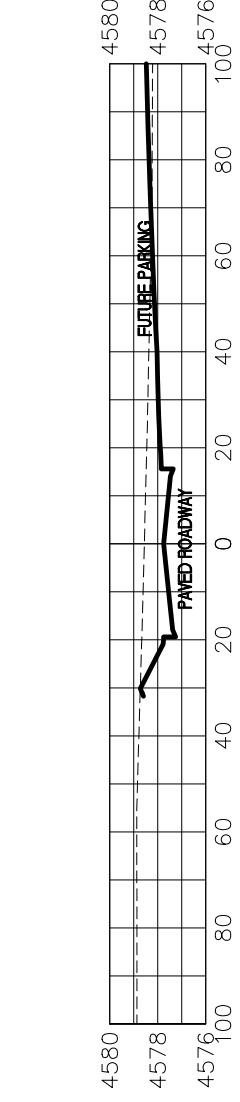
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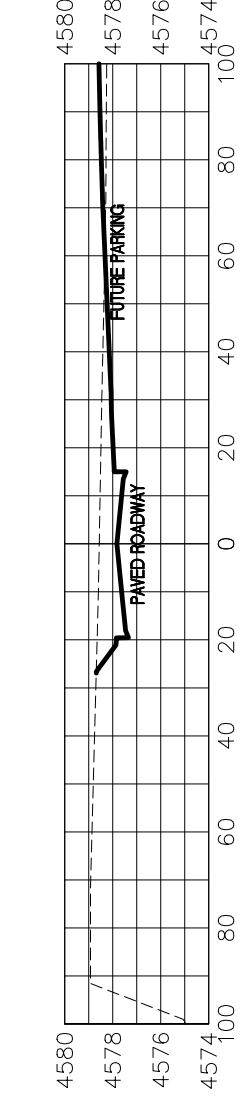
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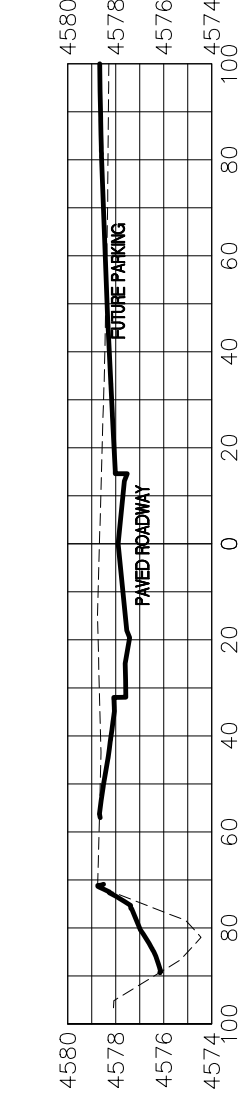
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36+25.00



36+00.00



35+75.00

SECONDARY ROAD

REVISION	DATE

DESCRIPTION	DATE

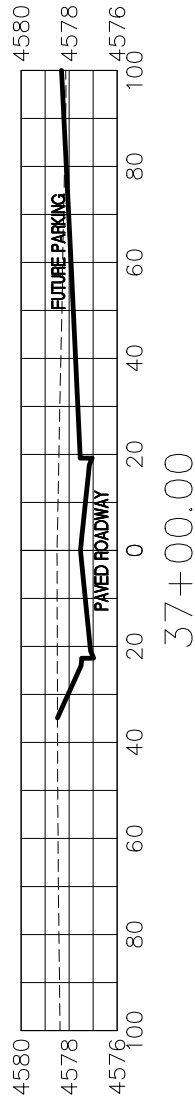
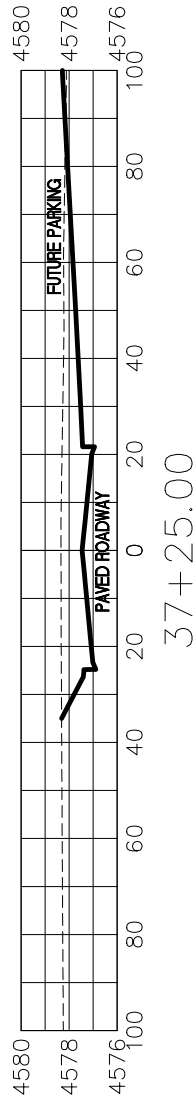
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	PLAN & PROFILE
	HORIZONTAL
	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS



SECONDARY ROAD

REVISION	DESCRIPTION	DATE

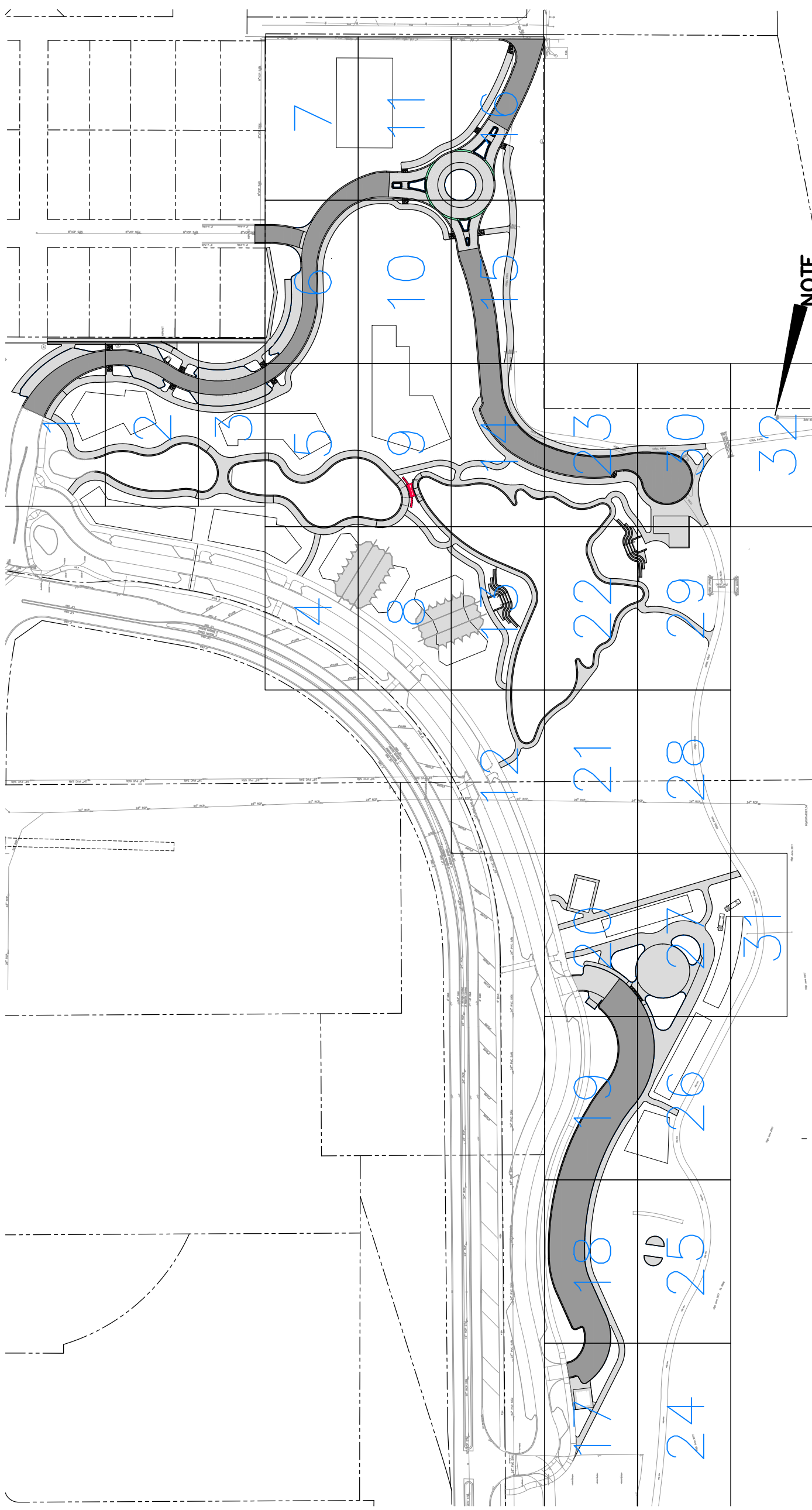
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DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

SCALES:	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
SITE CROSS SECTIONS

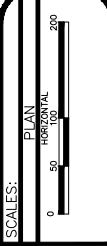


NOTE
 BLUE NUMBERS INDICATE
 THE SUBSET SHEET NUMBER
 FOR THE 20TH SCALE CONTOUR
 PLAN AND AS SUCH ARE
 PREFACED WITH CP FOR CONTOUR
 PLAN IE. CP01. THE SUBSET SHEET
 NUMBER IS IN THE INDICATED LOCATION
 ON ALL CONTOUR PLAN SHEETS

CP00

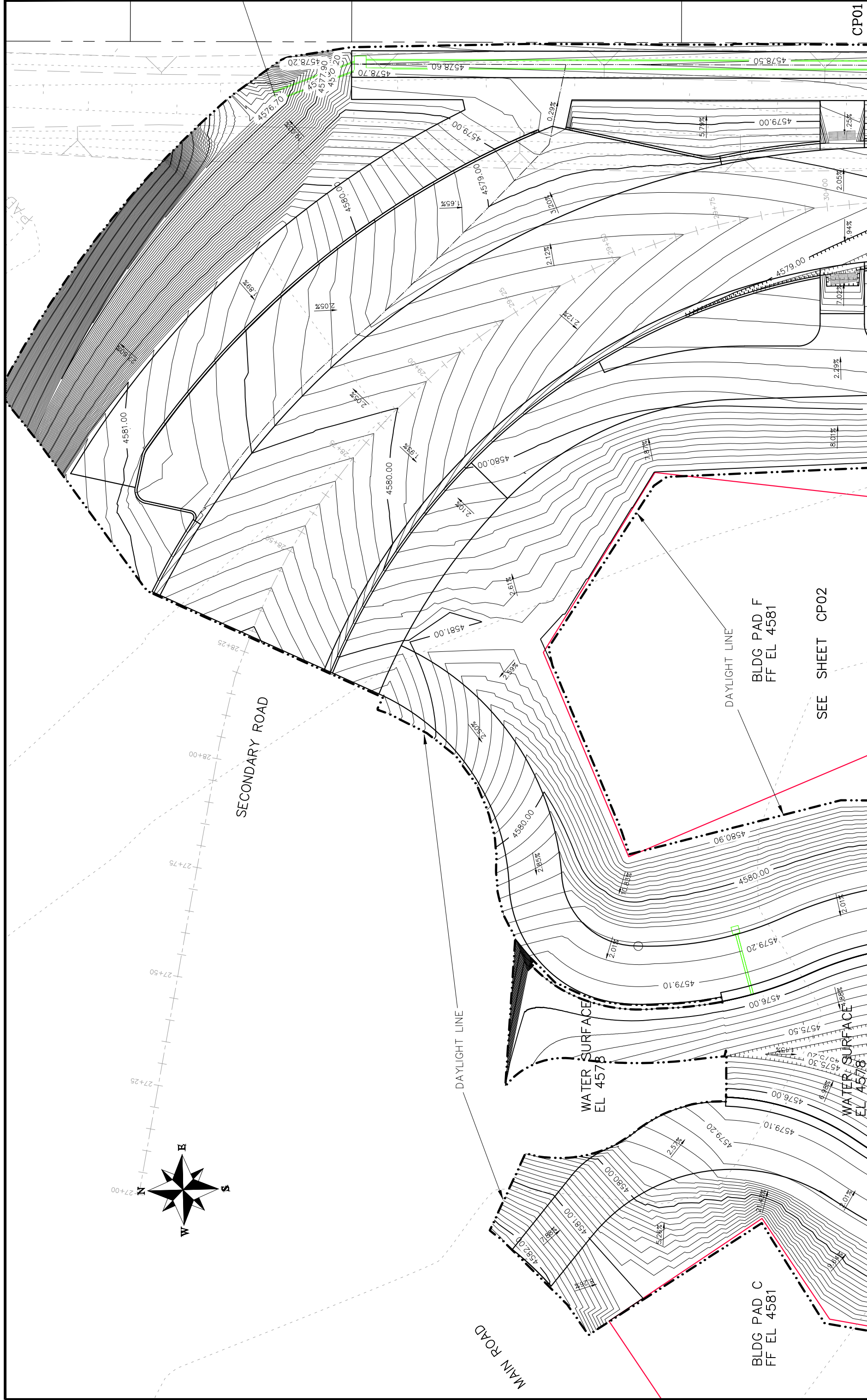
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REVISION	△		
REVISION	△		
REVISION	△		

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	ICP	DATE	2018
APPROVED BY	ICP	DATE	2018



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 TENTH FOOT CONTOUR PLAN SHEET KEY



REVISION	DATE	DESCRIPTION
Δ REV1	INT	
Δ REV2	INT	
Δ REV3	INT	
Δ REV4	INT	

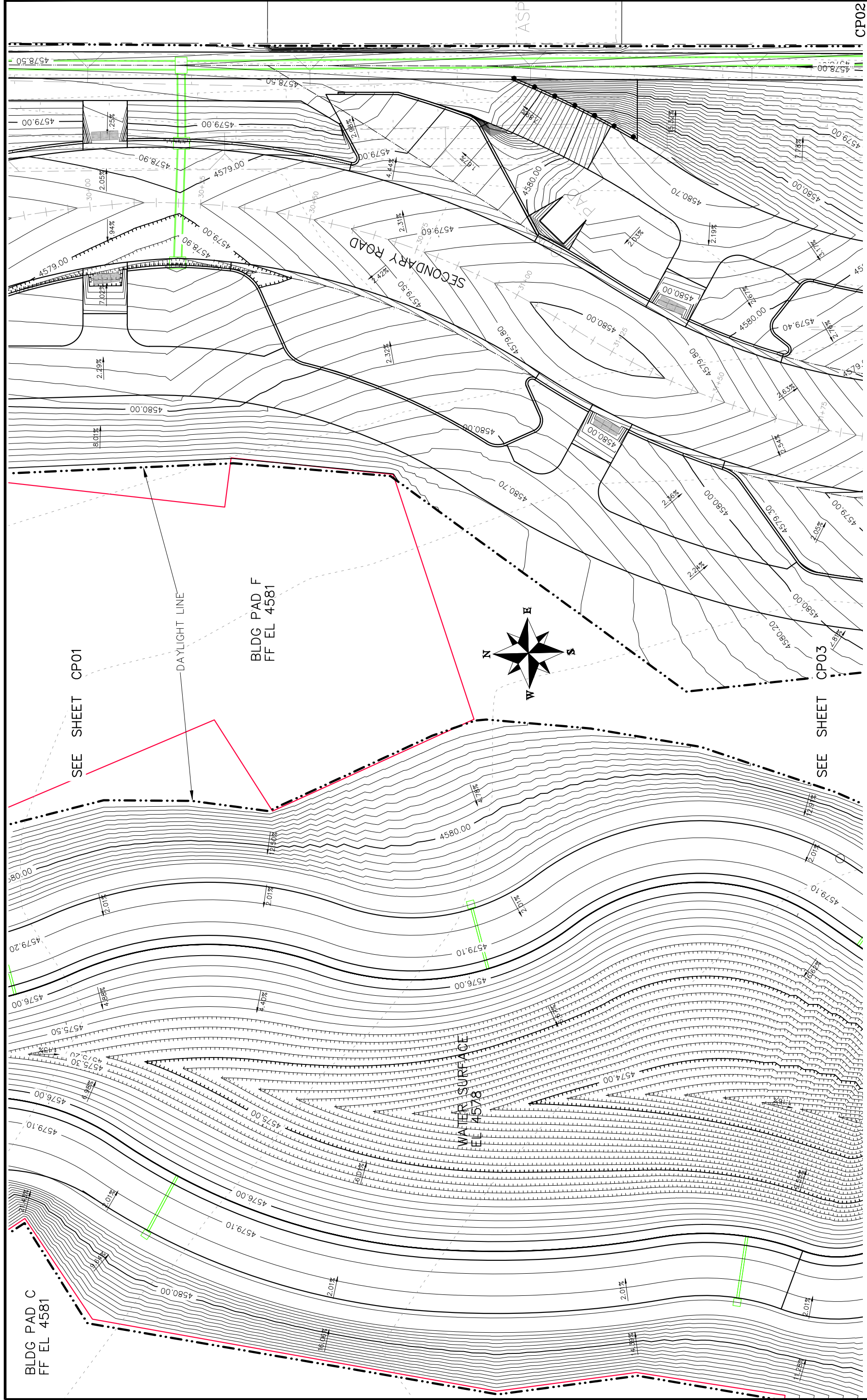
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DRAWN BY	JCS	DATE	2017
DESIGNED BY	JCS	DATE	2017
CHECKED BY	TCP	DATE	2017
APPROVED BY	TOP	DATE	2017

SCALE	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

74
Las Colonias Business Park
20th Scale Tenth Foot Contour Plan
CP01

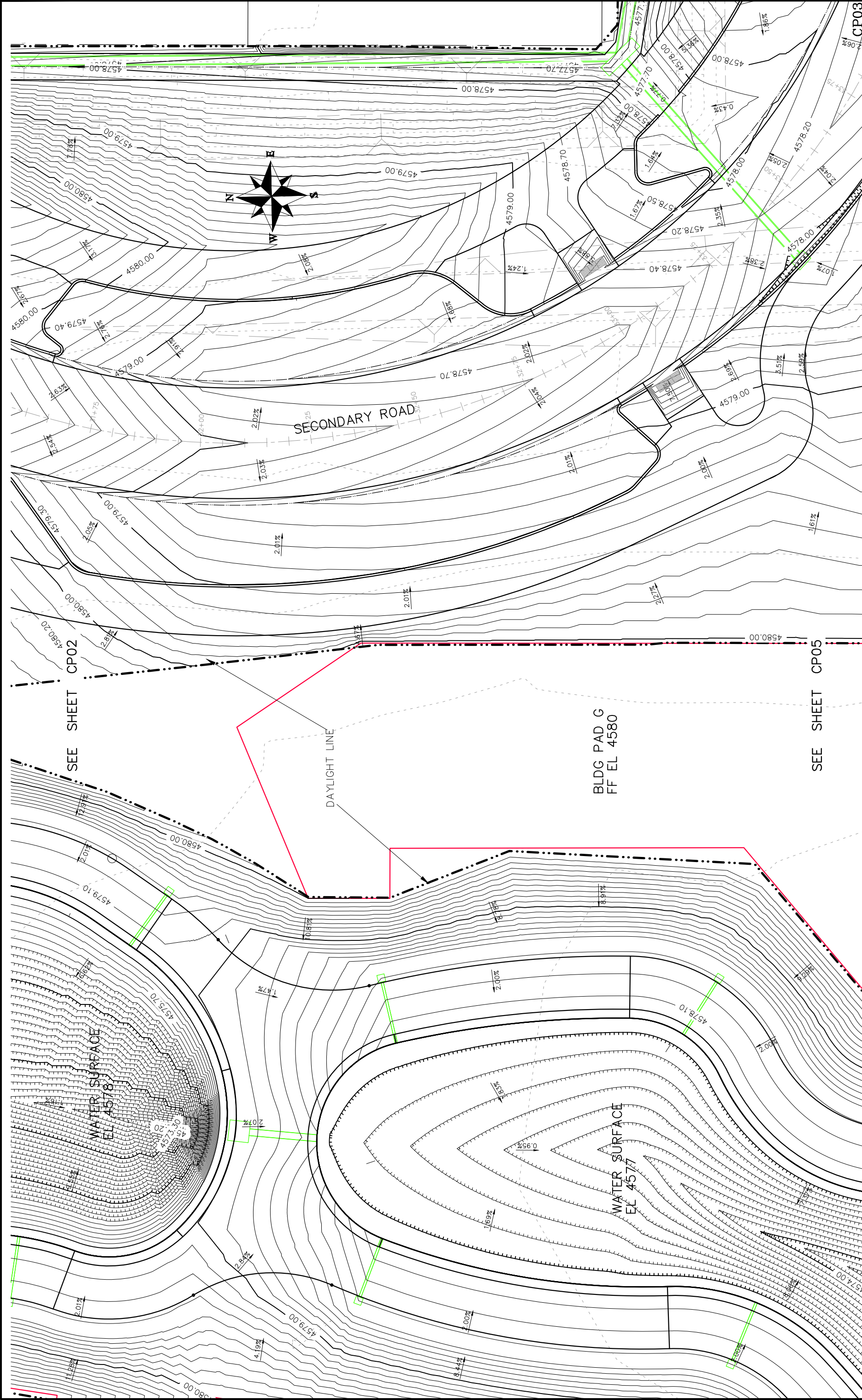


REVISION	DATE	DESCRIPTION
REVISION 1	REV1_DATE	REV1_INT
REVISION 2	REV2_DATE	REV2_INT
REVISION 3	REV3_DATE	REV3_INT
REVISION 4	REV4_DATE	REV4_INT

Grand Junction
 CITY OF
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



REVISION Δ REV1_INT REVISION Δ REV2_INT REVISION Δ REV3_INT REVISION Δ REV4_INT	DATE DATE DATE DATE	DRAWN BY JCS DESIGNED BY JCS CHECKED BY TOP APPROVED BY TOP	DATE 2017 DATE 2017 DATE 2017 DATE 2017	SCALES: PLAN & PROFILE HORIZONTAL 1" = 40' VERTICAL 1" = 4' NA NA NA NA	CITY OF Grand Junction COLORADO	PUBLIC WORKS ENGINEERING DIVISION	Las Colonias Business Park 20th Scale Tenth Foot Contour Plan	76
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SEE SHEET CPO2

SEE SHEET CP05

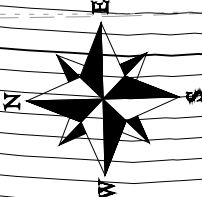
WATER SURFACE
EL 4578.20

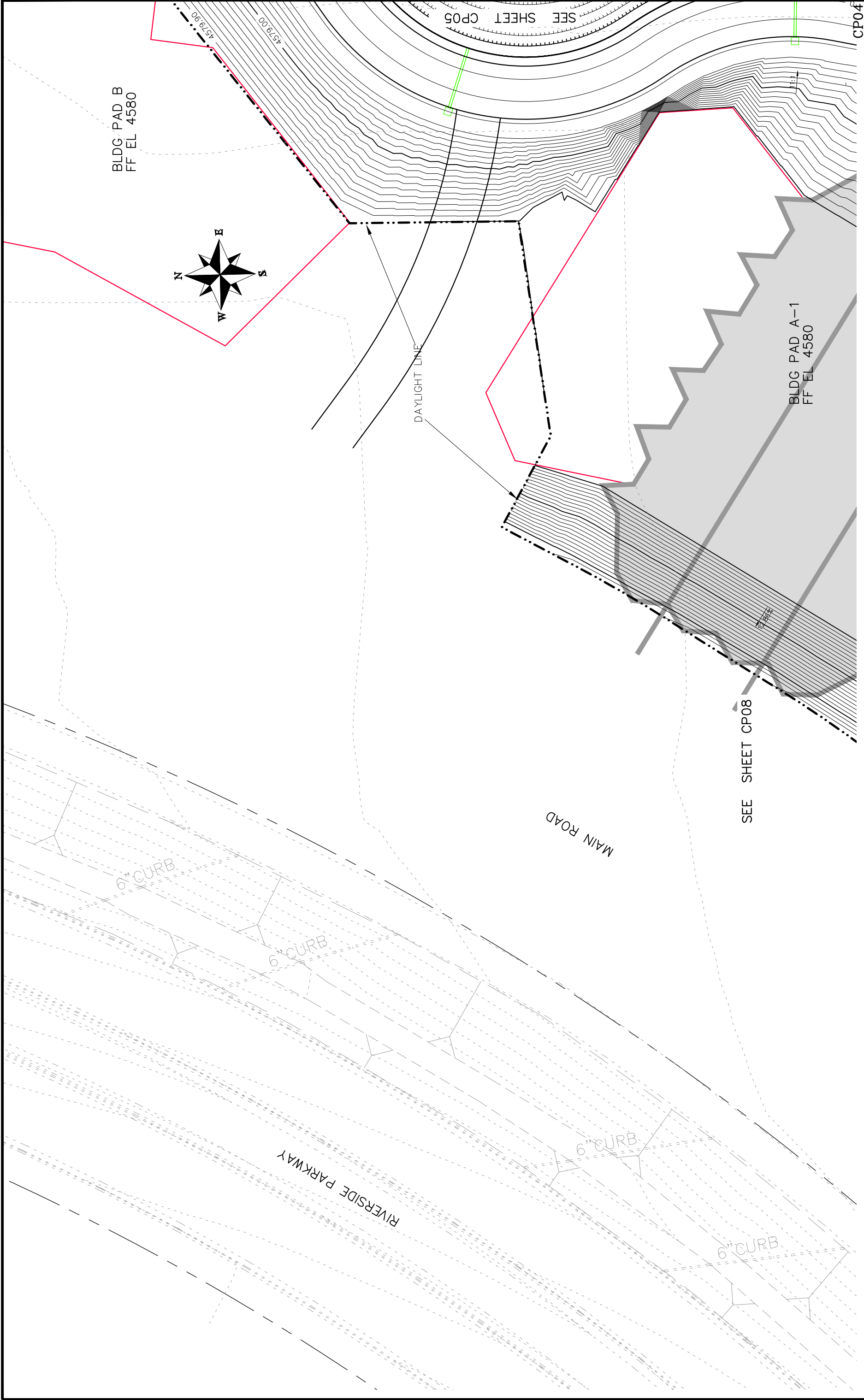
WATER SURFACE
EL 4577.10

BLDG PAD G
FF EL 4580

SECONDARY ROAD

DAYLIGHT LINE



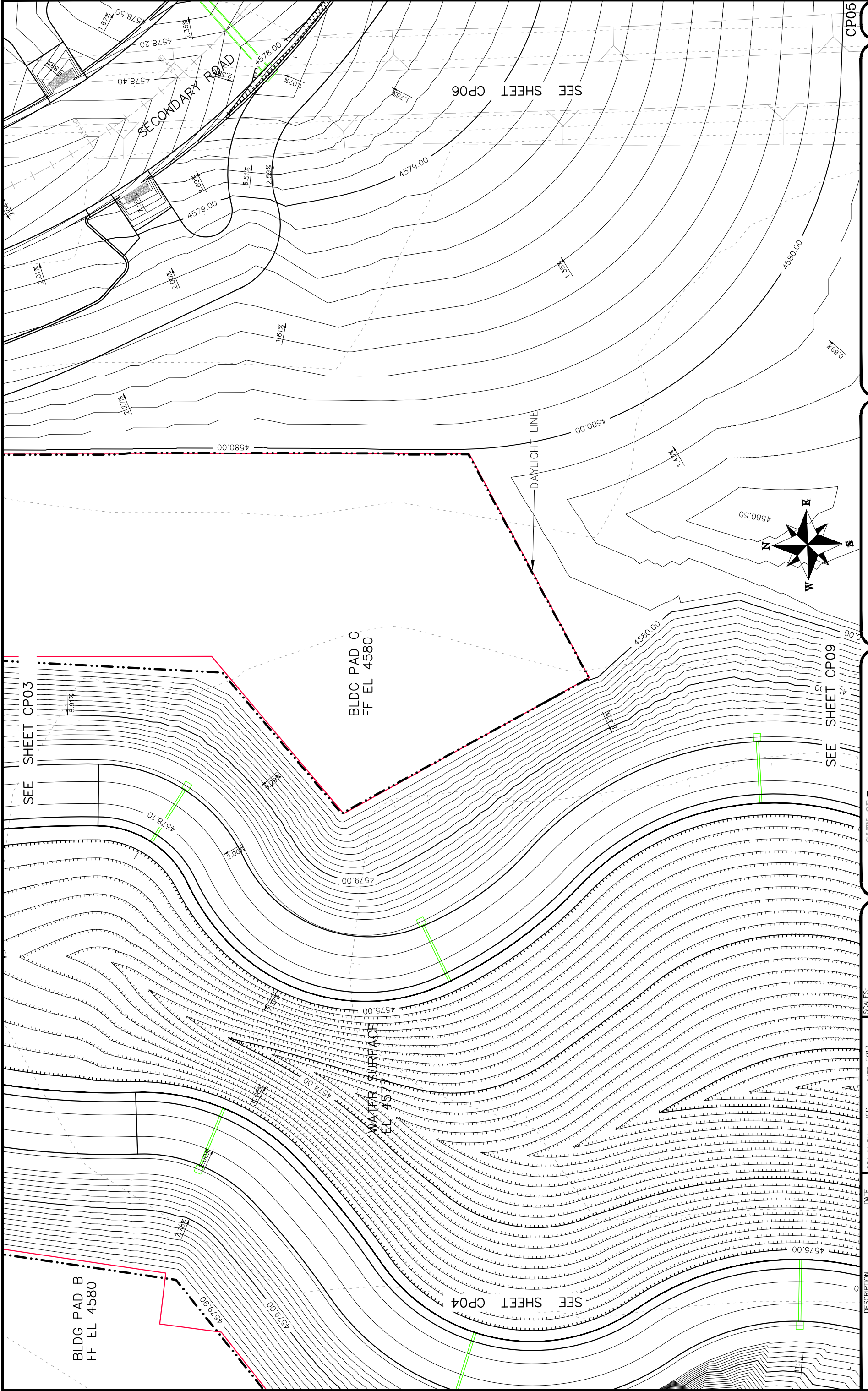


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REVISION 1	REV1_INT	____	____	____	____
REVISION 2	REV2_INT	____	____	____	____
REVISION 3	REV3_INT	____	____	____	____
REVISION 4	REV4_INT	____	____	____	____

CITY OF
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 COLORADO

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ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



REVISION	DATE	DESCRIPTION
REVISION 1	REV1_DATE	REV1_INT
REVISION 2	REV2_DATE	REV2_INT
REVISION 3	REV3_DATE	REV3_INT
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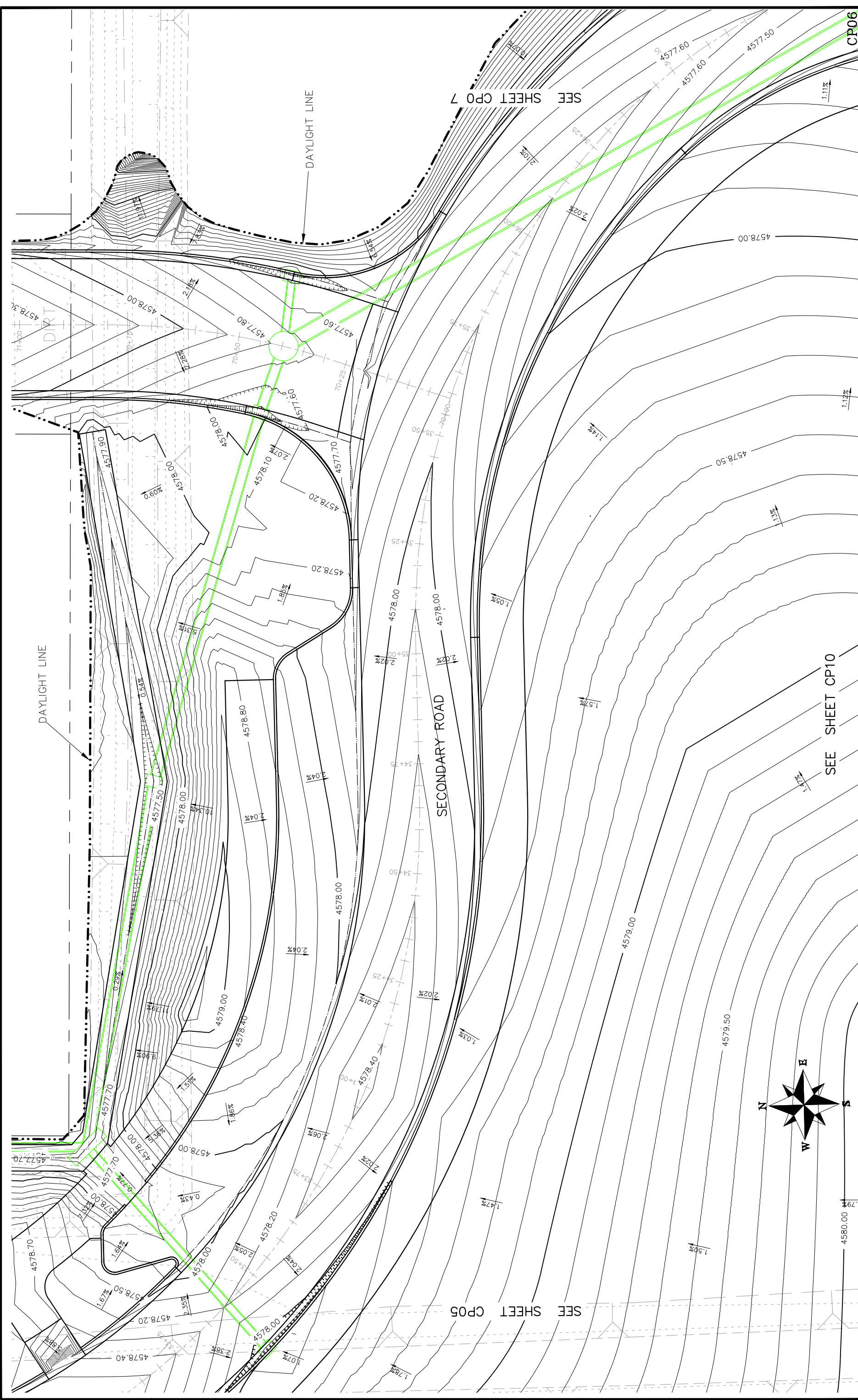
Grand Junction
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

DATE	DATE	DATE	DATE
DRAWN BY	JCS	DATE	2017
DESIGNED BY	JCS	DATE	2017
CHECKED BY	TOP	DATE	2017
APPROVED BY	TOP	DATE	2017

SCALE:	PLAN & PROFILE
0	HORIZONTAL
0	VERTICAL

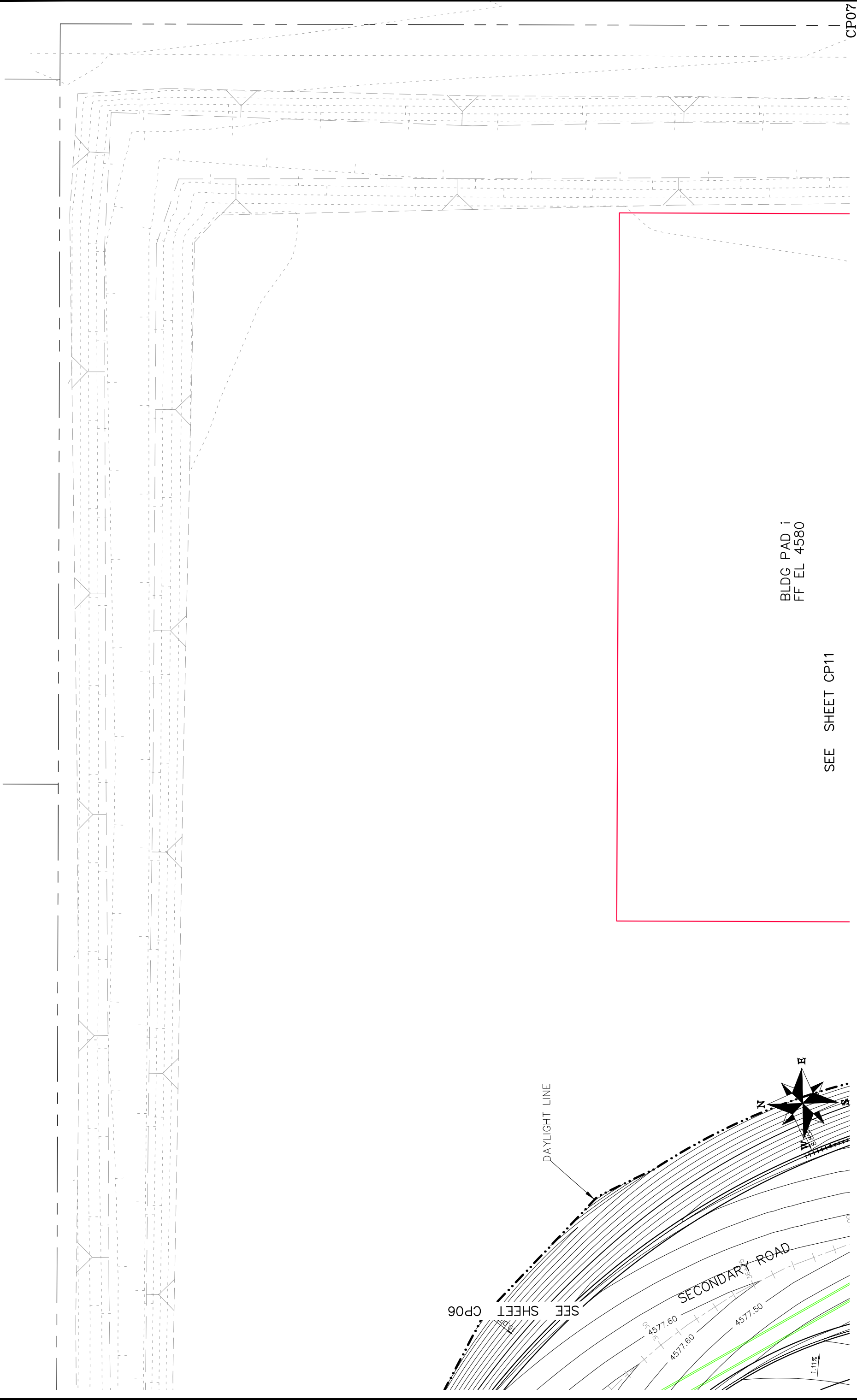


REVISION	DATE	DESCRIPTION
1	2017	REV1_INT
2	2017	REV2_INT
3	2017	REV3_INT
4	2017	REV4_INT

CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



BLDG PAD i
FF EL 4580

SEE SHEET CP11

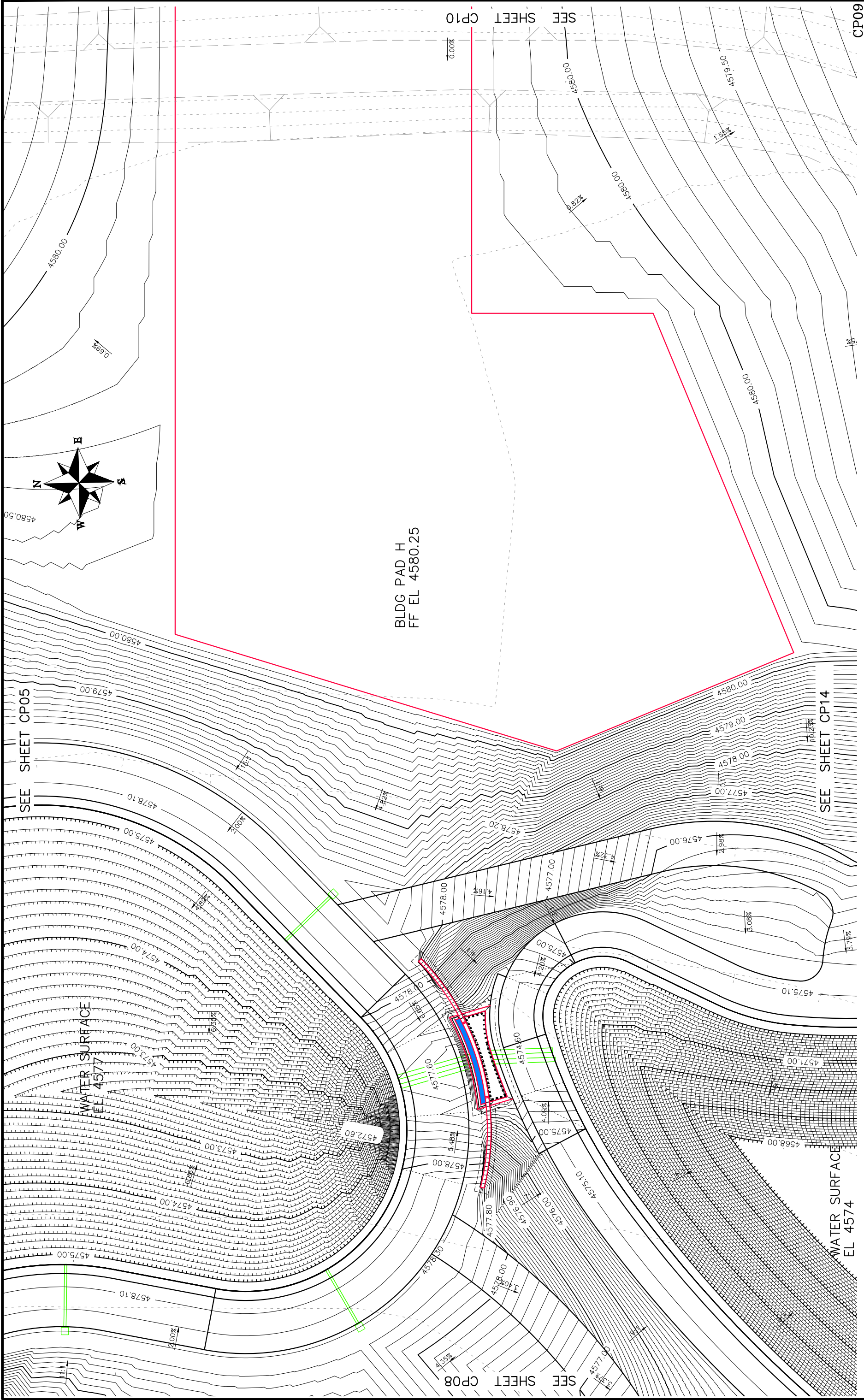
CP07

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REVISION 2	REV2_DATE		DATE	DATE	DATE	DATE
REVISION 3	REV3_DATE		DATE	DATE	DATE	DATE
REVISION 4	REV4_DATE		DATE	DATE	DATE	DATE

CITY OF
Grand Junction
 COLORADO

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 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



BLDG PAD H
FF EL 4580.25

WATER SURFACE
EL 4577

WATER SURFACE
EL 4574

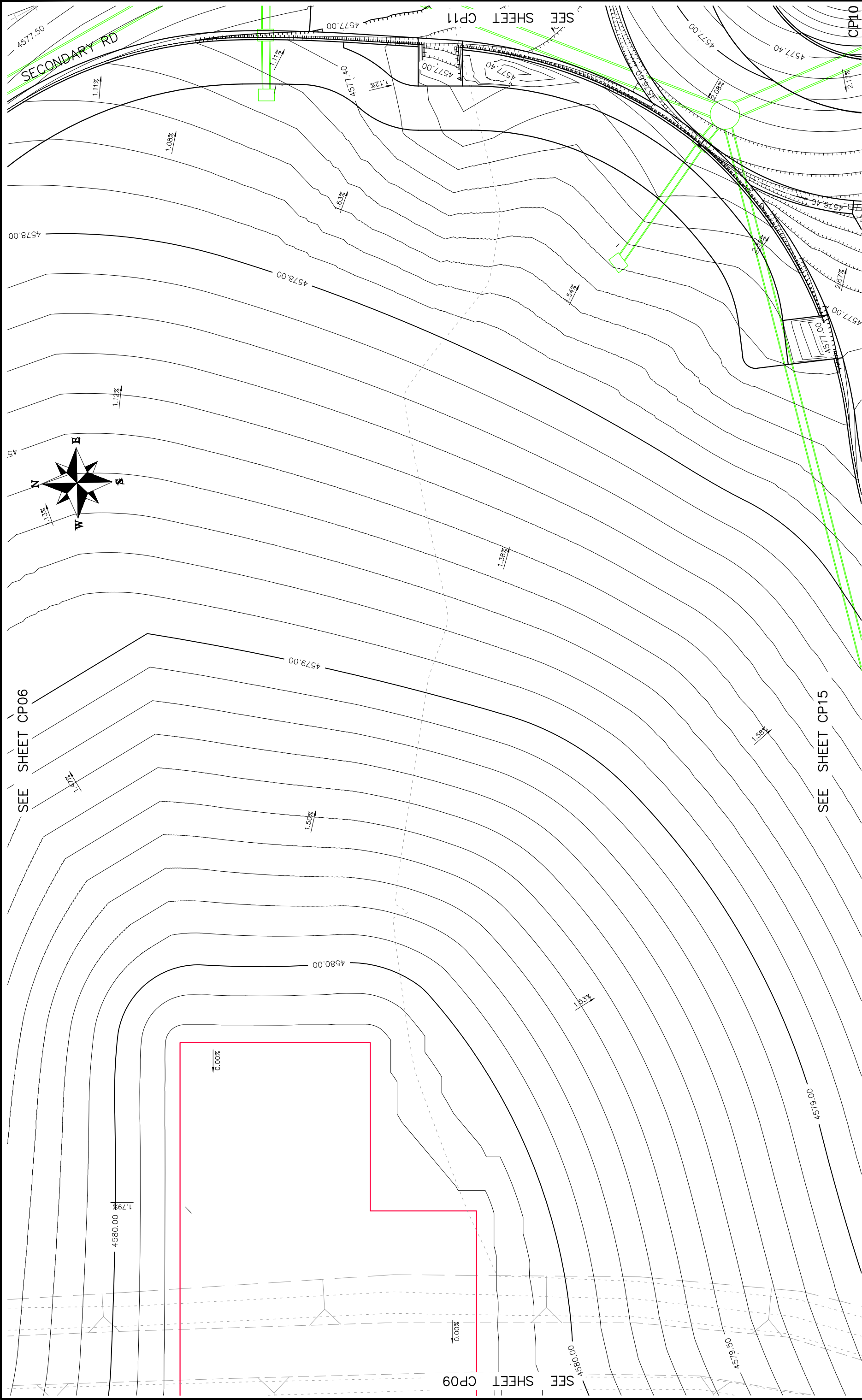
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REVISION Δ REV1_INT	DATE 2017	
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REVISION Δ REV3_INT	DATE 2017	
REVISION Δ REV4_INT	DATE 2017	



PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

SEE SHEET CP05
SEE SHEET CP08
SEE SHEET CP10
SEE SHEET CP14



REVISION	DATE	DESCRIPTION

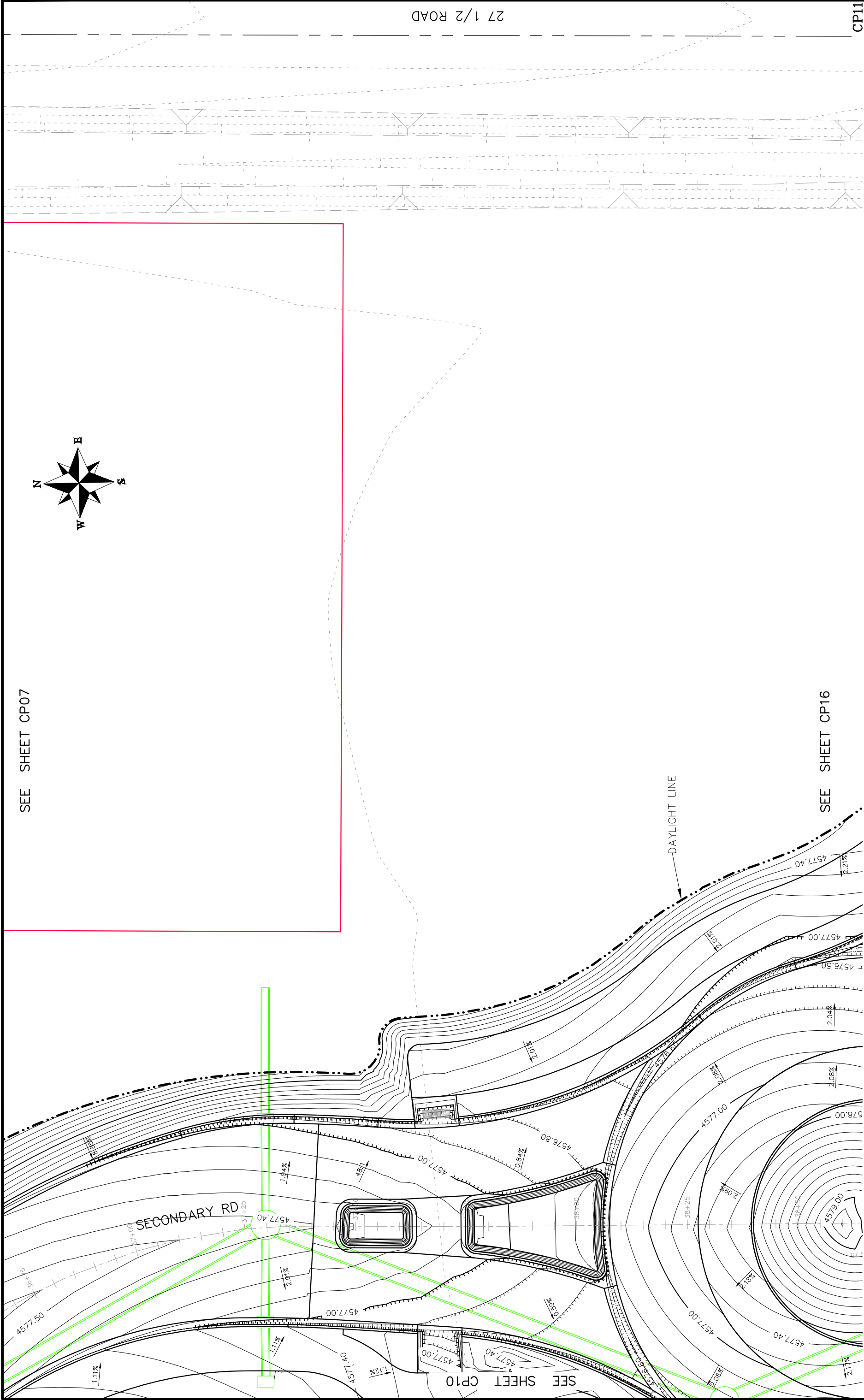
CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

SCALE	PLAN & PROFILE

DRAWN BY	DATE
JCS	2017
DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

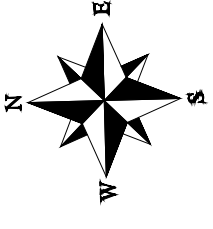


SEE SHEET CP07

SEE SHEET CP16

27 1/2 ROAD

CP11

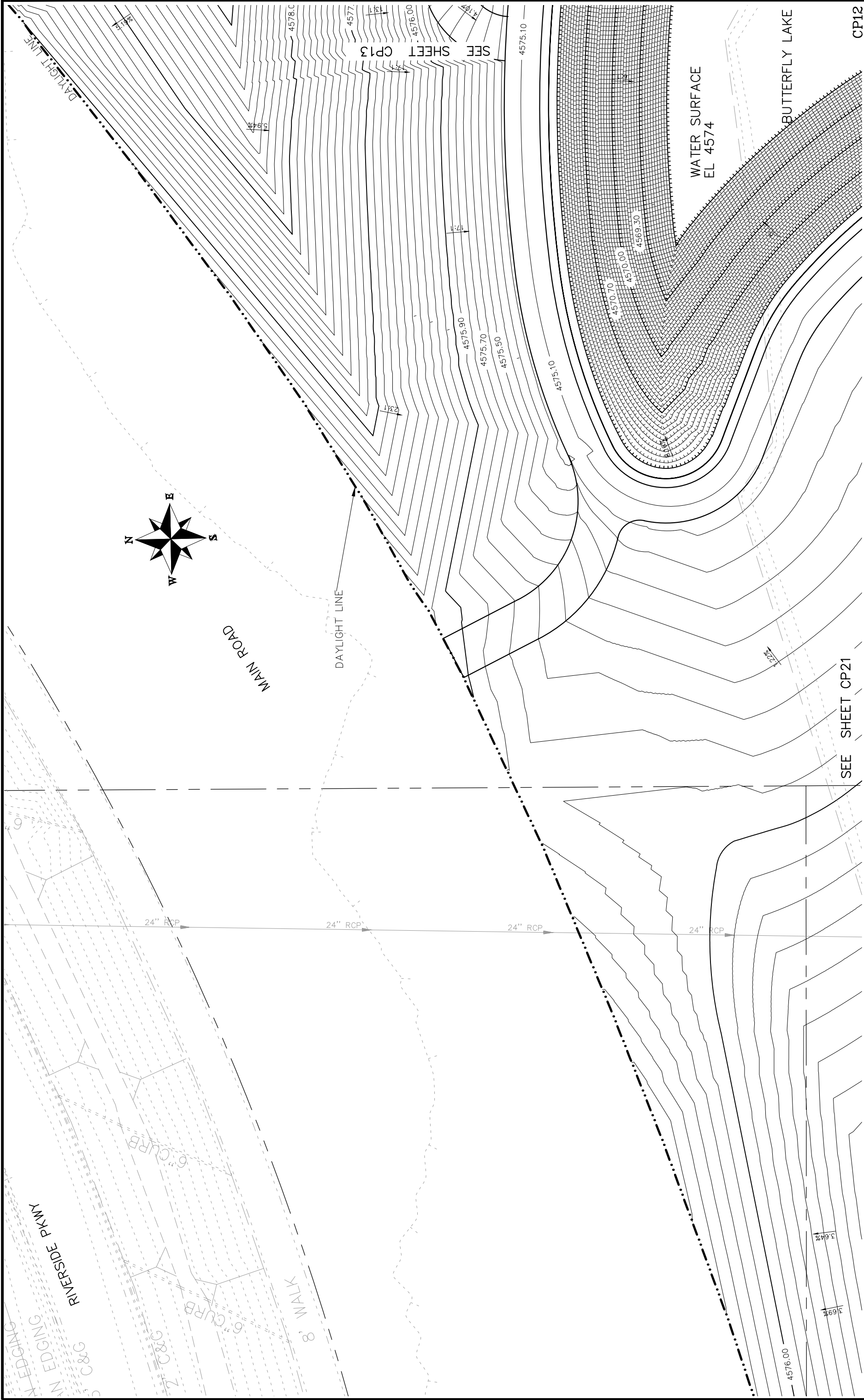


DESCRIPTION	DATE	DRAWN BY	DATE	SCALE
REVISION Δ REV1_INT		JCS	2017	PLAN & PROFILE
REVISION Δ REV2_INT		JCS	2017	3 HORIZONTAL
REVISION Δ REV3_INT		JCS	2017	0 VERTICAL
REVISION Δ REV4_INT		TCP	2017	NA

CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



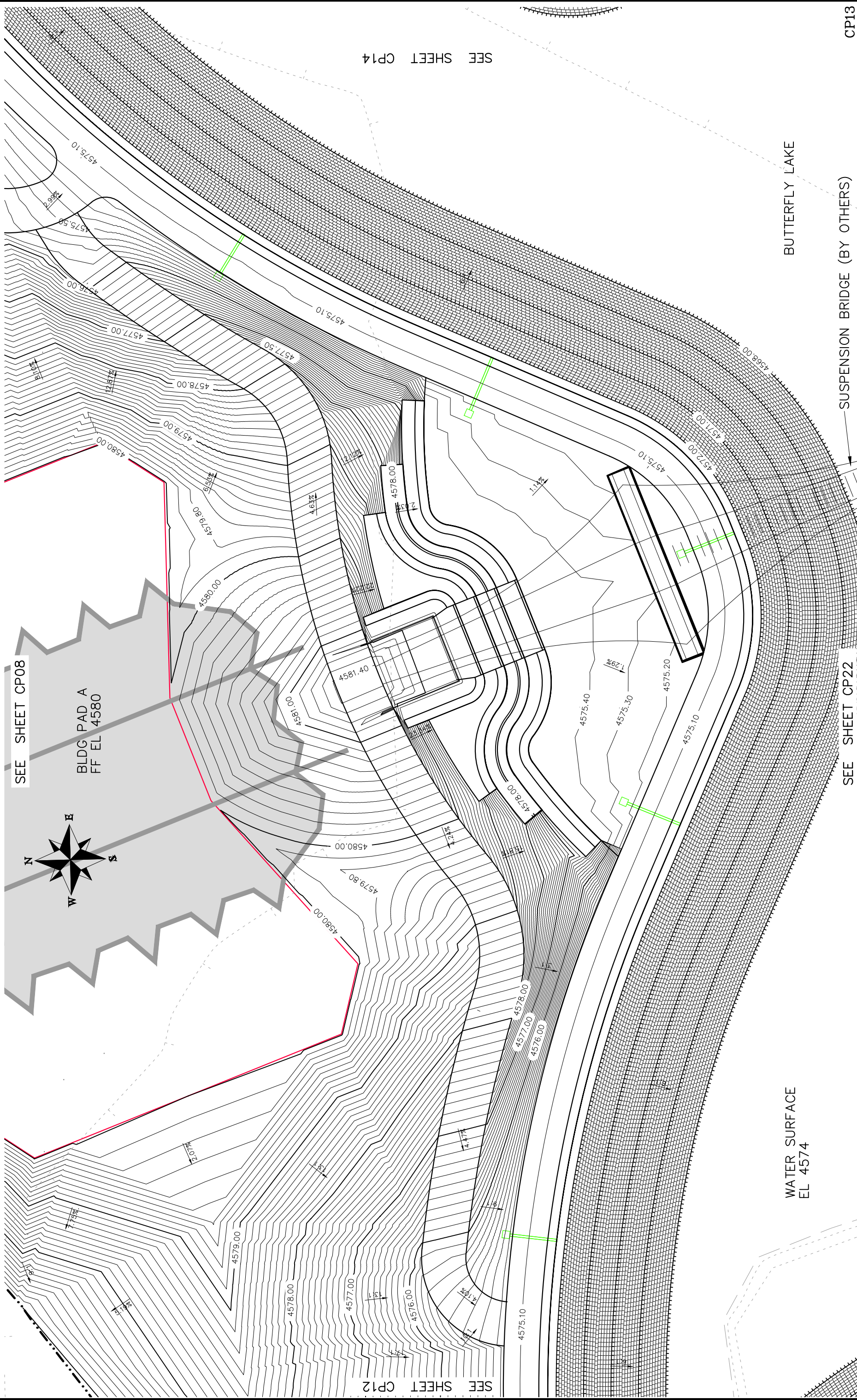
REVISION	DATE	DESCRIPTION	DATE	DATE	DATE	DATE
REVISION Δ REV1_INT	_____	_____	_____	_____	_____	_____
REVISION Δ REV2_INT	_____	_____	_____	_____	_____	_____
REVISION Δ REV3_INT	_____	_____	_____	_____	_____	_____
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CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

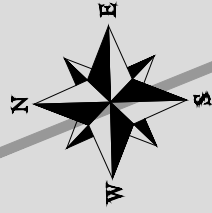
Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan

CPI.2



SEE SHEET CP08

BLDG PAD A
FF EL 4580



SEE SHEET CP12

SEE SHEET CP14

WATER SURFACE
EL 4574

BUTTERFLY LAKE

SUSPENSION BRIDGE (BY OTHERS)

SEE SHEET CP22

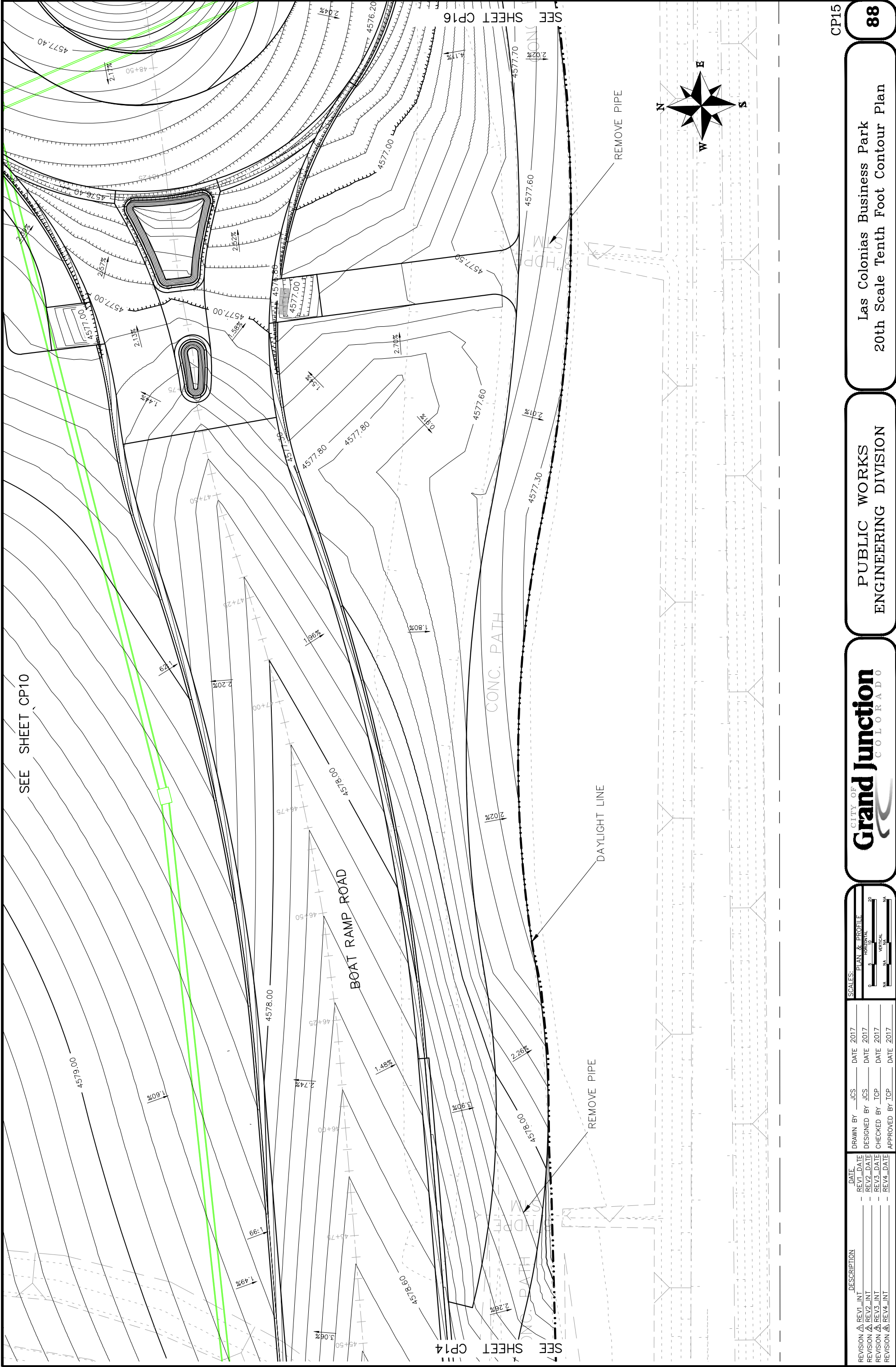
CPI13

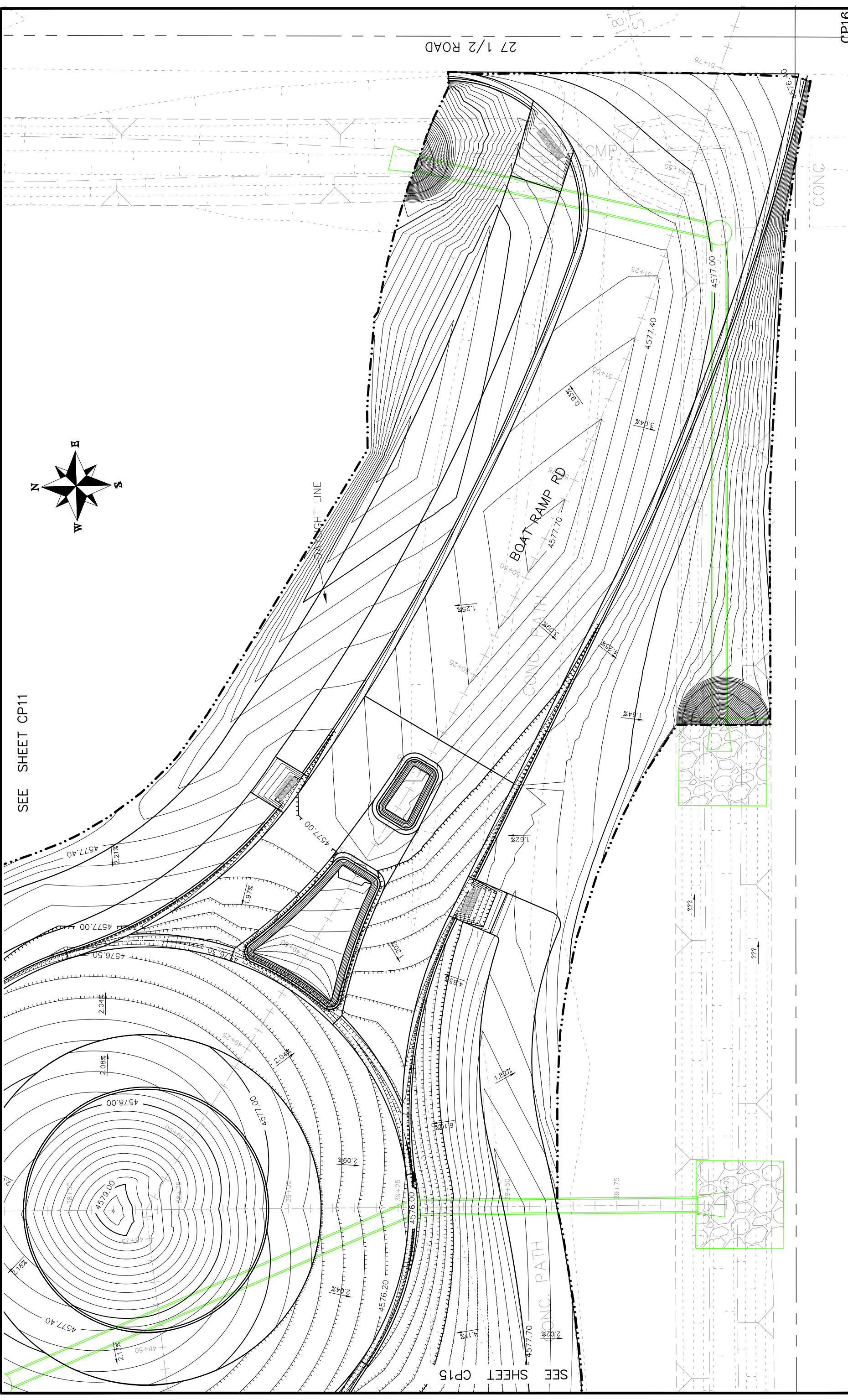
REVISION	DESCRIPTION	DATE	DRAWN BY	DATE
1	REV1_INT		JCS	2017
2	REV2_INT		JCS	2017
3	REV3_INT		JCS	2017
4	REV4_INT		TOP	2017

CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



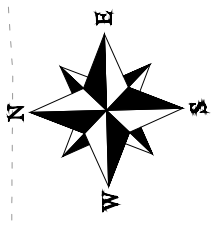
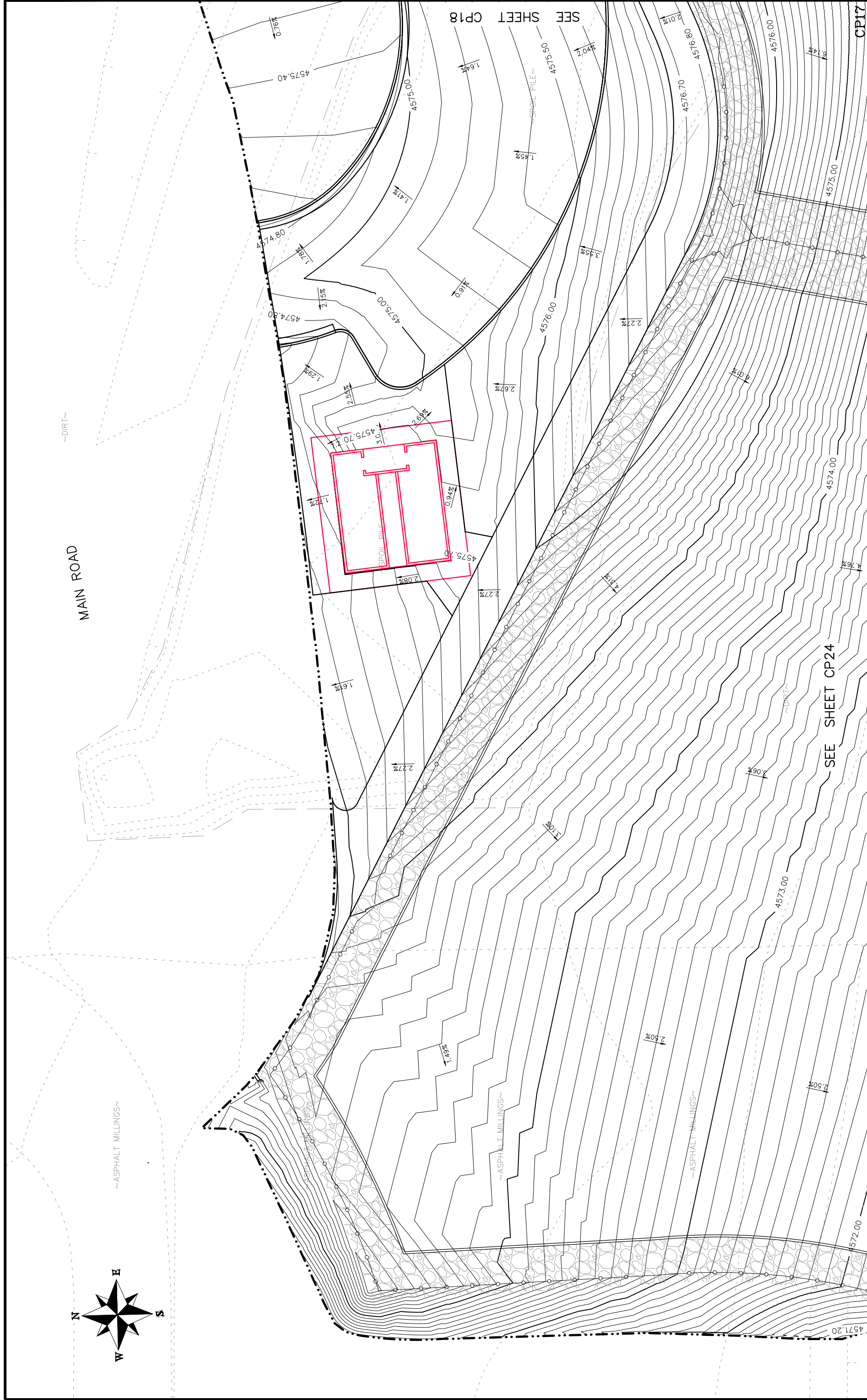


REVISION	DATE	DESCRIPTION
REVISION Δ REV1_INT	DATE	DESCRIPTION
REVISION Δ REV2_INT	DATE	DESCRIPTION
REVISION Δ REV3_INT	DATE	DESCRIPTION
REVISION Δ REV4_INT	DATE	DESCRIPTION

Grand Junction
 COLORADO
 CITY OF

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



REVISION	DATE	DESCRIPTION
REVISION 1	DATE	DESCRIPTION
REVISION 2	DATE	DESCRIPTION
REVISION 3	DATE	DESCRIPTION
REVISION 4	DATE	DESCRIPTION

DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE
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SCALE	SCALE
SCALE	SCALE
SCALE	SCALE
SCALE	SCALE

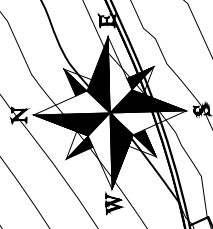


PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan



MAIN ROAD



REVISION	DATE	DESCRIPTION
REVISION Δ REV1_INT	DATE 2017	
REVISION Δ REV2_INT	DATE 2017	
REVISION Δ REV3_INT	DATE 2017	
REVISION Δ REV4_INT	DATE 2017	

DATE	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
DATE 2017	JCS	JCS	JCS	TOP

SCALE	PLAN & PROFILE
0	HORIZONTAL
3	VERTICAL

Grand Junction
CITY OF
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

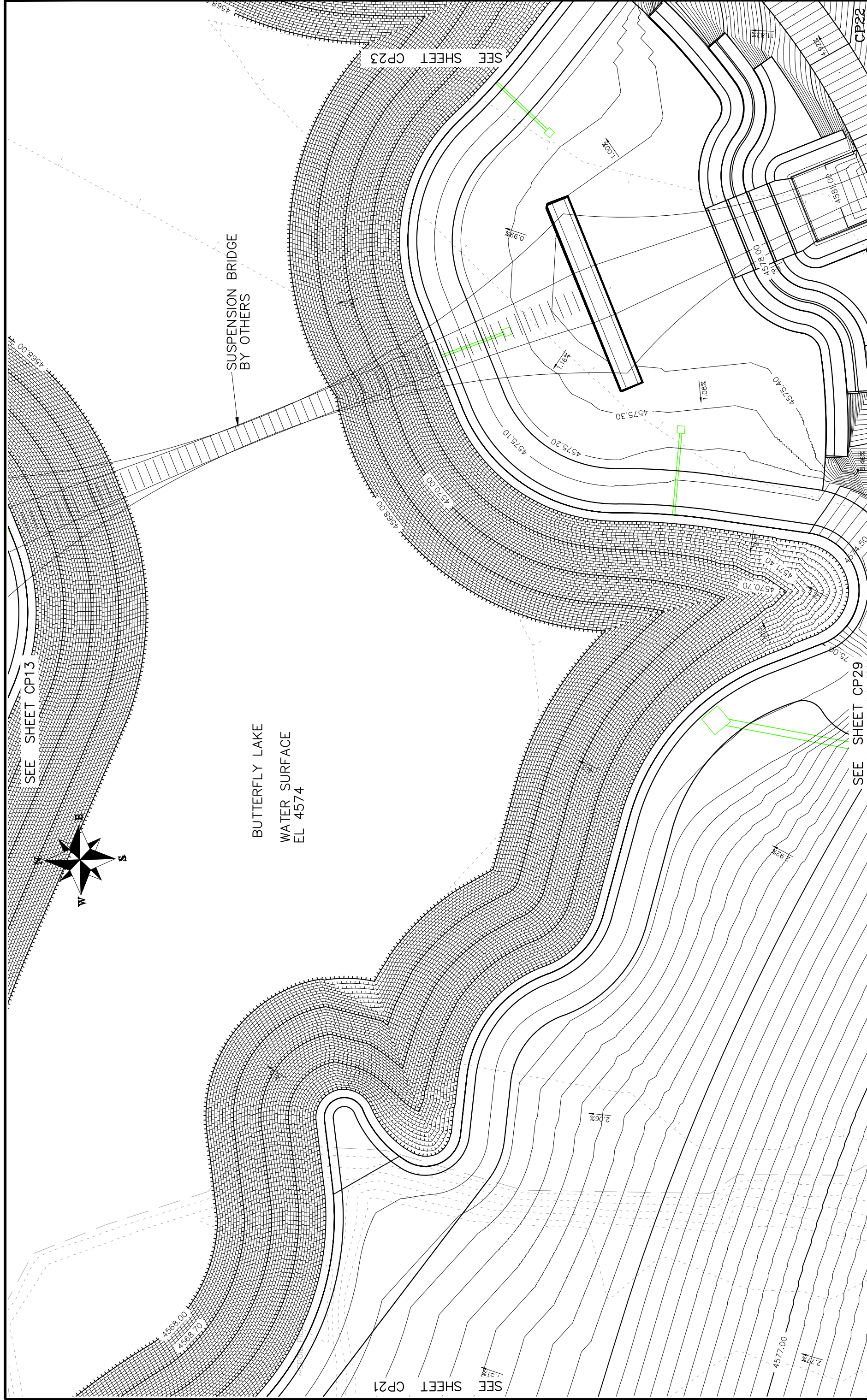


REVISION	DESCRIPTION	DATE	BY	DATE
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2	REV2_INT		JCS	2017
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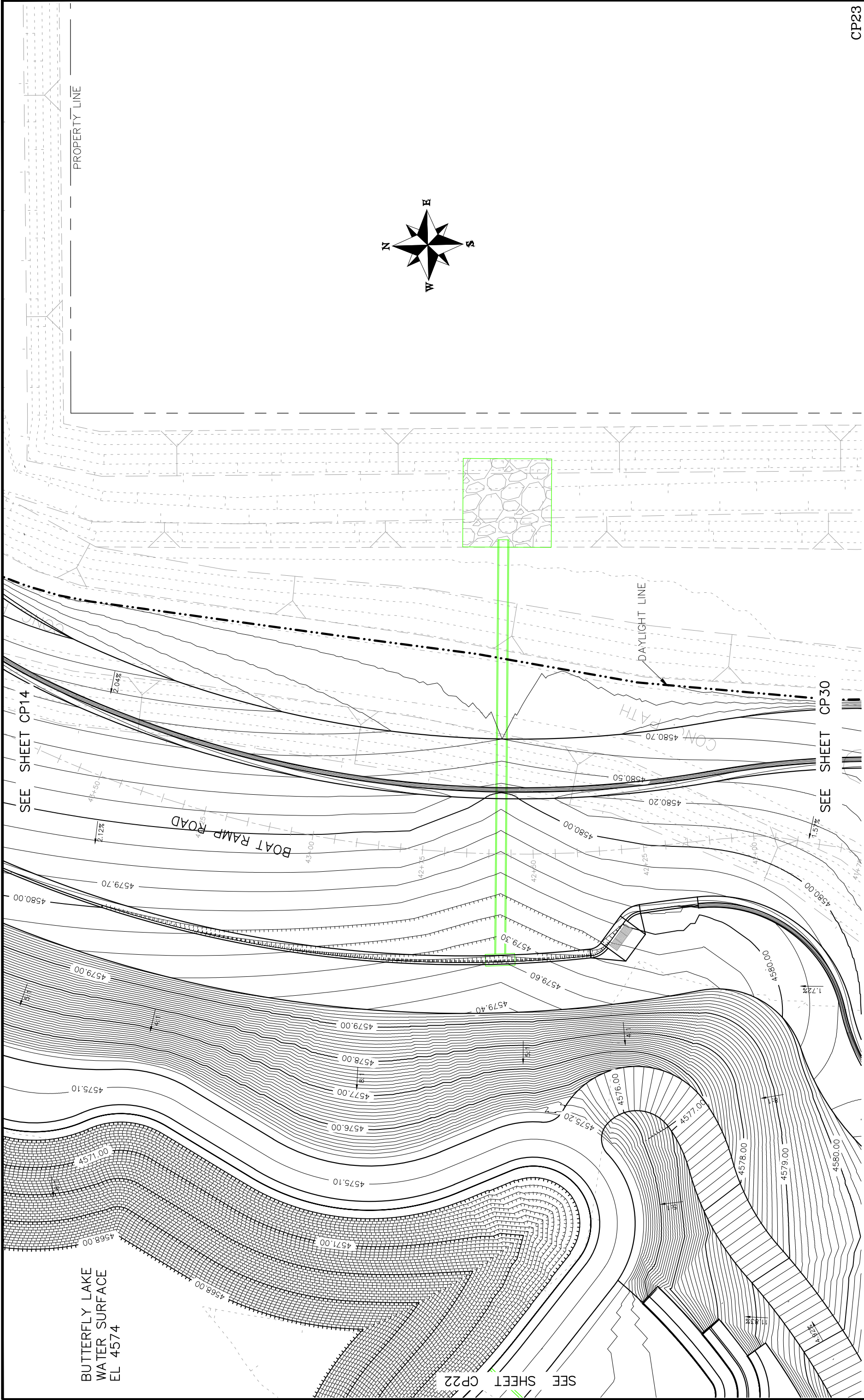
CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan



<p>REVISION Δ REV1_INT _____ DATE _____</p> <p>REVISION Δ REV2_INT _____ DATE _____</p> <p>REVISION Δ REV3_INT _____ DATE _____</p> <p>REVISION Δ REV4_INT _____ DATE _____</p>		<p>DATE _____</p> <p>DATE _____</p> <p>DATE _____</p> <p>DATE _____</p>		<p>DRAWN BY JCS</p> <p>DESIGNED BY JCS</p> <p>CHECKED BY JCS</p> <p>APPROVED BY JCS</p>		<p>DATE 2017</p> <p>DATE 2017</p> <p>DATE 2017</p> <p>DATE 2017</p>	
<p>DESCRIPTION _____</p>		<p>PLAN & PROFILE</p> <p>HORIZONTAL 1"=100'</p> <p>VERTICAL 1"=10'</p>		<p>SCALE: _____</p>		<p>SEE SHEET CP29</p>	
<p>Grand Junction CITY OF COLORADO</p>				<p>PUBLIC WORKS ENGINEERING DIVISION</p>			
<p>Las Colonias Business Park 20th Scale Tenth Foot Contour Plan</p>				<p>95</p>			



REVISION	DATE	DESCRIPTION
1	2017	REV1_INT
2	2017	REV2_INT
3	2017	REV3_INT
4	2017	REV4_INT

DATE	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
2017	JCS	JCS	JCS	TOP

SCALE	PLAN & PROFILE
1" = 40'	1" = 40'
1" = 20'	1" = 20'
1" = 10'	1" = 10'



PUBLIC WORKS
ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

CP23

96



SEE SHEET CP34

SEE SHEET CP25

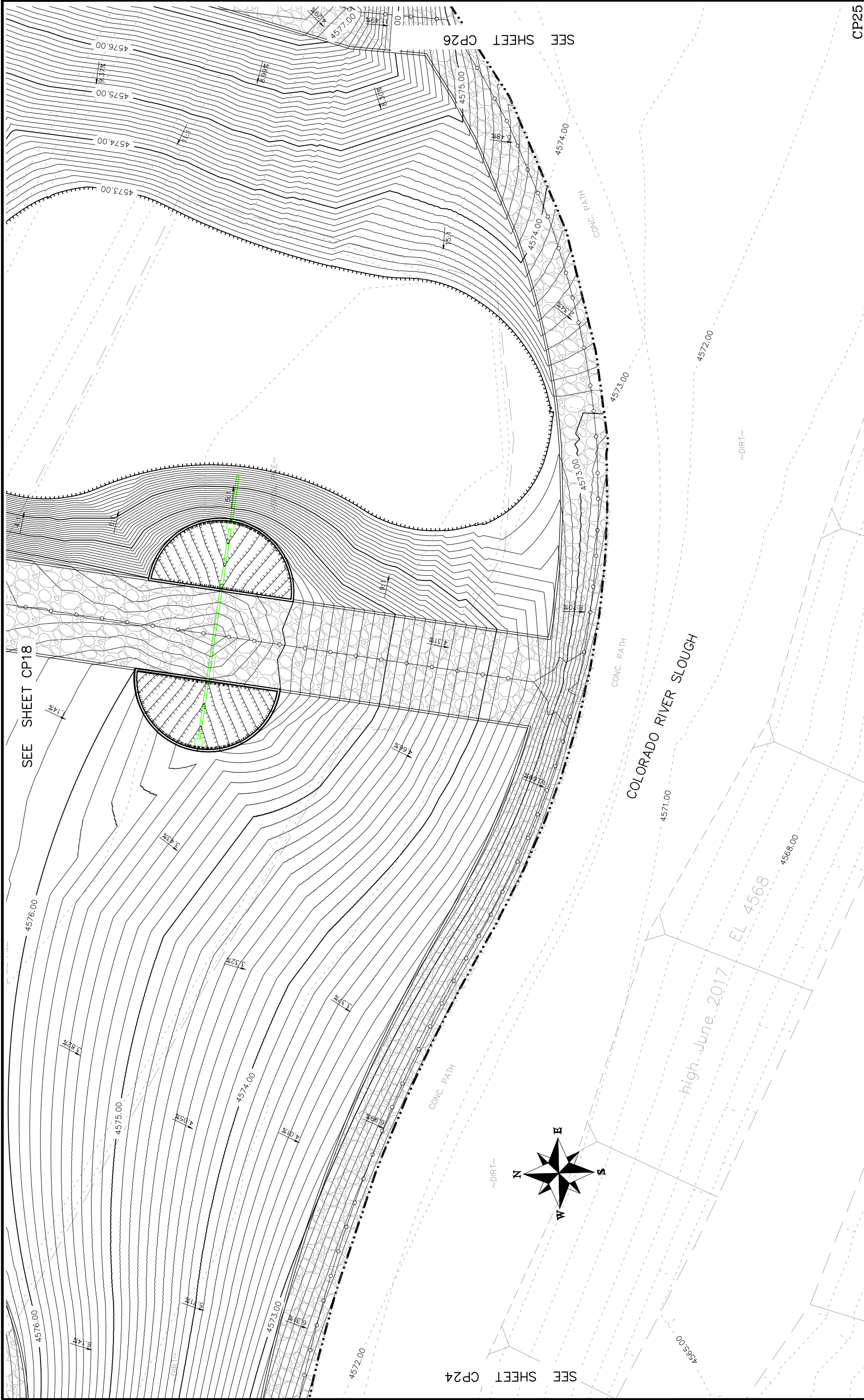
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REVISION Δ REV3_INT			TCP	2017
REVISION Δ REV4_INT			TCP	2017

SCALES:	
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VERTICAL	1" = 10'



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ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

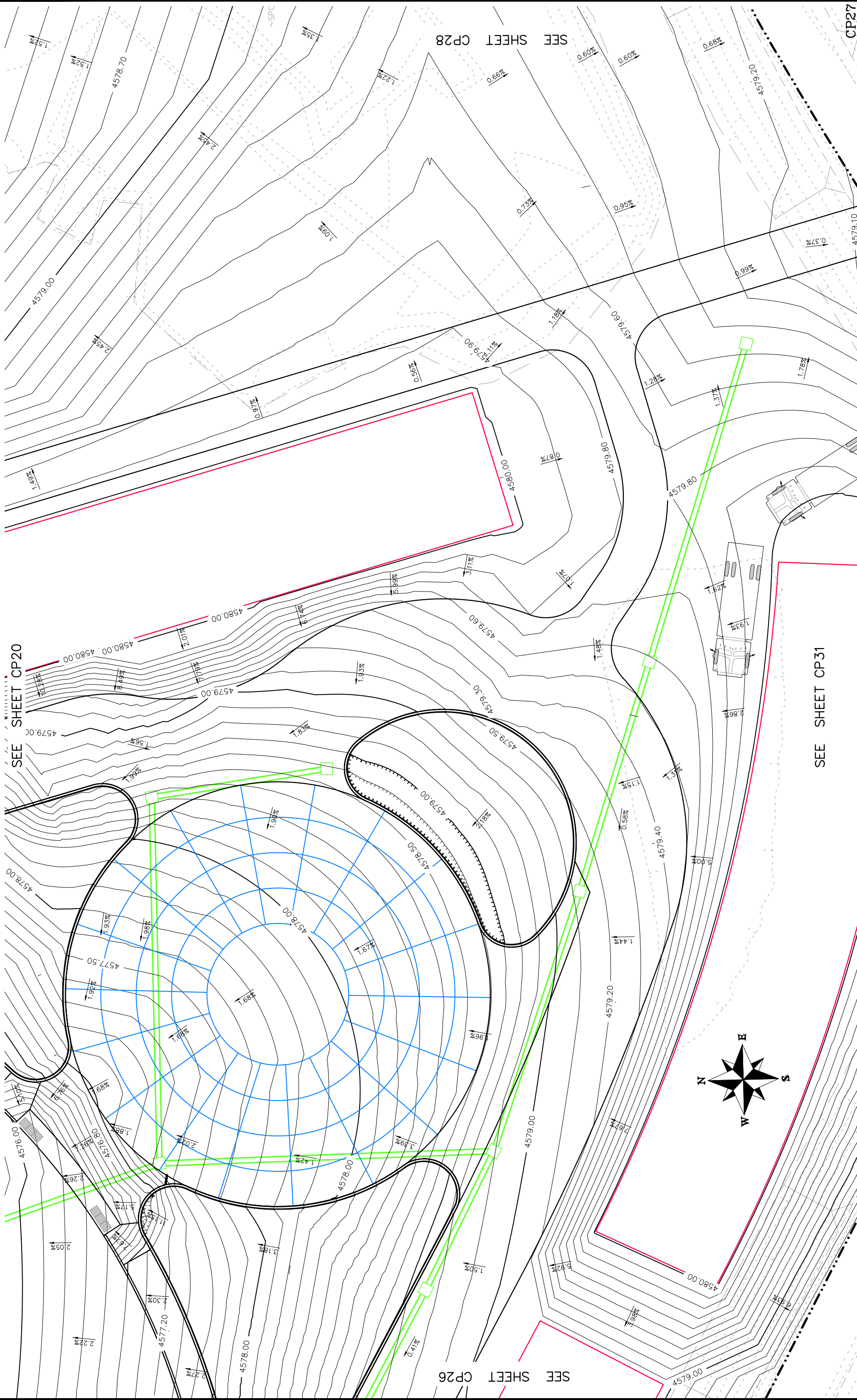


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REVISION Δ REV3_INT		TCP	2017		
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Las Colonias Business Park
20th Scale Tenth Foot Contour Plan



REVISION	DATE	DESCRIPTION
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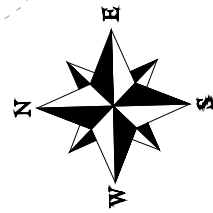
CITY OF
Grand Junction
 COLORADO

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ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan
100

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2017	JCS	JCS	TCP	TCP

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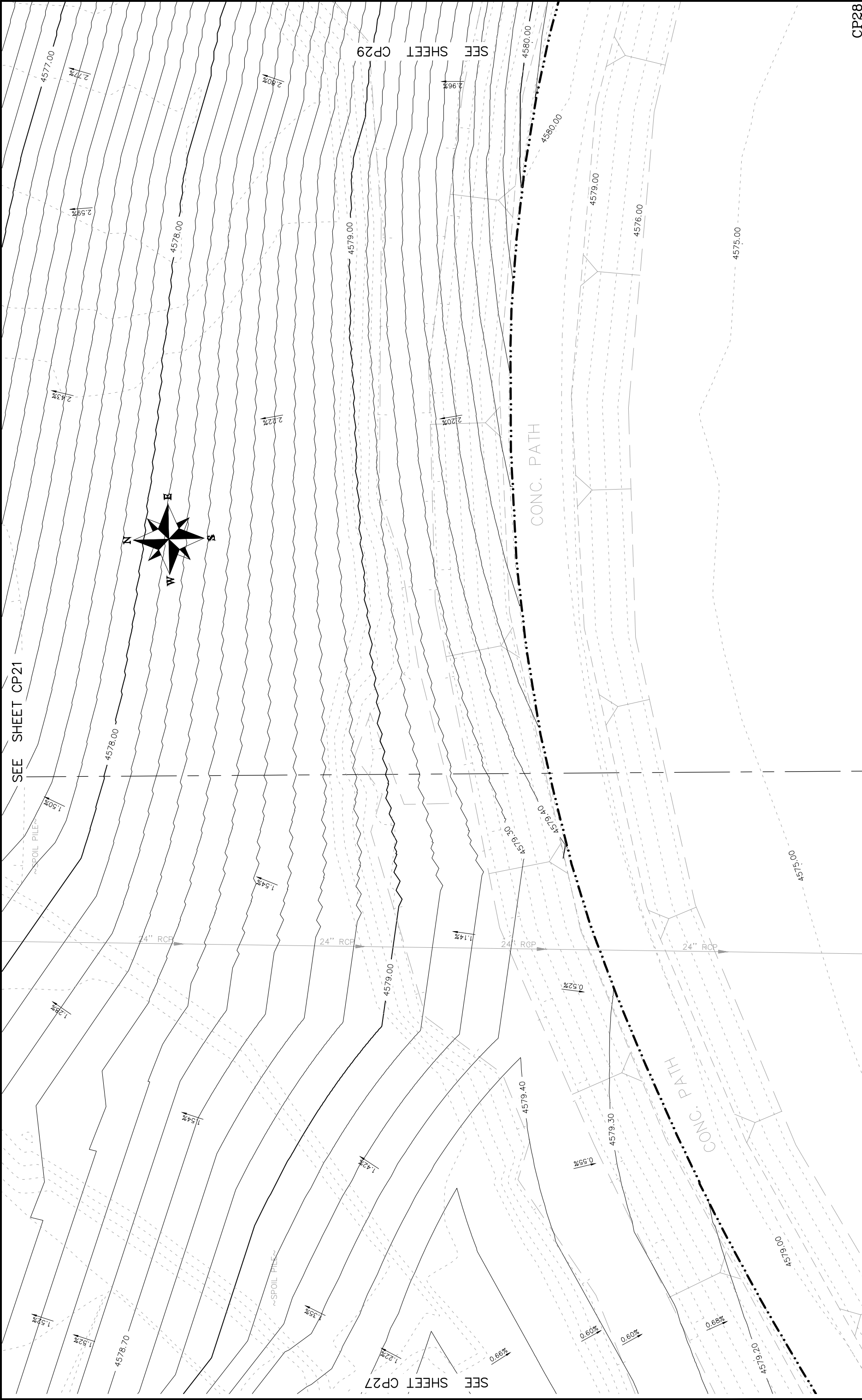
SEE SHEET CP31

SEE SHEET CP20

SEE SHEET CP26

SEE SHEET CP28

CP27



REVISION	DATE	DESCRIPTION

Grand Junction
 COLORADO
 CITY OF

PUBLIC WORKS
 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan

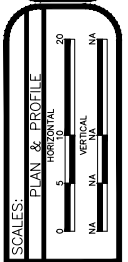


SEE SHEET CP22

SEE SHEET CP28

SEE SHEET CP30

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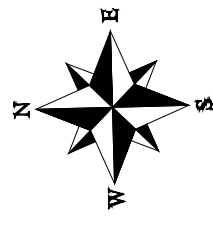
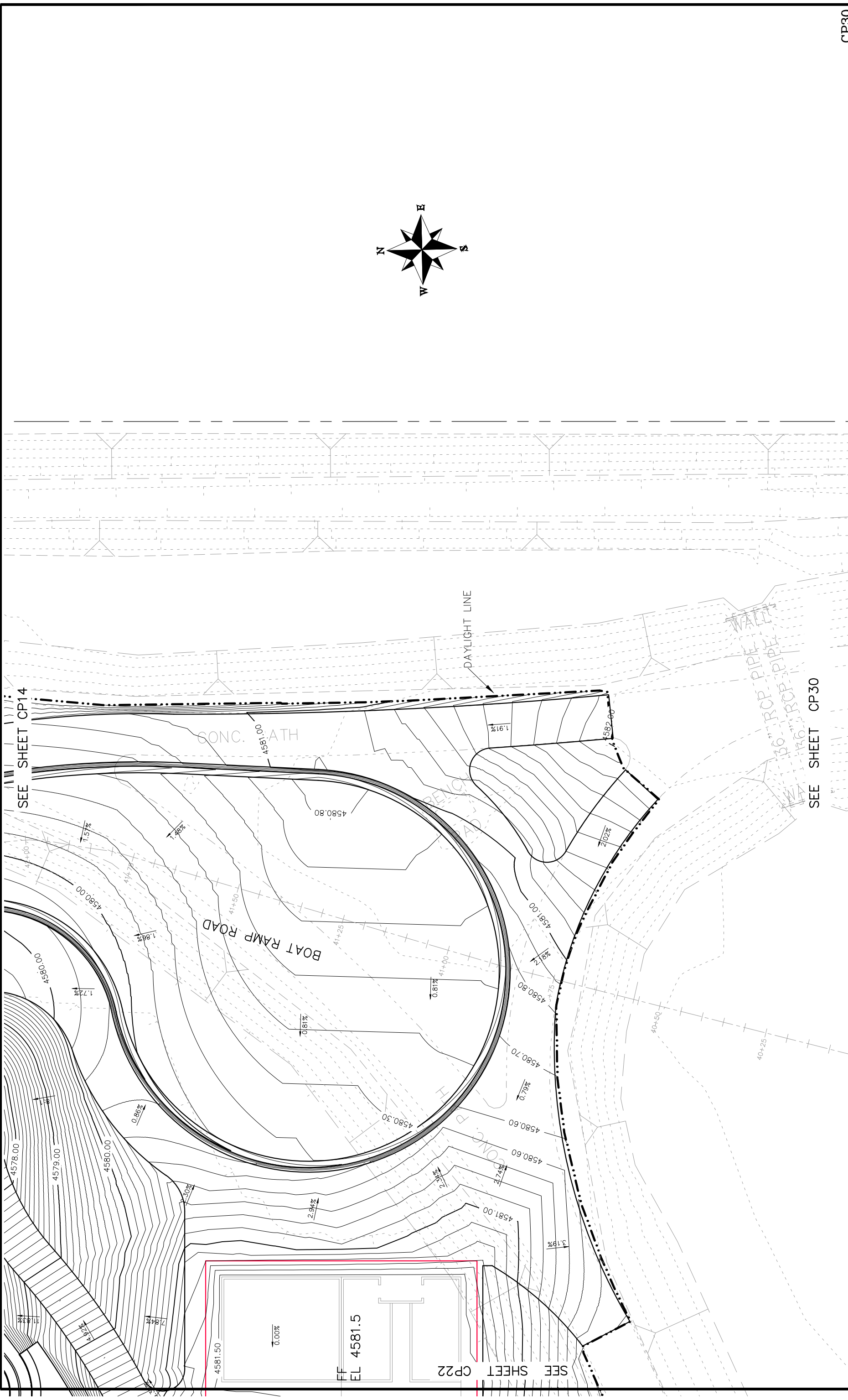
SEE SHEET CP29

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ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

CP29

102



SEE SHEET CP14

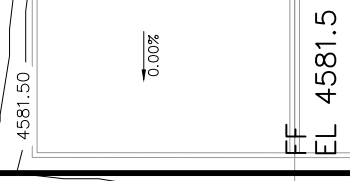
SEE SHEET CP30

CONC. PATH

BOAT RAMP ROAD

DAYLIGHT LINE

36" RCP PIPE WALL
36" RCP PIPE
36" RCP PIPE



EL 4581.5

SEE SHEET CP22

REVISION	DATE	DESCRIPTION
REVISION 1	REVI_DATE	REVI_DESCRIPTION
REVISION 2	REV2_DATE	REV2_DESCRIPTION
REVISION 3	REV3_DATE	REV3_DESCRIPTION
REVISION 4	REV4_DATE	REV4_DESCRIPTION

SCALE	DATE	DESIGNED BY	CHECKED BY	APPROVED BY
PLAN & PROFILE	DATE 2017	DESIGNED BY JCS	CHECKED BY JCS	APPROVED BY JCS
HORIZONTAL	DATE 2017	DESIGNED BY JCS	CHECKED BY JCS	APPROVED BY JCS
VERTICAL	DATE 2017	DESIGNED BY JCS	CHECKED BY JCS	APPROVED BY JCS

SCALES:

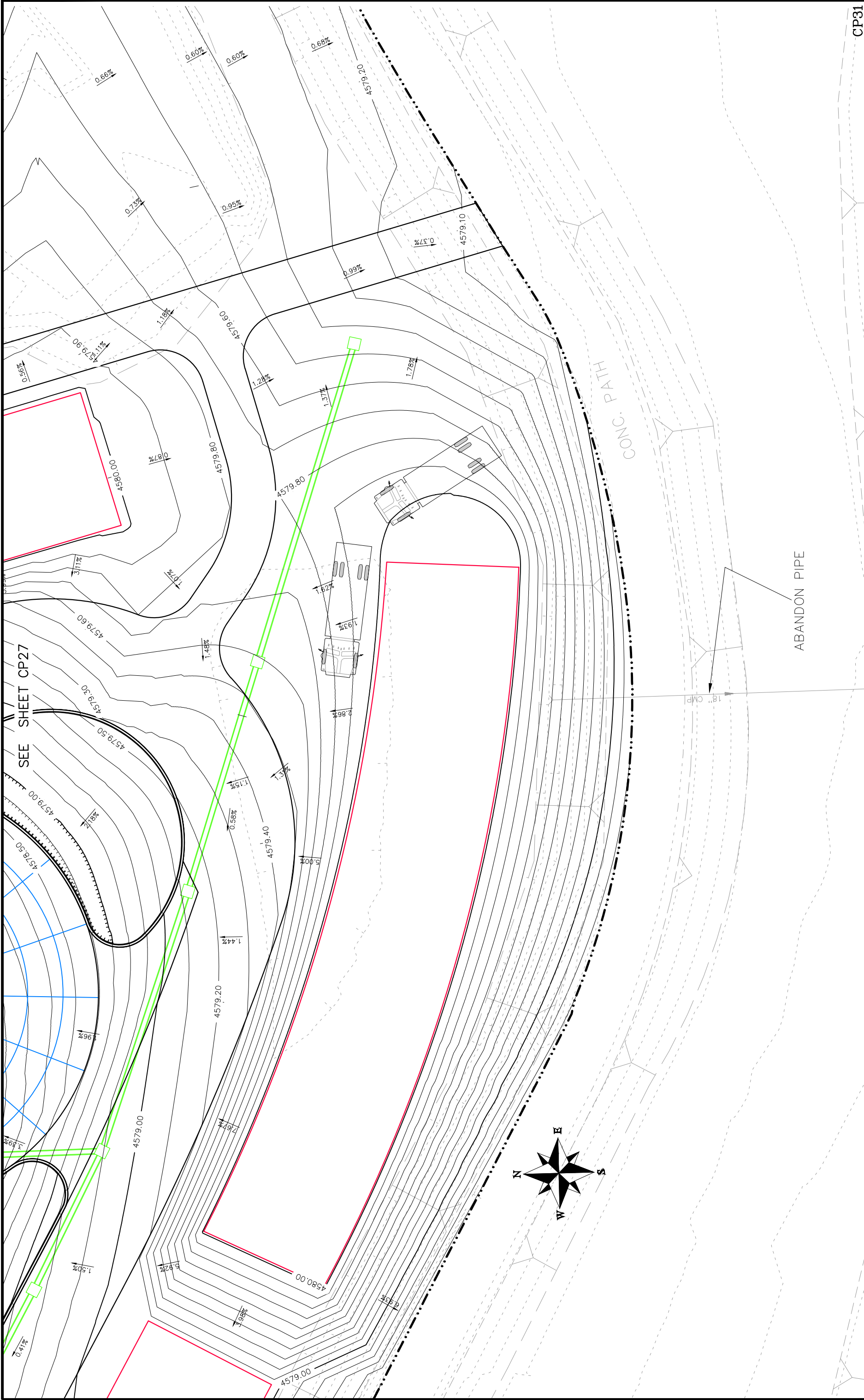
PLAN & PROFILE
HORIZONTAL
VERTICAL



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ENGINEERING DIVISION

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan

CP30
103



REVISION	DATE	DESCRIPTION
REVISION Δ REV1_INT	DATE 2017	
REVISION Δ REV2_INT	DATE 2017	
REVISION Δ REV3_INT	DATE 2017	
REVISION Δ REV4_INT	DATE 2017	

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 ENGINEERING DIVISION

Las Colonias Business Park
 20th Scale Tenth Foot Contour Plan
 CP31 **104**

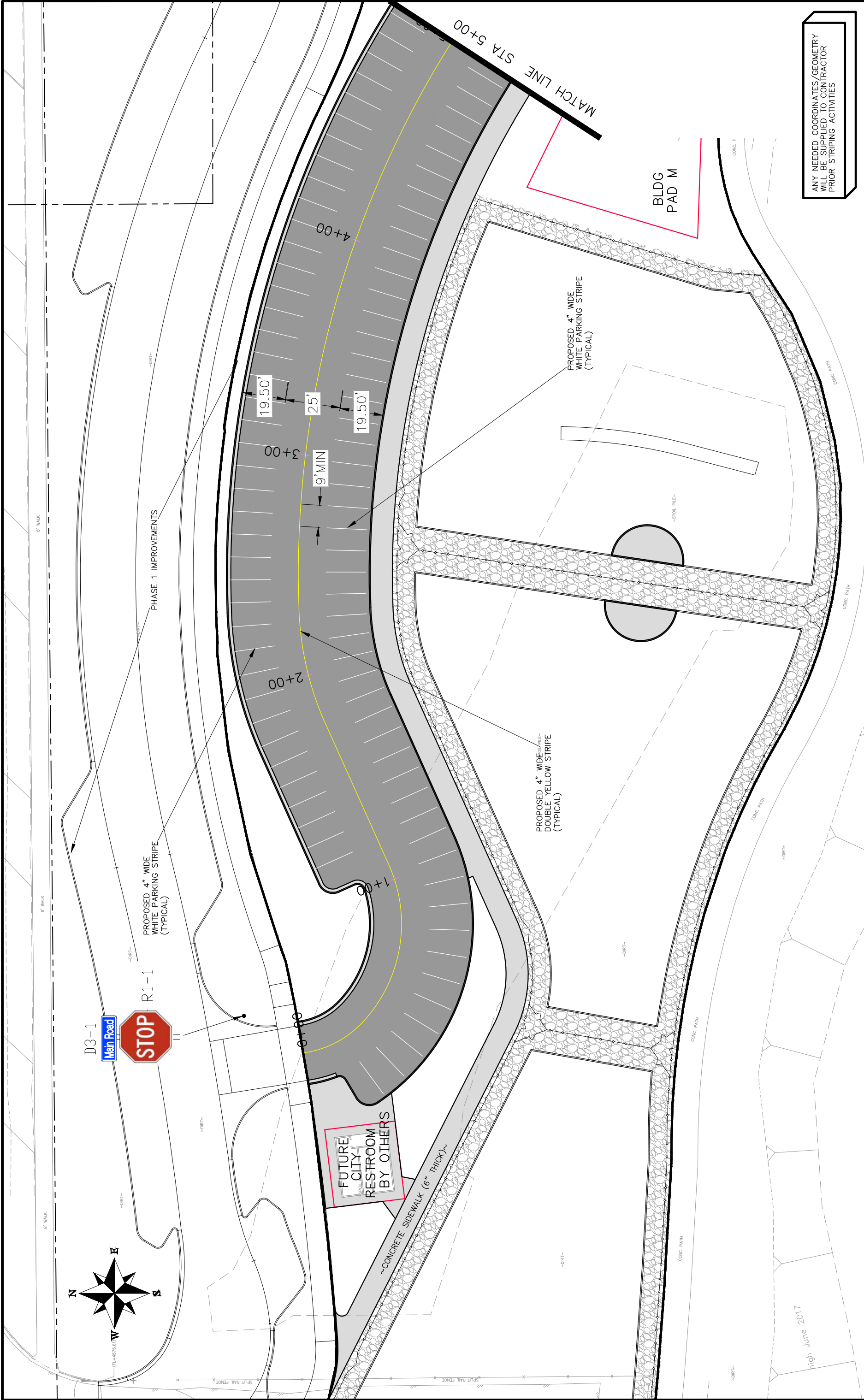


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REVISION 3	REV3_INT	REV3_DATE	TCP	2017	2017
REVISION 4	REV4_INT	REV4_DATE	TCP	2017	2017



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ENGINEERING DIVISION**

Las Colonias Business Park
20th Scale Tenth Foot Contour Plan



ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

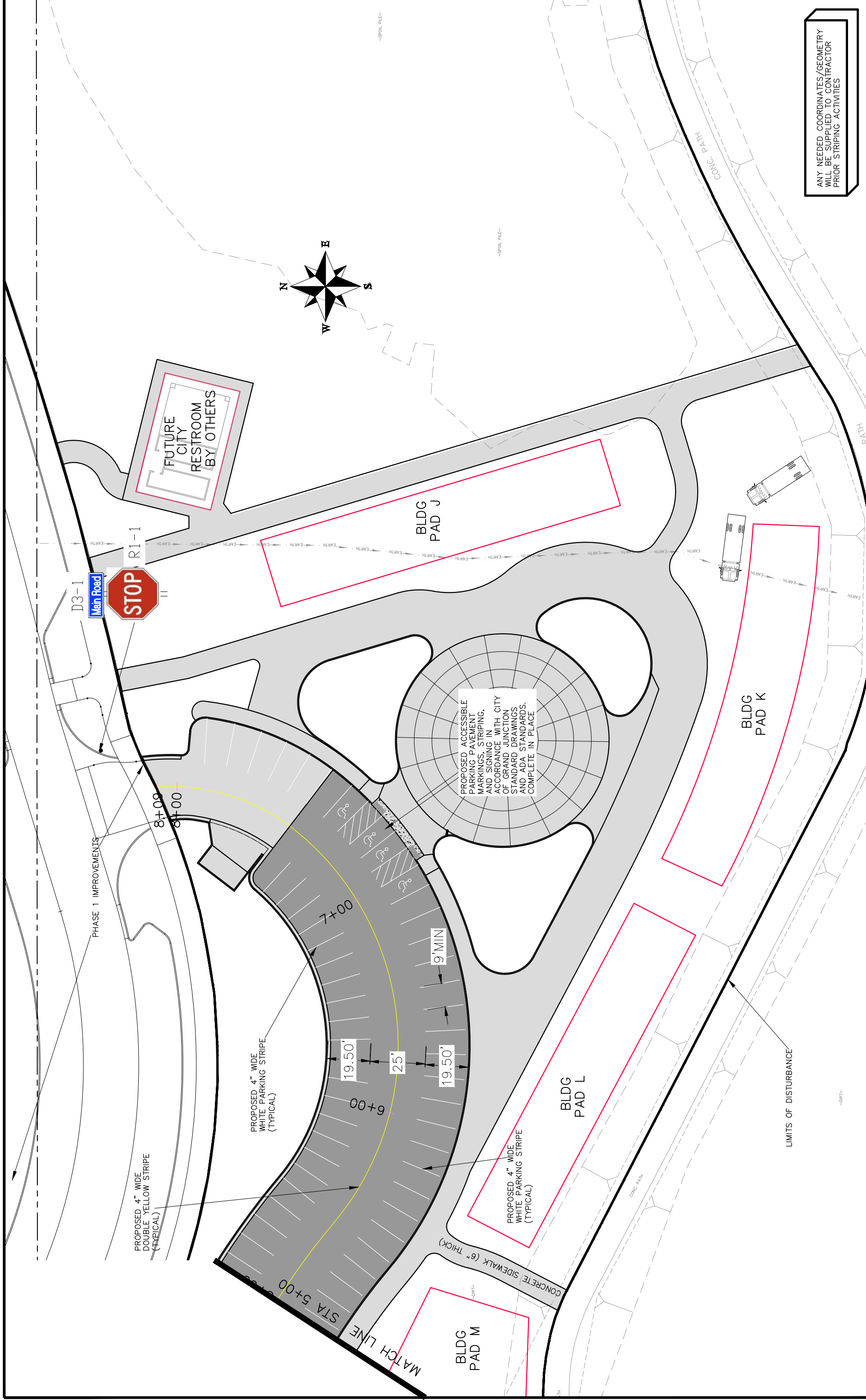
REVISION	DESCRIPTION	DATE

DRAWN BY JCS DATE 2017
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 CHECKED BY TOP DATE 2017
 APPROVED BY TOP DATE 2017

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Las Colonias Business Park Phase 2
 Signing and Striping Plan



ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

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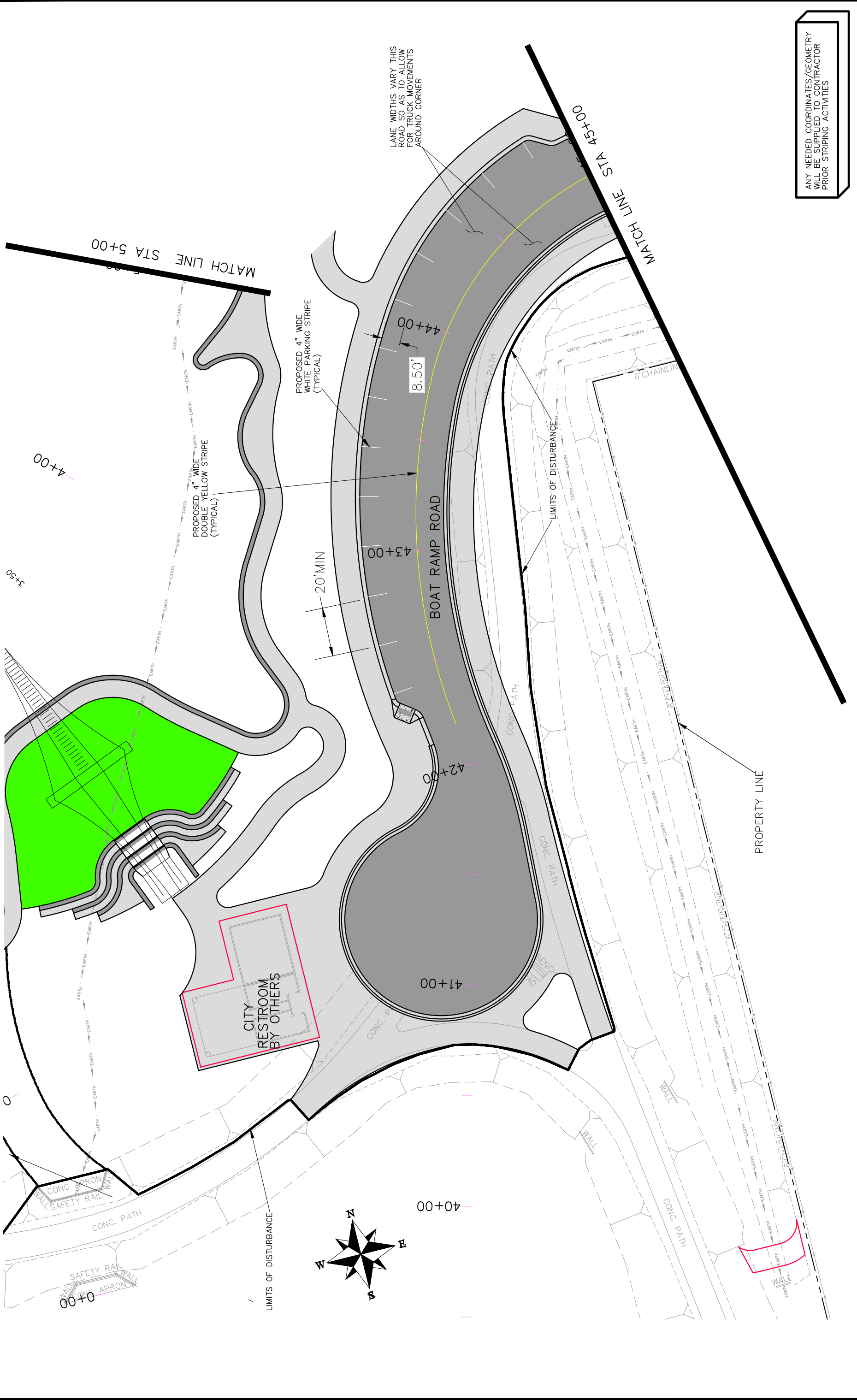
SCALES:	PLAN & PROFILE
0	10 HORIZONTAL
0	NA VERTICAL

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Las Colonias Business Park Phase 2 Signing and Striping Plan

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ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

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REVISION	DATE	BY	DATE	2017
REVISION	DATE	BY	DATE	2017
REVISION	DATE	BY	DATE	2017

DESCRIPTION	DATE

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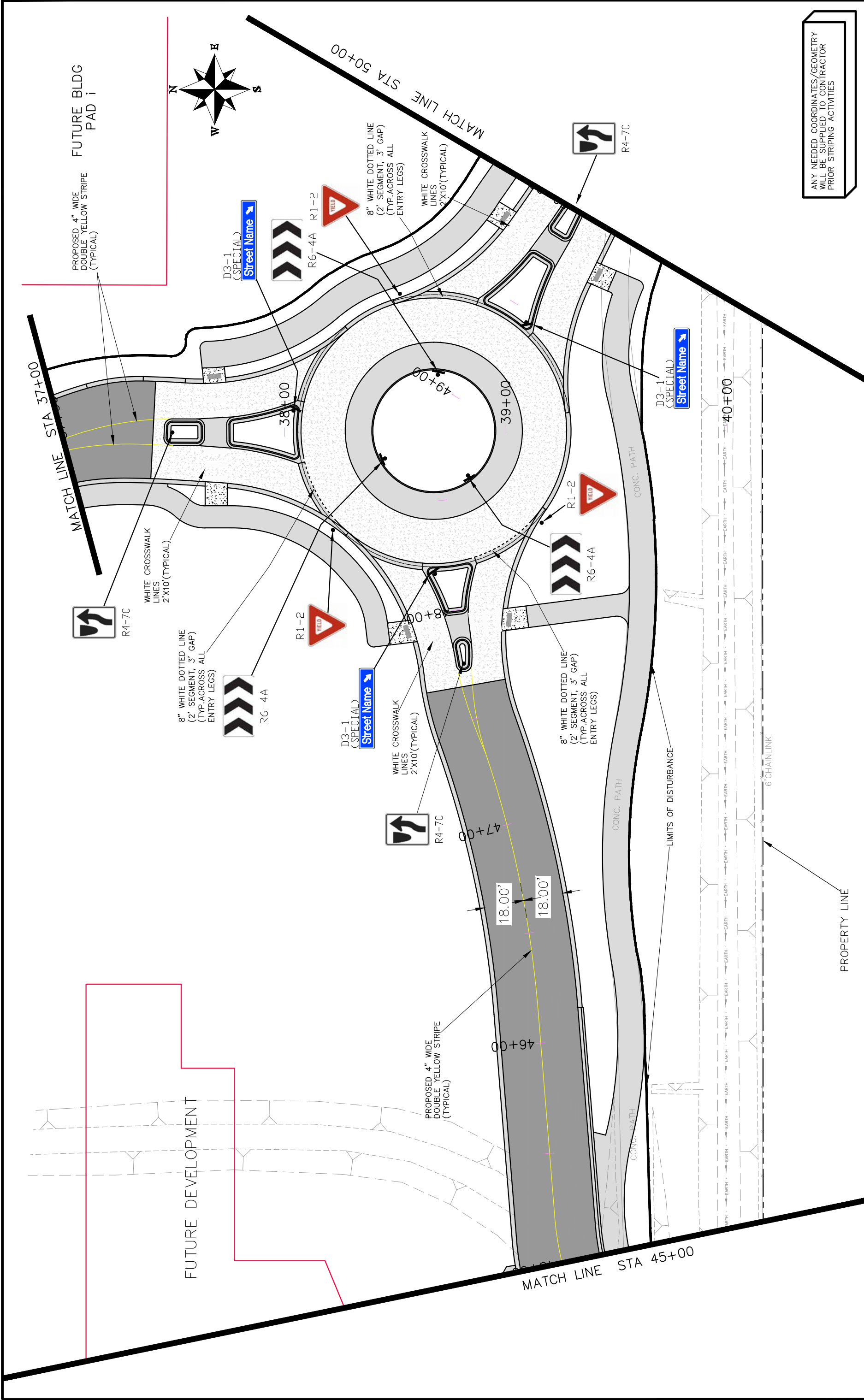
SCALES:	PLAN & PROFILE
	HORIZONTAL
	VERTICAL

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Las Colonias Business Park Phase 2 Signing and Striping Plan

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ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

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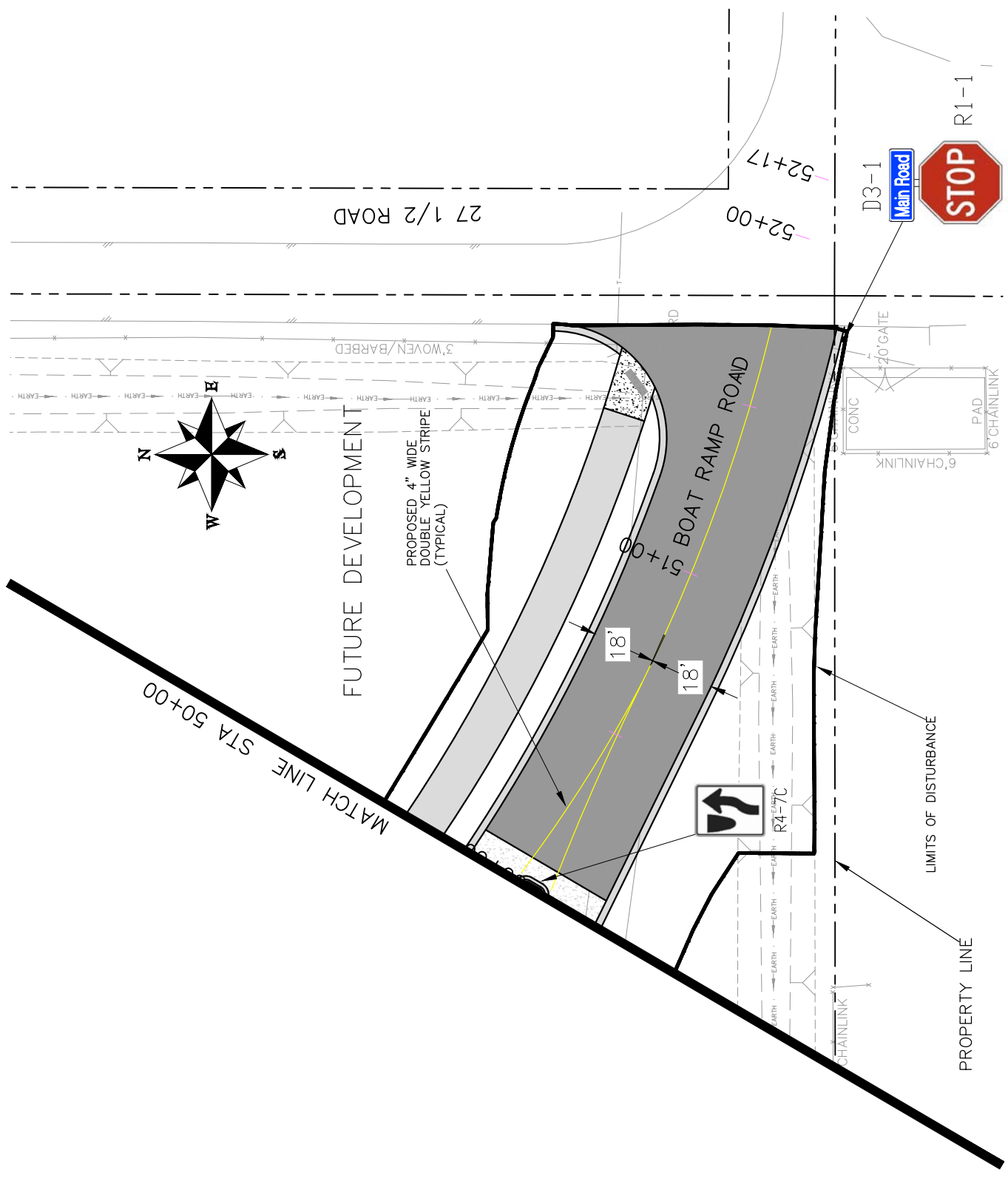
DATE: 2017
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 DATE: 2017
 DATE: 2017

SCALES:
 PLAN & PROFILE: 1" = 20'
 HORIZONTAL: 1" = 40'
 VERTICAL: 1" = 10'

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 ENGINEERING DIVISION

Las Colonias Business Park Phase 2
 Signing and Striping Plan
109



ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

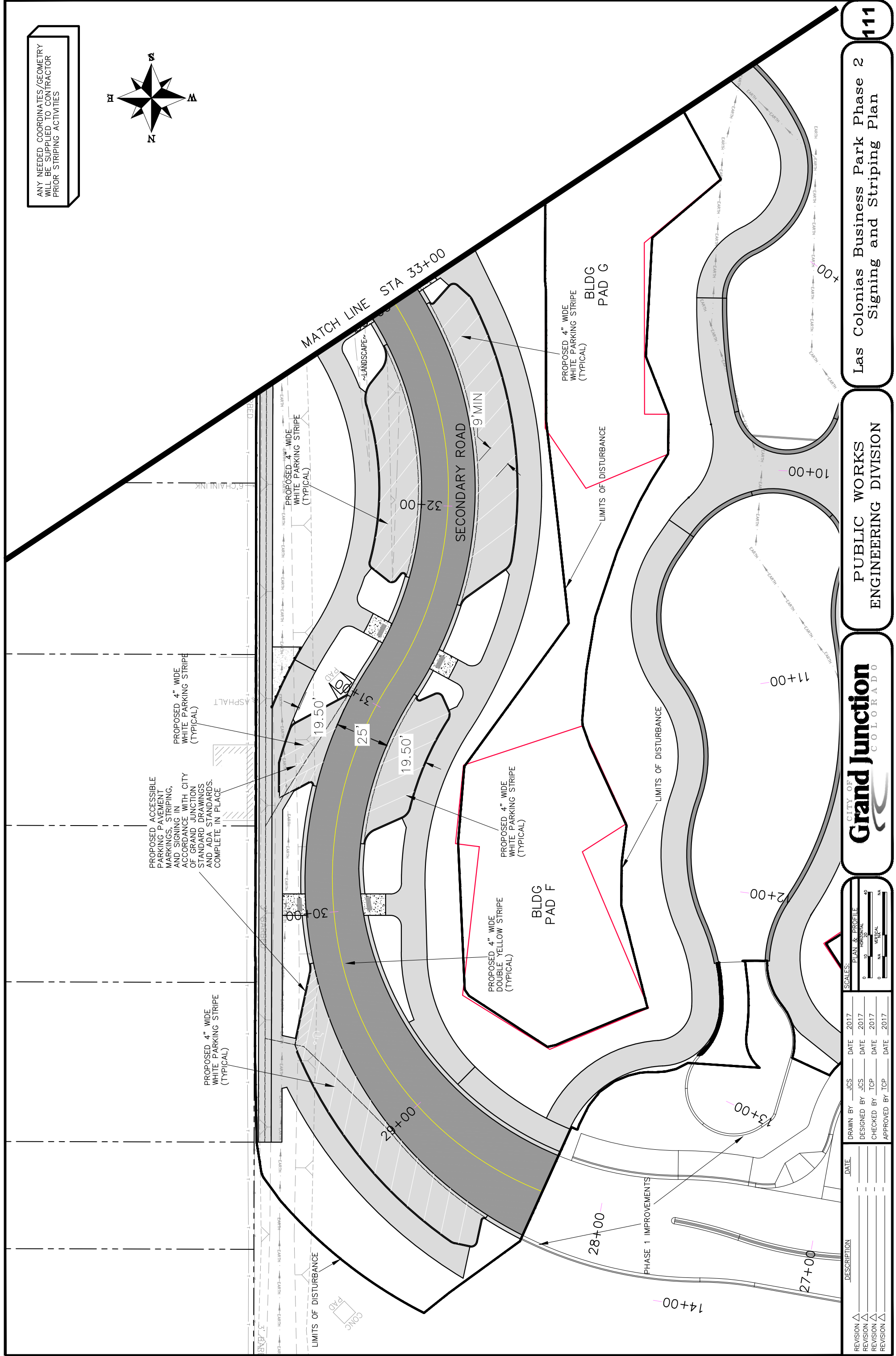
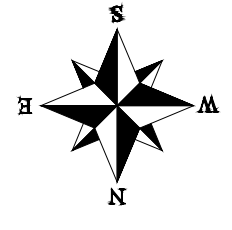
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REVISION 2		2017	JCS	2017	HORIZONTAL
REVISION 3		2017	TCP	2017	VERTICAL
REVISION 4		2017	TCP	2017	NA



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Las Colonias Business Park Phase 2
Signing and Striping Plan
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ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES



PROPOSED ACCESSIBLE PARKING, PAVEMENT MARKINGS, STRIPING, AND SIGNING IN ACCORDANCE WITH CITY OF GRAND JUNCTION STANDARD DRAWINGS AND ADA STANDARDS. COMPLETE IN PLACE

PROPOSED 4" WIDE WHITE PARKING STRIPE (TYPICAL)

PROPOSED 4" WIDE WHITE PARKING STRIPE (TYPICAL)

PROPOSED 4" WIDE WHITE PARKING STRIPE (TYPICAL)

PROPOSED 4" WIDE DOUBLE YELLOW STRIPE (TYPICAL)

PROPOSED 4" WIDE WHITE PARKING STRIPE (TYPICAL)

PROPOSED 4" WIDE WHITE PARKING STRIPE (TYPICAL)

REVISION	DATE
REVISION	DATE
REVISION	DATE
REVISION	DATE

DESCRIPTION	DATE

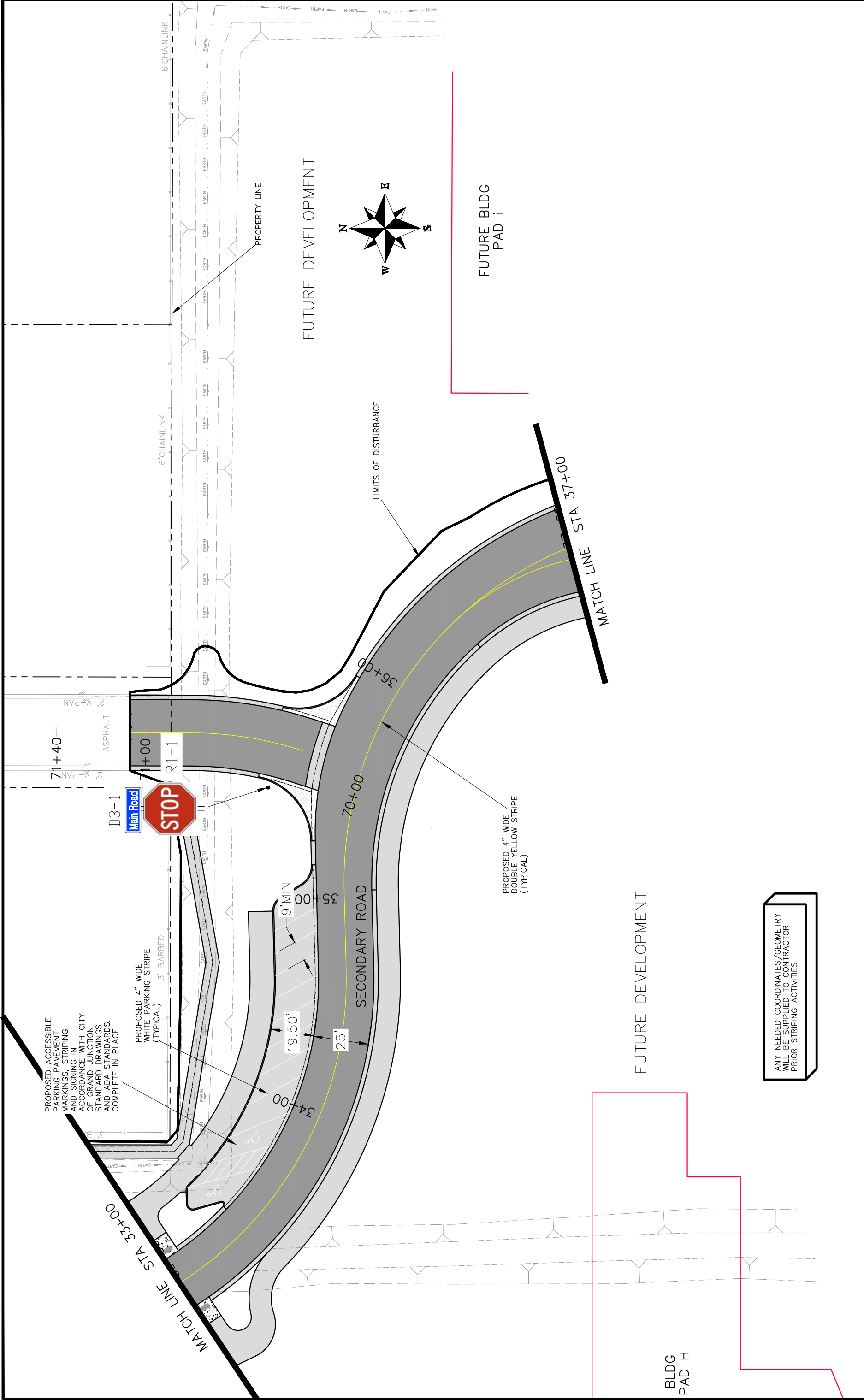
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SCALES:	PLAN & PROFILE
0	1" = 20'
0	1" = 40'
0	1" = 80'
0	1" = 160'



PUBLIC WORKS ENGINEERING DIVISION

Las Colonias Business Park Phase 2
Signing and Striping Plan



ANY NEEDED COORDINATES/GEOMETRY WILL BE SUPPLIED TO CONTRACTOR PRIOR STRIPING ACTIVITIES

REVISION	DATE	DESCRIPTION

DATE	DATE	DATE	DATE

SCALE	PLAN & PROFILE
0	0
10	10
20	20
30	30
40	40
50	50
60	60
70	70
80	80
90	90
100	100



PUBLIC WORKS
ENGINEERING DIVISION

EROSION CONTROL MEASURES

Contractor to update the SWMP according to specific construction phasing and stormwater management practices for current construction activity when warranted.

Site Description

1. The site has a total disturbance area of 23.02 acres with the majority of disturbance being caused by the development of Phase 2 of the Las Colonias Business Park.
2. Stormwater leaves the site through double 3' x 6' Reinforced Concrete Box Culverts, a 24" RCP built from the Water Quality Pond during Phase 1, two 36" RCP's crossing the riverfront path just ahead of the pedestrian bridge and another 36" RCP in the same area where they all drain directly to the Colorado River.
3. Proposed utilities for this project include: storm drain, sanitary sewer, potable water, gas, electricity, telephone, cable television, and broadband infrastructure.

EROSION CONTROL MEASURES

Performance Standards

The general requirements for erosion control work shall be as follows:

1. Any grading shall be conducted in such a manner so as to effectively reduce accelerated soil erosion and resulting sedimentation.
2. All grading shall be designed, constructed and completed in such a manner so that exposed area of any disturbed land shall be limited to the shortest time period.
3. Sediment caused by accelerated soil erosion shall be removed from runoff water before leaving the site.
4. The contractor shall try to minimize the amount of disturbance necessary for the construction project by preserving established vegetation to act as a BMP.

During Construction (Temporary Measures)

1. **Anchored Straw Bales (ASB):** The use of hay bales is proposed as a culvert outlet trap at the junction of the outlet of the tripple 3x7 and double 3x6 RCBC's to stop any sediment produced from stormwater runoff from continuing to the new temporary drain channel as shown on the construction drawings. Hay bales will also be used further as a sediment trap where the new temporary channel ties to the existing channel downstream of the culvert outlet trap.
2. **Erosion Logs:** The use of erosion logs is proposed at the toe of cut and fill slopes and other areas where sediment from upstream flows may spill to existing drainage ways. Other locations are shown on the plan. Installation shall be in accordance with the detail as shown on the plans.
3. **Inlet Protection:** The use of inlet protection is proposed at all inlets to trap sediment before entering the storm drain system.

After Construction (Permanent Measures)

1. **Rip-Rap:** The use of rip-rap per construction drawings is proposed for around the outlet of several pipes as noted and shown.
1. **Reseeding:** the majority of the site will be seeded with grass or other plantings as shown in the landscape plans. All disturbed areas will be seeded if otherwise not proposed to be paved.

Maintenance

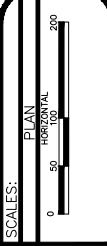
1. The contractor or his designated representative shall make routine checks on all erosion control measures to determine if repairs or sediment removal is necessary.
2. After each rainfall or moderate snow melt, erosion control measures are to be checked. If repairs are needed, they shall be completed immediately.
3. Silt and sediment shall be removed when they reach a height of one-half of the barrier (erosion log or anchored straw bale).
4. When temporary measures are to be removed, any silt and sediment deposits shall be removed and spread evenly in fill areas.

General Notes

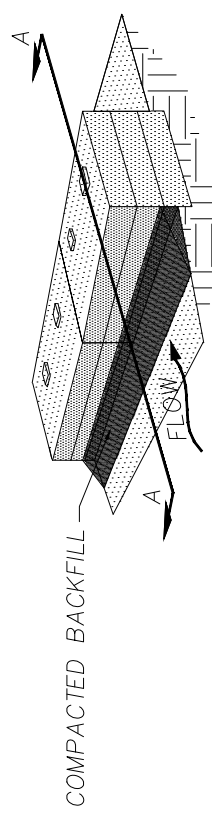
1. The SWMP establishes the minimum acceptable requirements for stormwater pollution prevention on site. The Contractor may supplement these requirements as appropriate for specific construction activities. Any changes to the practices shown on this plan must be reviewed by Project Inspector/Engineer prior to implementation.
2. At all times during construction, erosion and sediment control shall be maintained by the contractor or his designated representative.
3. Erosion control systems shall be installed as grading progresses.
4. The Contractor shall provide and maintain a portable concrete washout facility.
5. Details shown are schematic only. Adjust as necessary to fit field conditions.
6. Erosion bales shall be placed to avoid runoff flowing between, around or under bales. Bales shall be anchored with 2" x 2" x 4' wooden stakes or #4 reinforcing bars, two per bale (see details for further instructions).
7. Negative impacts to downstream areas (or receiving waters) caused by the slope grading to be monitored and corrected by the contractor.
8. Construction traffic entrances shall be cleaned on a continual basis during slope grading.
9. A copy of the SWMP and construction plans shall be maintained on site at all times.

REVISION	DESCRIPTION	DATE

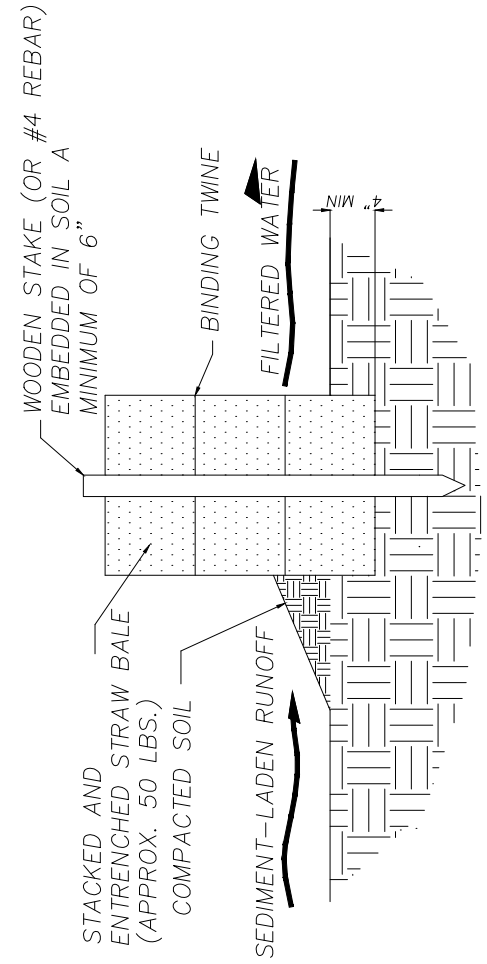
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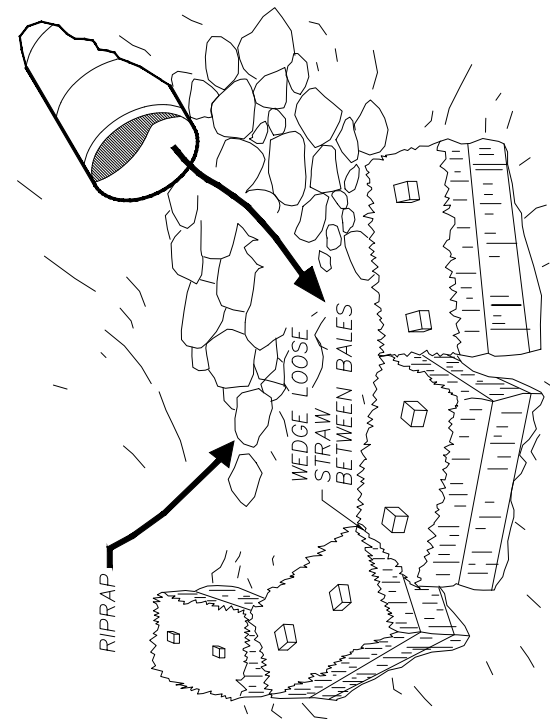
**PUBLIC WORKS
ENGINEERING DIVISION**



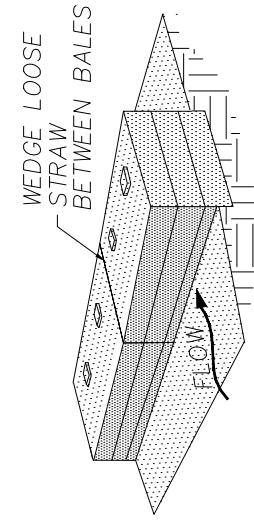
STEP 3. PLACE COMPACTED BACKFILL AGAINST THE UPSTREAM FACE.



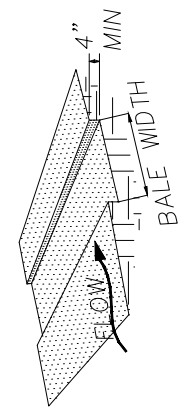
SECTION A-A



CULVERT OUTLET TRAP
N.T.S.
ANCHORED STRAW BALE (A.S.B.)

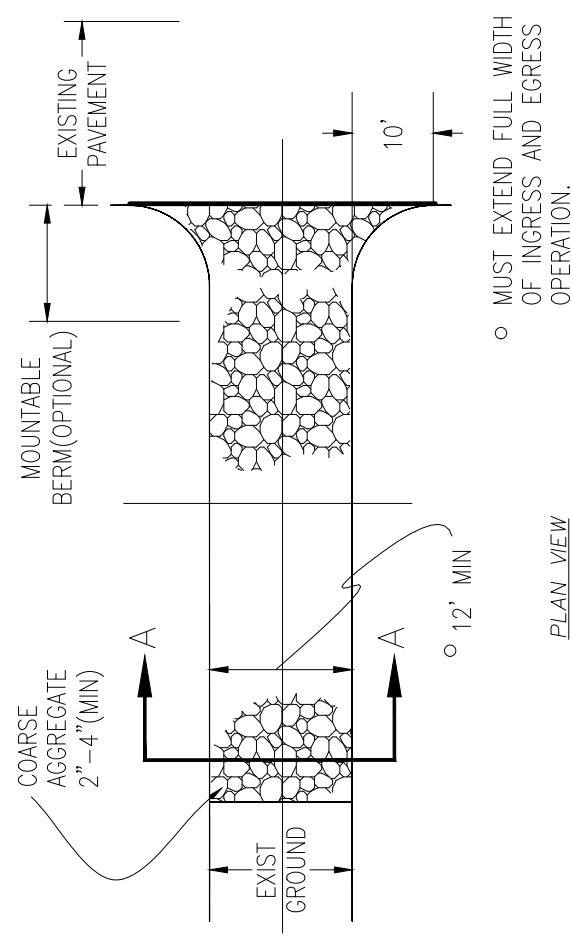


STEP 2. PLACE BALE IN TRENCH, STAKE IN PLACE

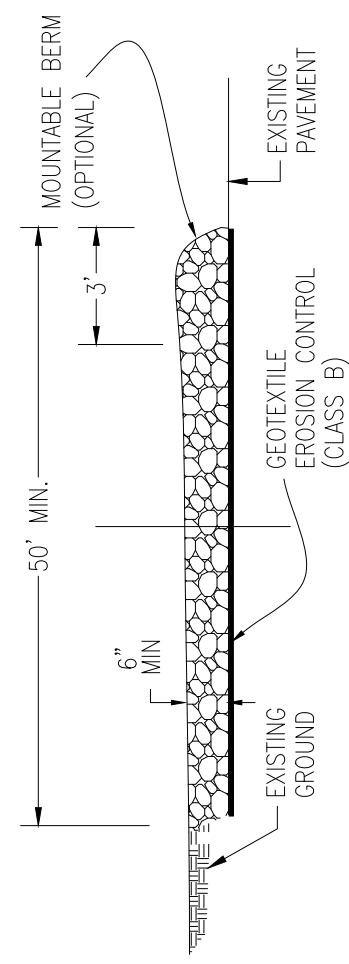


STEP 1. EXCAVATE TRENCH FOR BALES

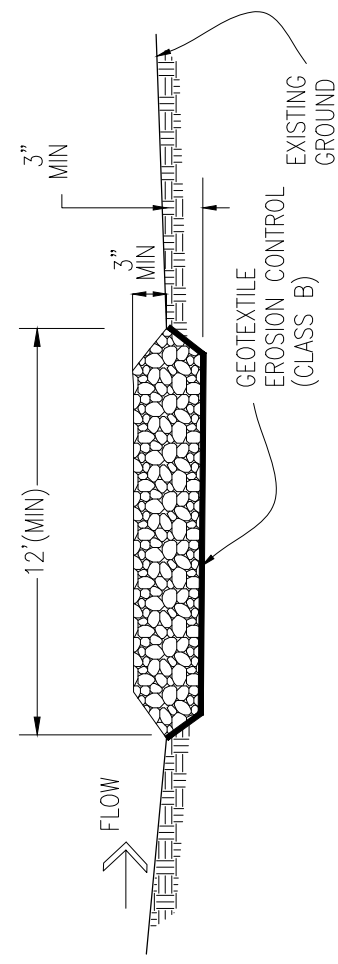
BALE INSTALLATION PROCEDURE



PLAN VIEW



SIDE ELEVATION



SECTION A-A

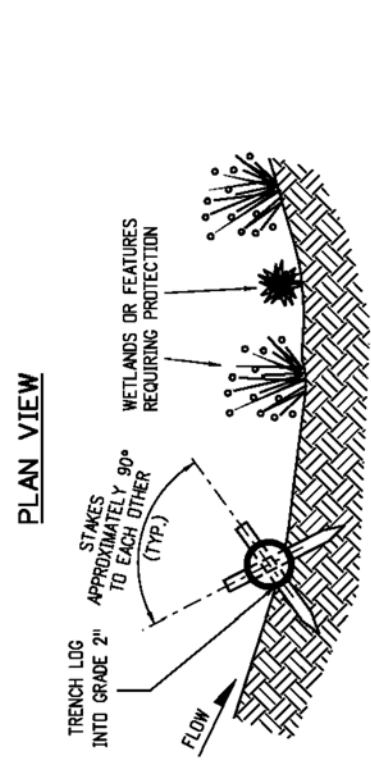
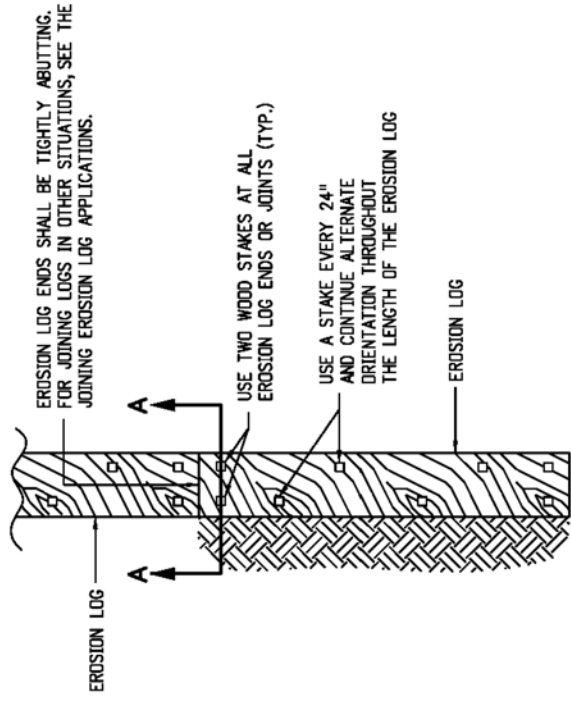
STABILIZED CONSTRUCTION ENTRANCE

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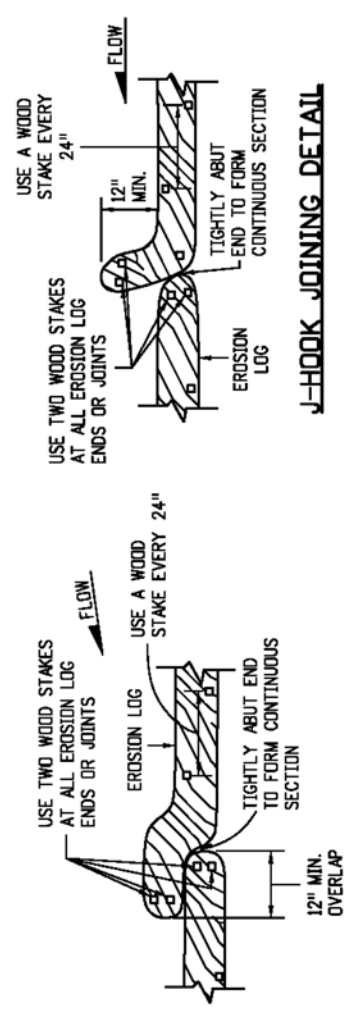


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ENGINEERING DIVISION

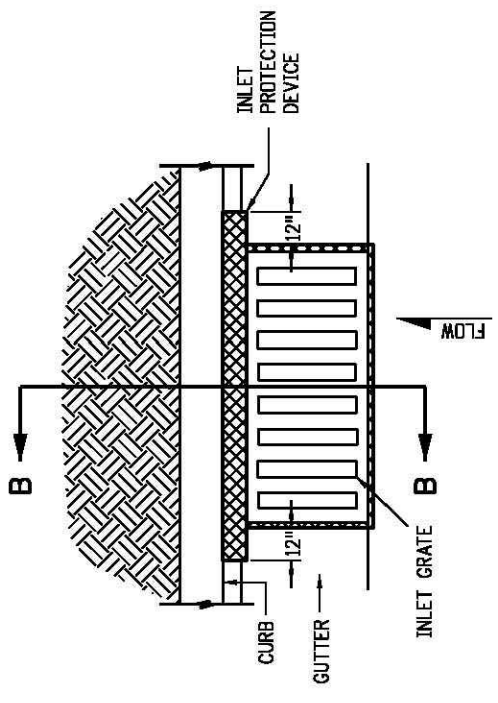
LAS COLONIAS BUSINESS PARK PHASE 2
STORM WATER MANAGEMENT DETAILS



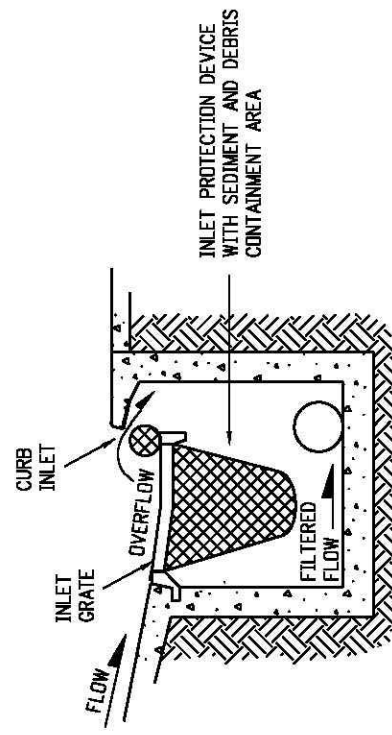
TYPICAL STAKE INSTALLATION
SECTION A-A



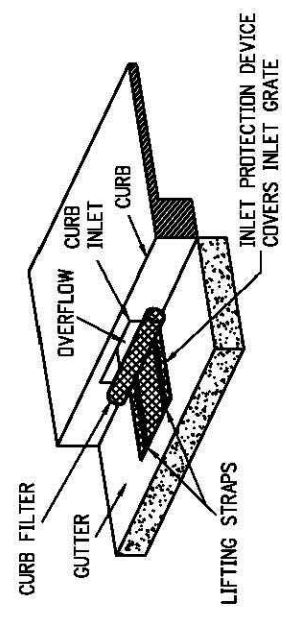
JOINING EROSION LOG APPLICATIONS



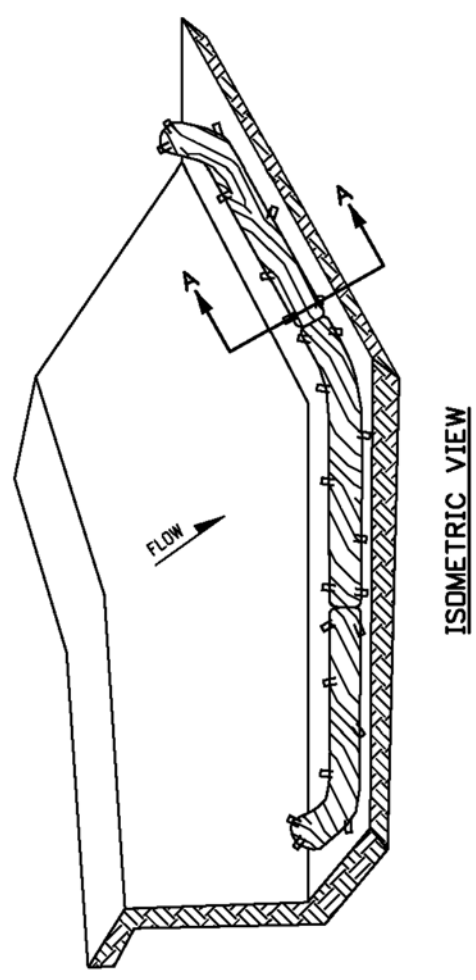
PLAN VIEW



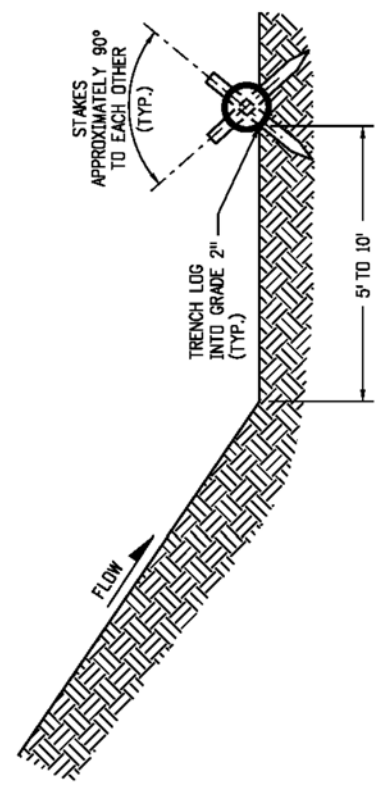
SECTION B-B
OPTION A
STORM DRAIN INLET PROTECTION (TYPE II)



ISOMETRIC VIEW
OPTION B
STORM DRAIN INLET PROTECTION (TYPE II)



ISOMETRIC VIEW



SECTION A-A

- NOTES:**
1. EROSION LOGS USED AT TOE OF SLOPE SHALL BE PLACED 5 TO 10 FEET BEYOND TOE OF SLOPE TO PROVIDE STORAGE CAPACITY.
 2. EROSION LOGS SHALL BE PLACED ON THE CONTOUR WITH ENDS FLARED UP SLOPE.
 3. SEE SHEET 2 OF 11 FOR JOINING LOGS DETAIL.

EROSION LOG TOE OF SLOPE PROTECTION

EROSION LOGS PAY ITEMS NUMBER	DESCRIPTION
208-00012	TYPE 1 (9")
208-00002	TYPE 1 (12")
208-00013	TYPE 1 (20")
208-00007	TYPE 2 (8")
208-00008	TYPE 2 (12")
208-00009	TYPE 2 (18")

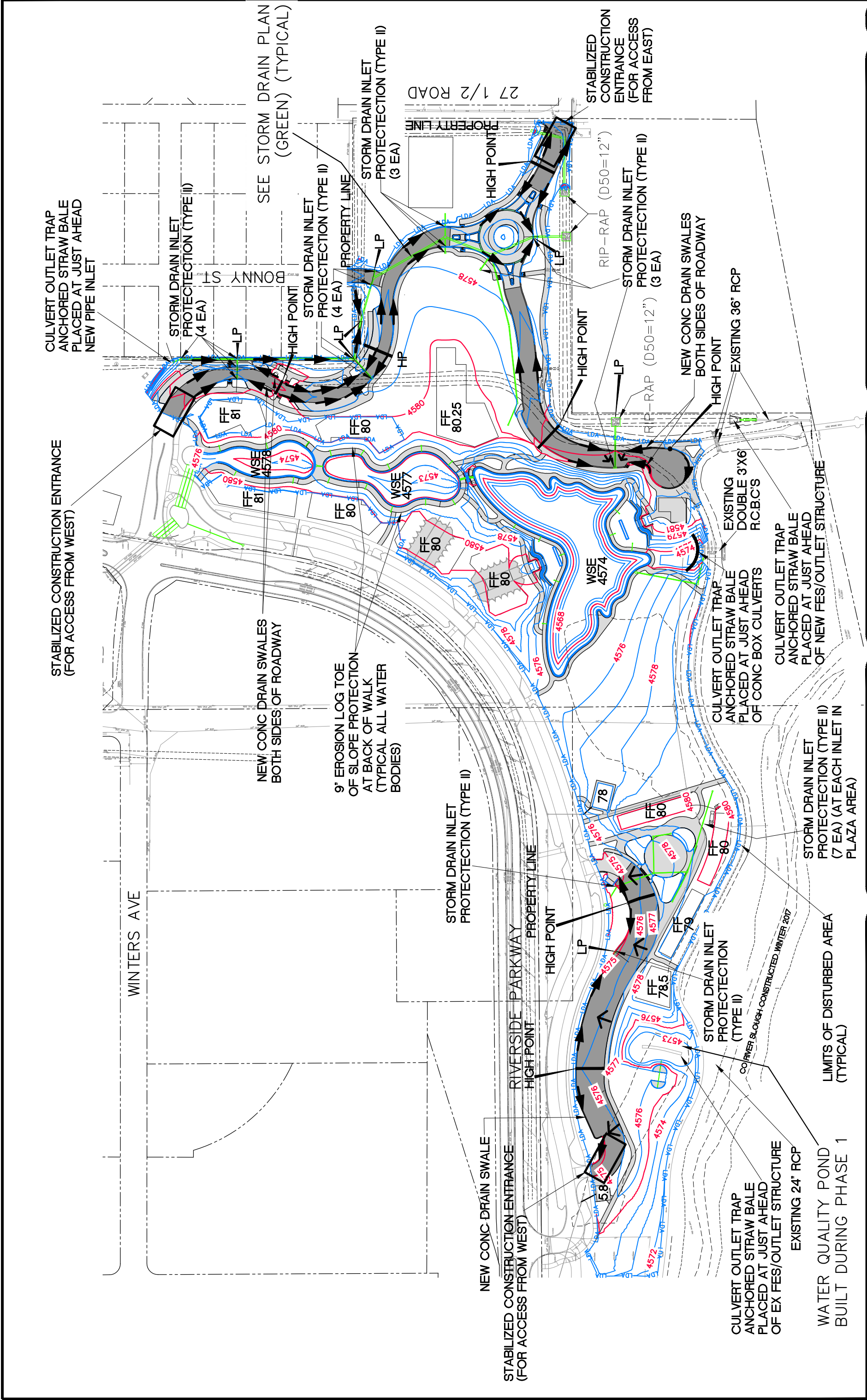
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LAS COLONIAS BUSINESS PARK PHASE 2
STORM WATER MANAGEMENT DETAILS

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REVISION	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018
REVISION			DESIGNED BY	JCS	DATE	2018
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REVISION			APPROVED BY	TCP	DATE	2018

PLAN SCALE: 1" = 30' HORIZONTAL
 1" = 10' VERTICAL

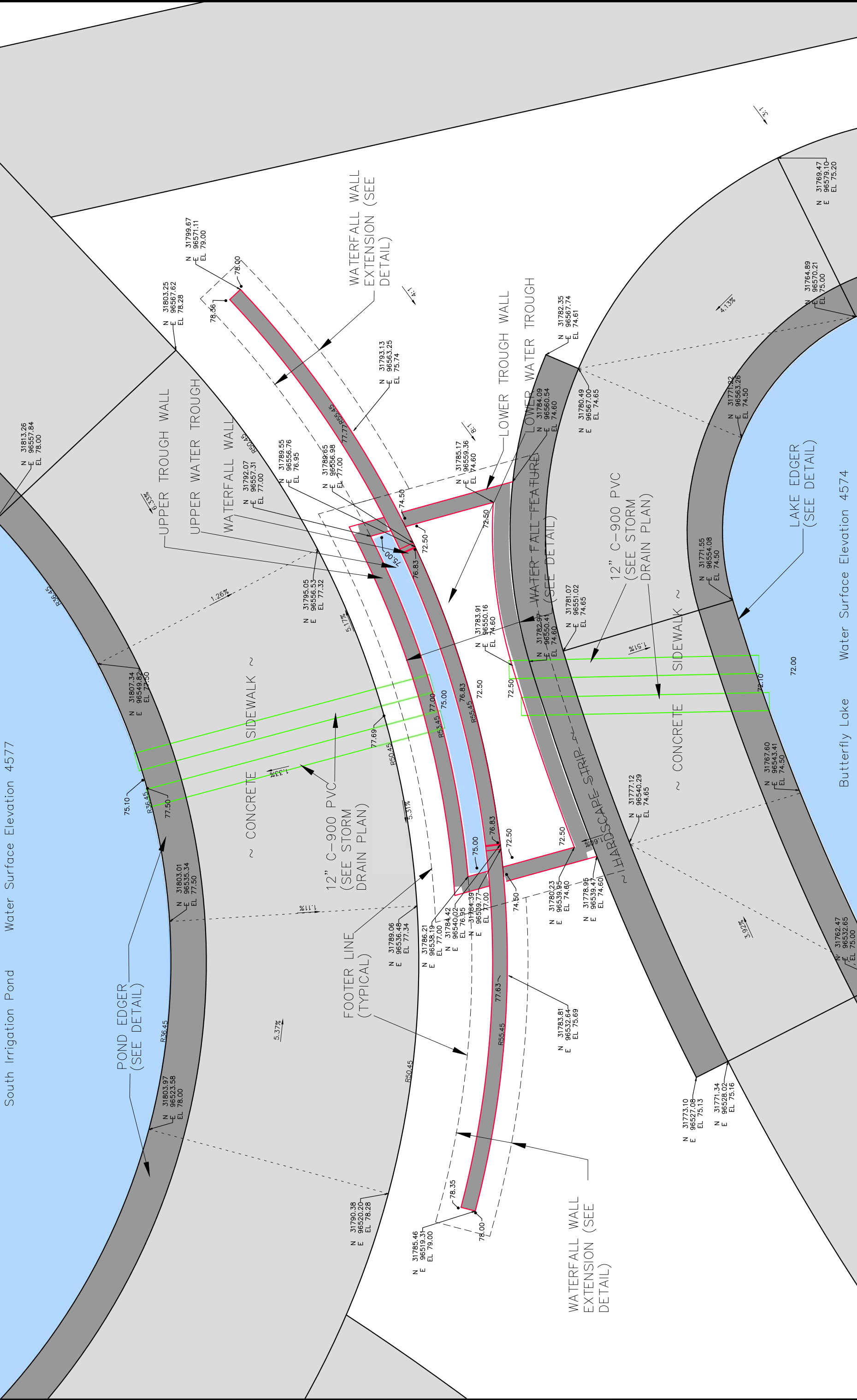
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LAS COLONIAS BUSINESS PARK PHASE 2
 STORM WATER MANAGEMENT SITE MAP

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South Irrigation Pond Water Surface Elevation 4577



REVISION	DATE	DESCRIPTION

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JCS		
DESIGNED BY	DATE	2018
JCS		
CHECKED BY	DATE	2018
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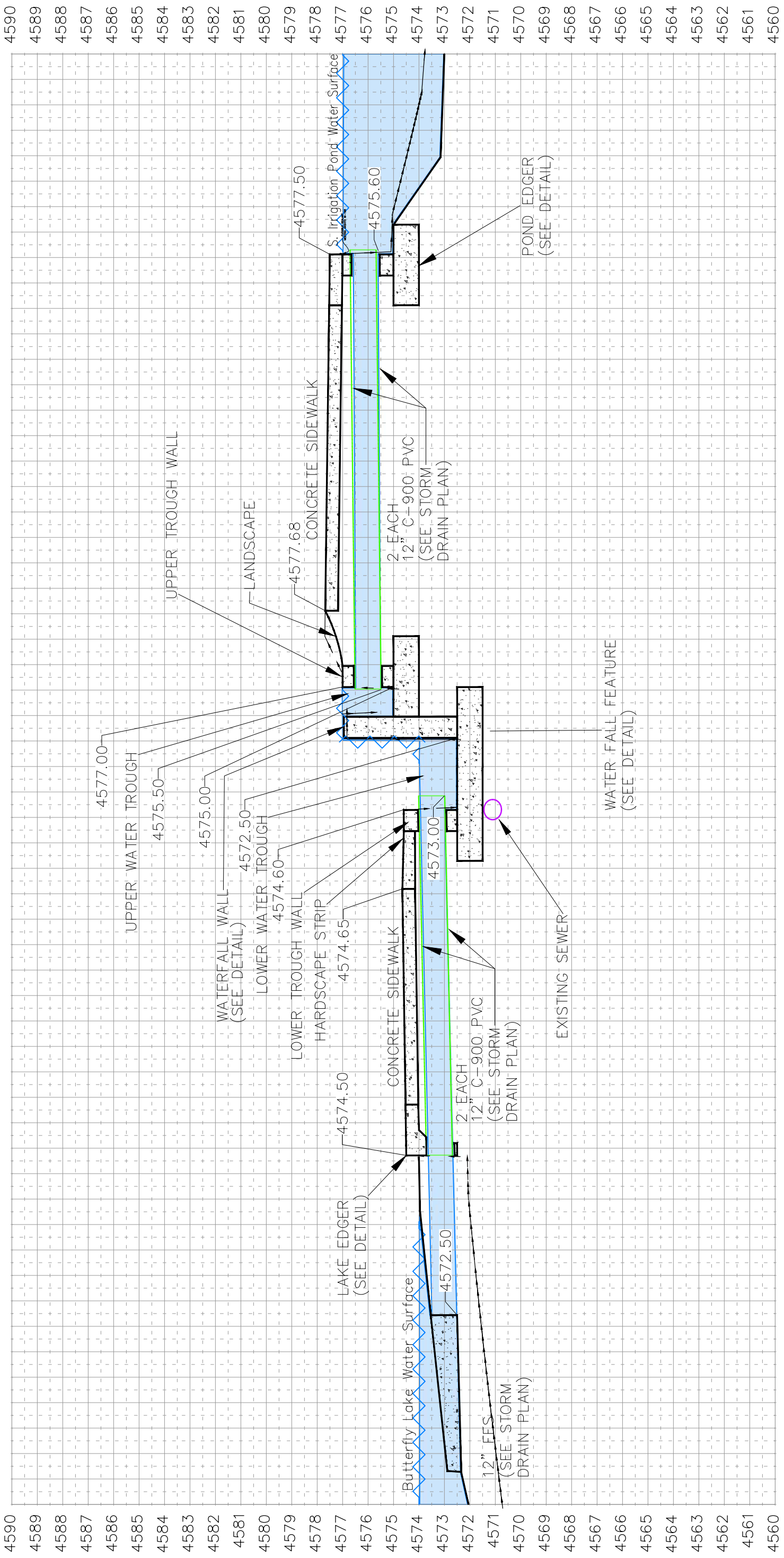
SCALE:
PLAN
1" = 20'



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LAS COLONIAS BUSINESS PARK PHASE 2
OUTLET WORKS DETAILS

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SOUTH IRRIGATION POND OUTFALL

REVISION	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TCP	DATE	2018
APPROVED BY	TCP	DATE	2018

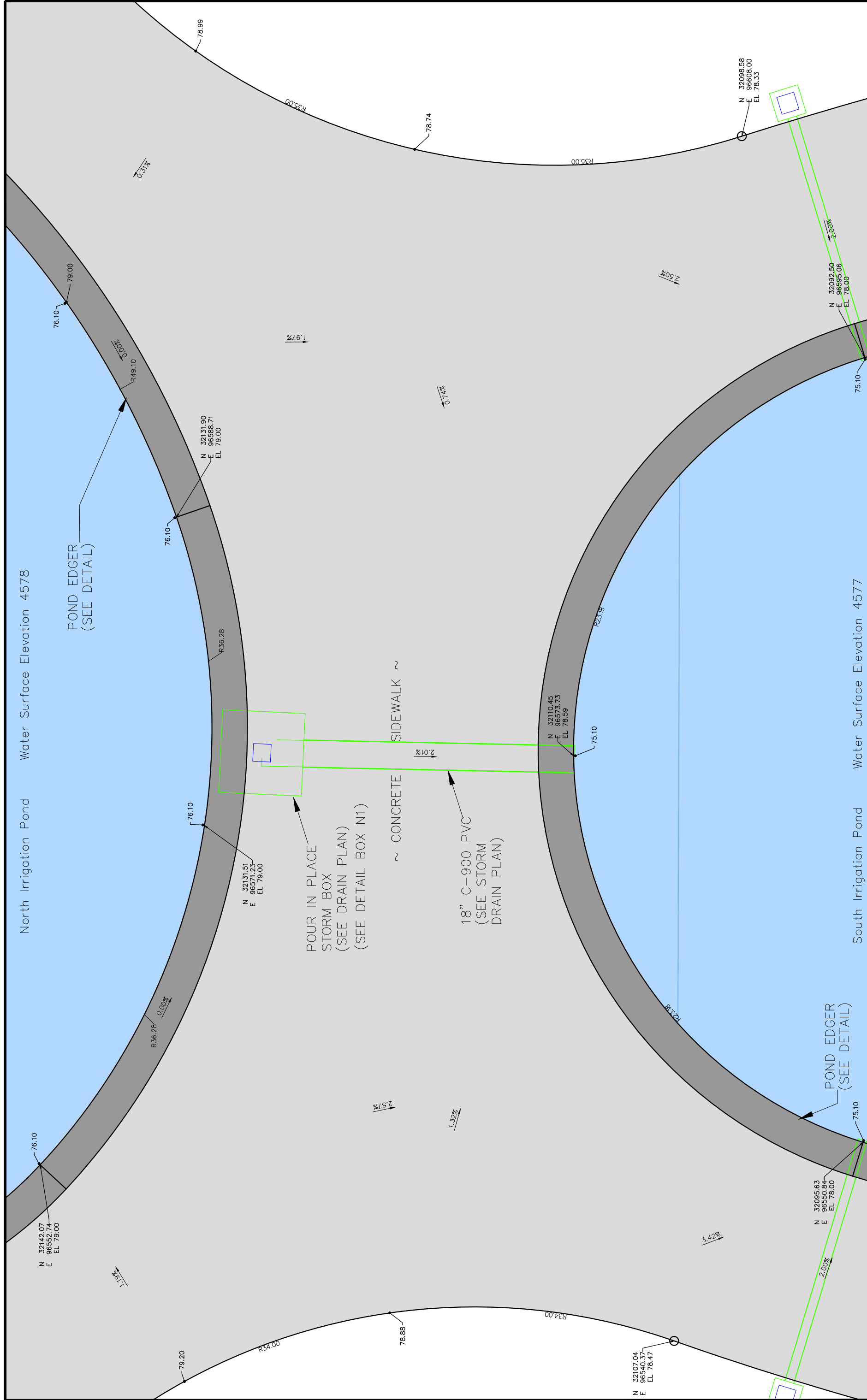
SCALES:	PLAN & PROFILE
	HORIZONTAL
	VERTICAL



PUBLIC WORKS
ENGINEERING DIVISION

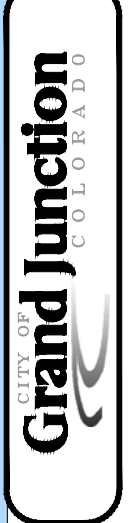
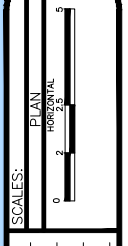
LAS COLONIAS BUSINESS PARK PHASE 2
OUTLET WORKS DETAILS

N:\landproj\2018 LAS COLONIAS BUSINESS PARK (Phase II and Later)\DWG\Phase 2\PROJECT DETAILS LARGE SCALE PLAN AND PROFILE.dwg, (2), 7/3/2018 7:38:53 AM



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REVISION Δ		

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DESIGNED BY	JCS	DATE	2018
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APPROVED BY	TCP	DATE	2018



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
OUTLET WORKS DETAILS

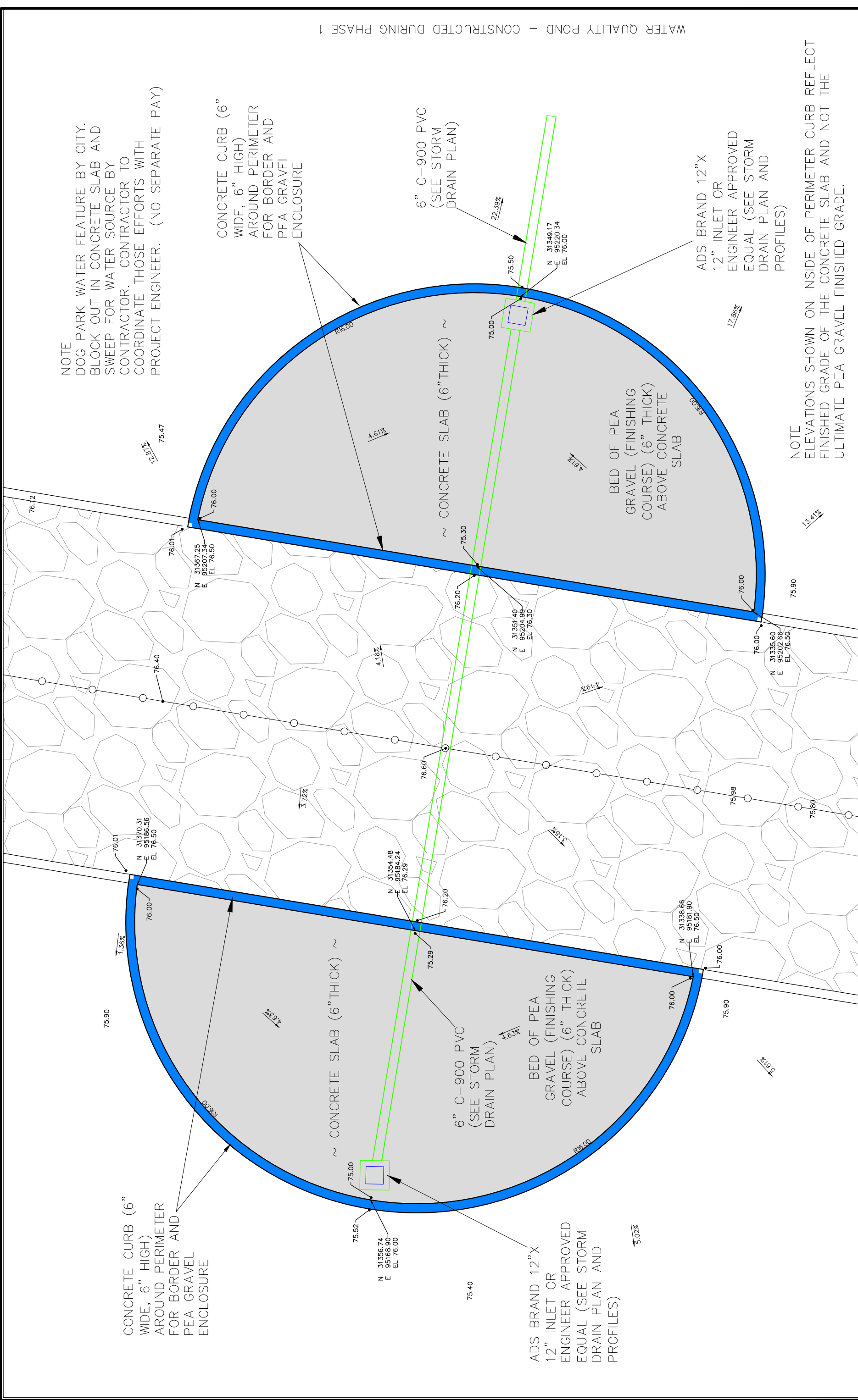
NOTE
 DOG PARK WATER FEATURE BY CITY.
 BLOCK OUT IN CONCRETE SLAB AND
 SWEEP FOR WATER SOURCE BY
 CONTRACTOR. CONTRACTOR TO
 COORDINATE THOSE EFFORTS WITH
 PROJECT ENGINEER. (NO SEPARATE PAY)

CONCRETE CURB (6" WIDE, 6" HIGH) AROUND PERIMETER FOR BORDER AND PEA GRAVEL ENCLOSURE

6" C-900 PVC (SEE STORM DRAIN PLAN)

ADS BRAND 12" X 12" INLET OR ENGINEER APPROVED EQUAL (SEE STORM DRAIN PLAN AND PROFILES)

NOTE
 ELEVATIONS SHOWN ON INSIDE OF PERIMETER CURB REFLECT FINISHED GRADE OF THE CONCRETE SLAB AND NOT THE ULTIMATE PEA GRAVEL FINISHED GRADE.



CONCRETE CURB (6" WIDE, 6" HIGH) AROUND PERIMETER FOR BORDER AND PEA GRAVEL ENCLOSURE

CONCRETE SLAB (6" THICK)

6" C-900 PVC (SEE STORM DRAIN PLAN)

BED OF PEA GRAVEL (FINISHING COURSE) (6" THICK) ABOVE CONCRETE SLAB

ADS BRAND 12" X 12" INLET OR ENGINEER APPROVED EQUAL (SEE STORM DRAIN PLAN AND PROFILES)

REVISION	DATE	DRAWN BY	DATE	SCALE	PLAN
REVISION	DATE	DESIGNED BY	DATE	0	HORIZONTAL
REVISION	DATE	CHECKED BY	DATE	2	2
REVISION	DATE	APPROVED BY	DATE	3	3

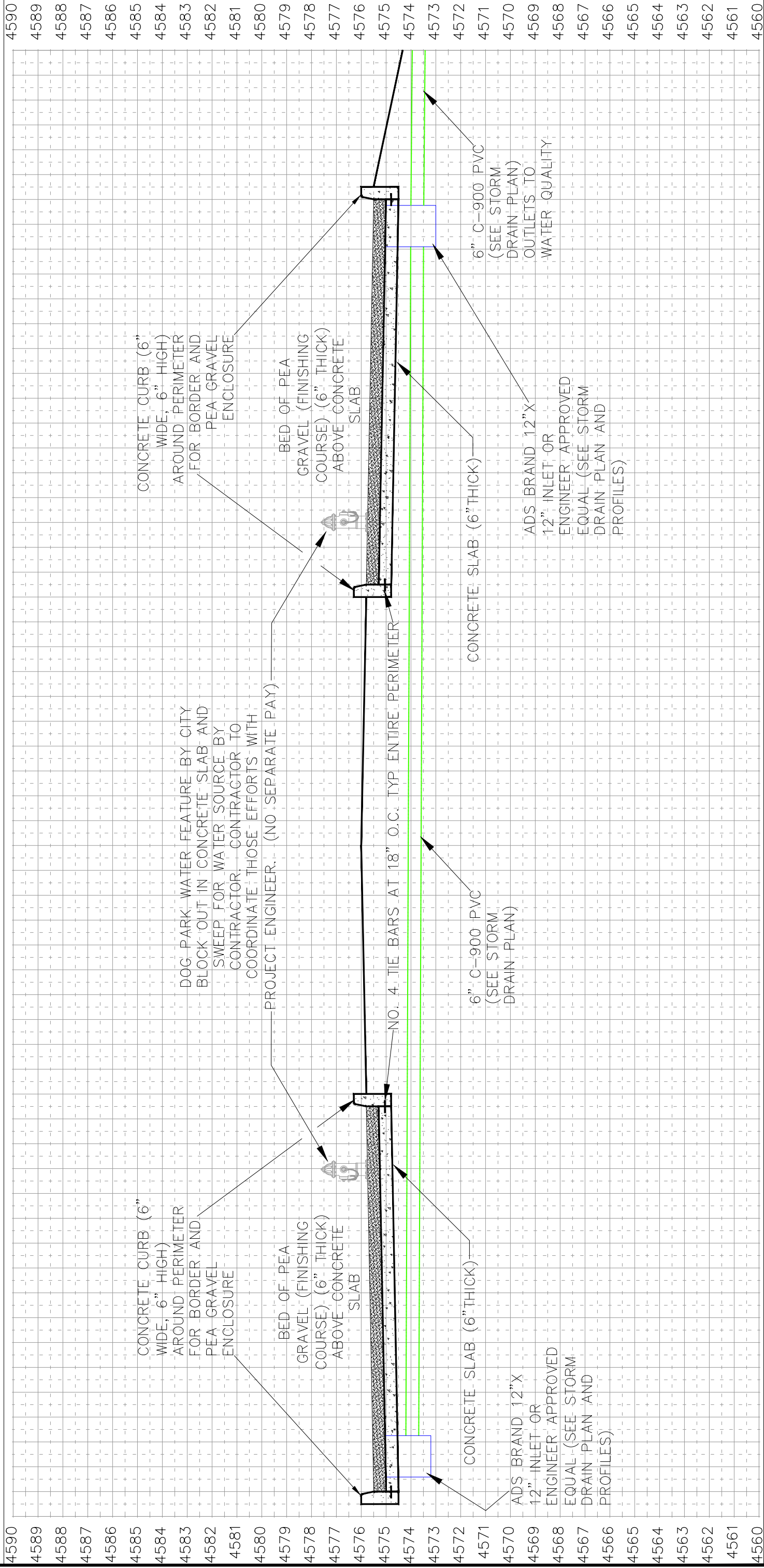
DESCRIPTION

CITY OF **Grand Junction** COLORADO

PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2 DOG PARK WATER FEATURE

120



REVISION	DESCRIPTION	DATE
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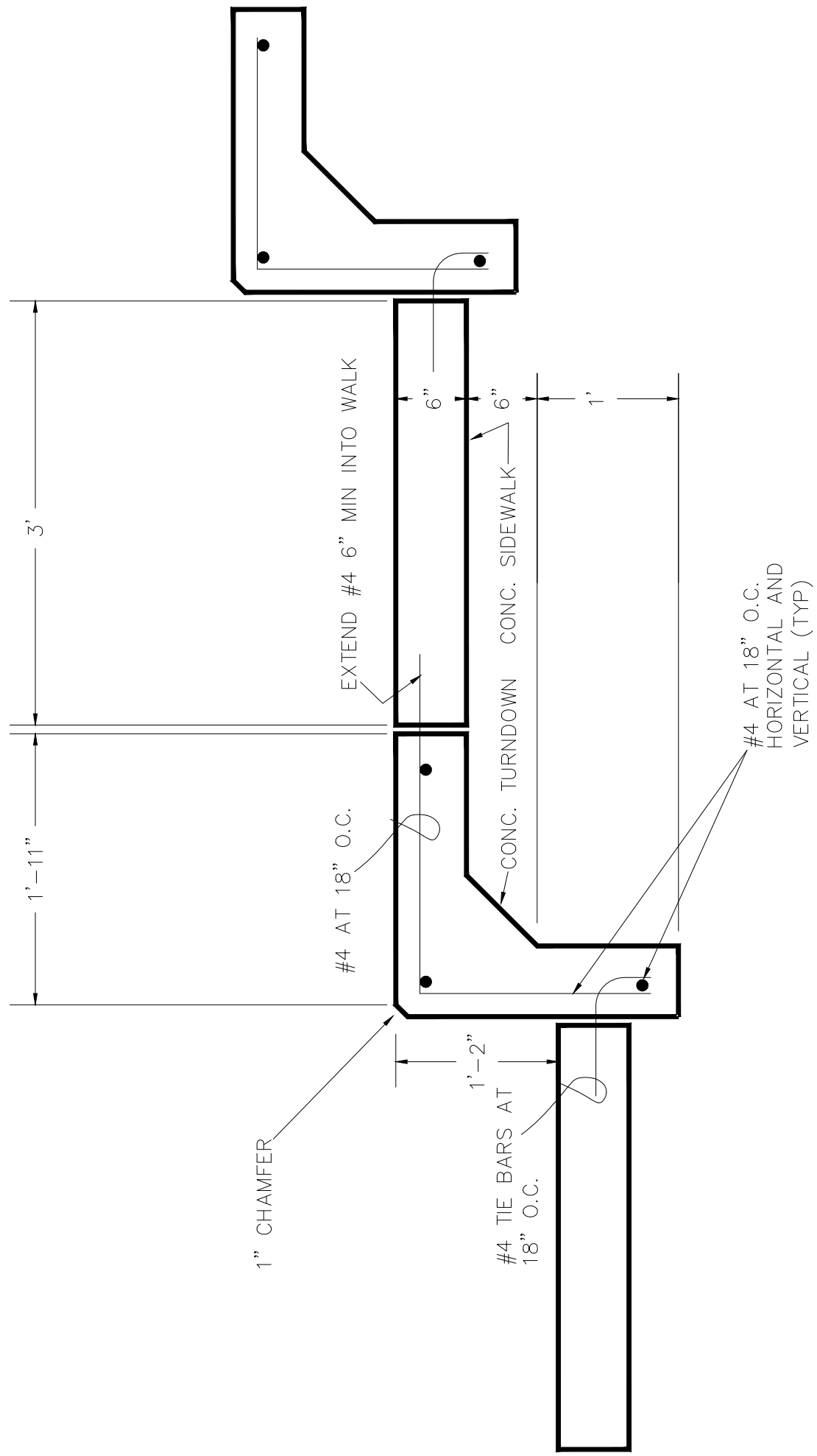
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APPROVED BY	TCP	DATE	2018

SCALES:	PLAN & PROFILE
	HORIZONTAL
	VERTICAL



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ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
DOG PARK WATER FEATURE



REVISION	DESCRIPTION	DATE
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DESIGNED BY	DATE
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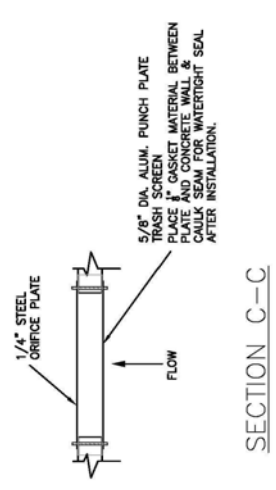
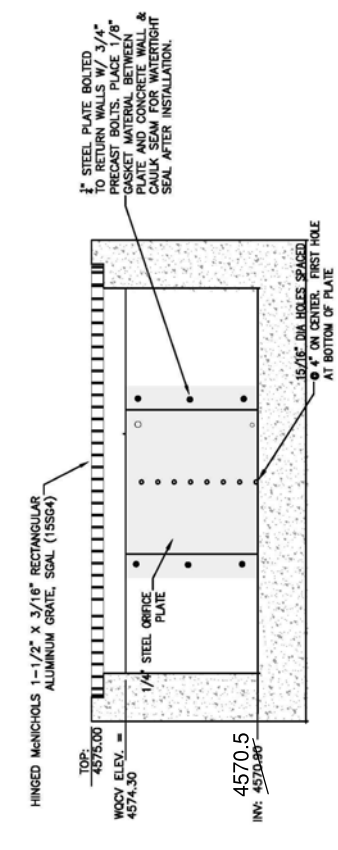
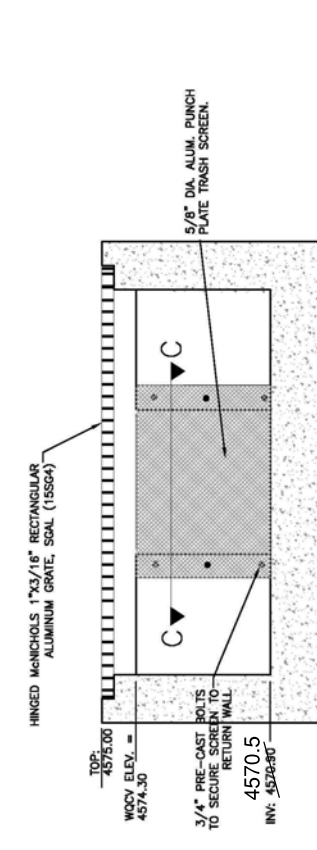
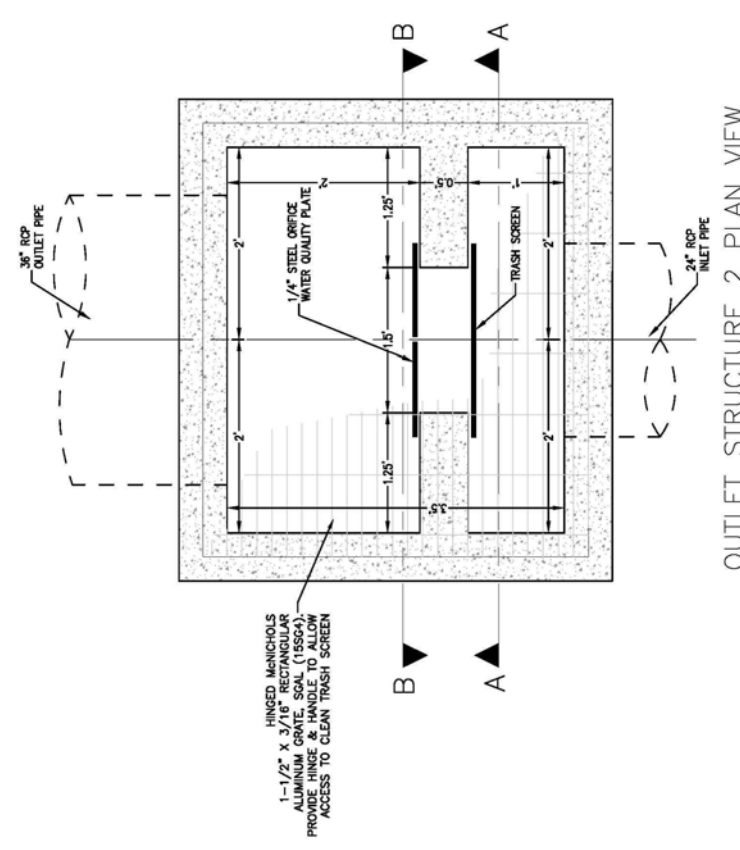
APPROVED BY	DATE
TCP	2018

PLAN	SCALE
HORIZONTAL	0



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
TERRACING DETAIL



REVISION	DESCRIPTION	DATE
REVISION 1		
REVISION 2		
REVISION 3		
REVISION 4		

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
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APPROVED BY	TOP	DATE	2018

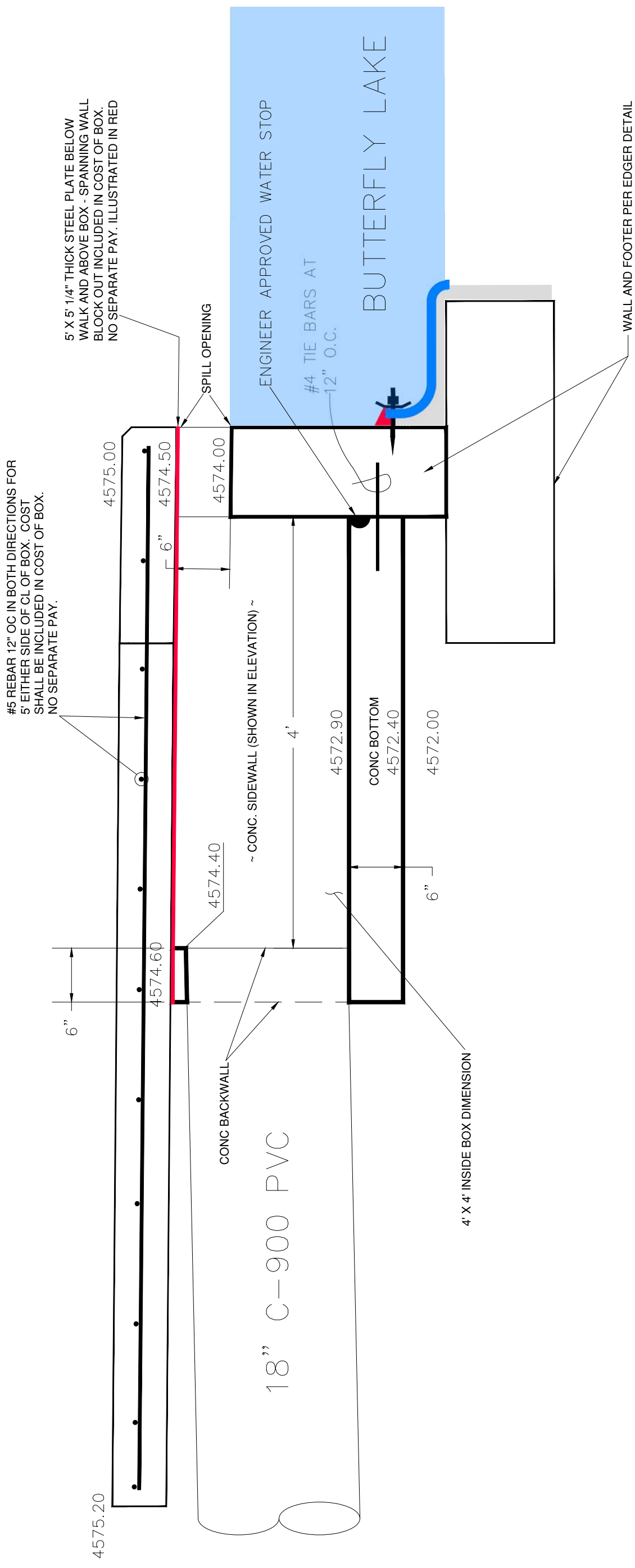
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HORIZONTAL	0
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PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
WATER QUALITY OUTLET STRUCTURE POND 3

123

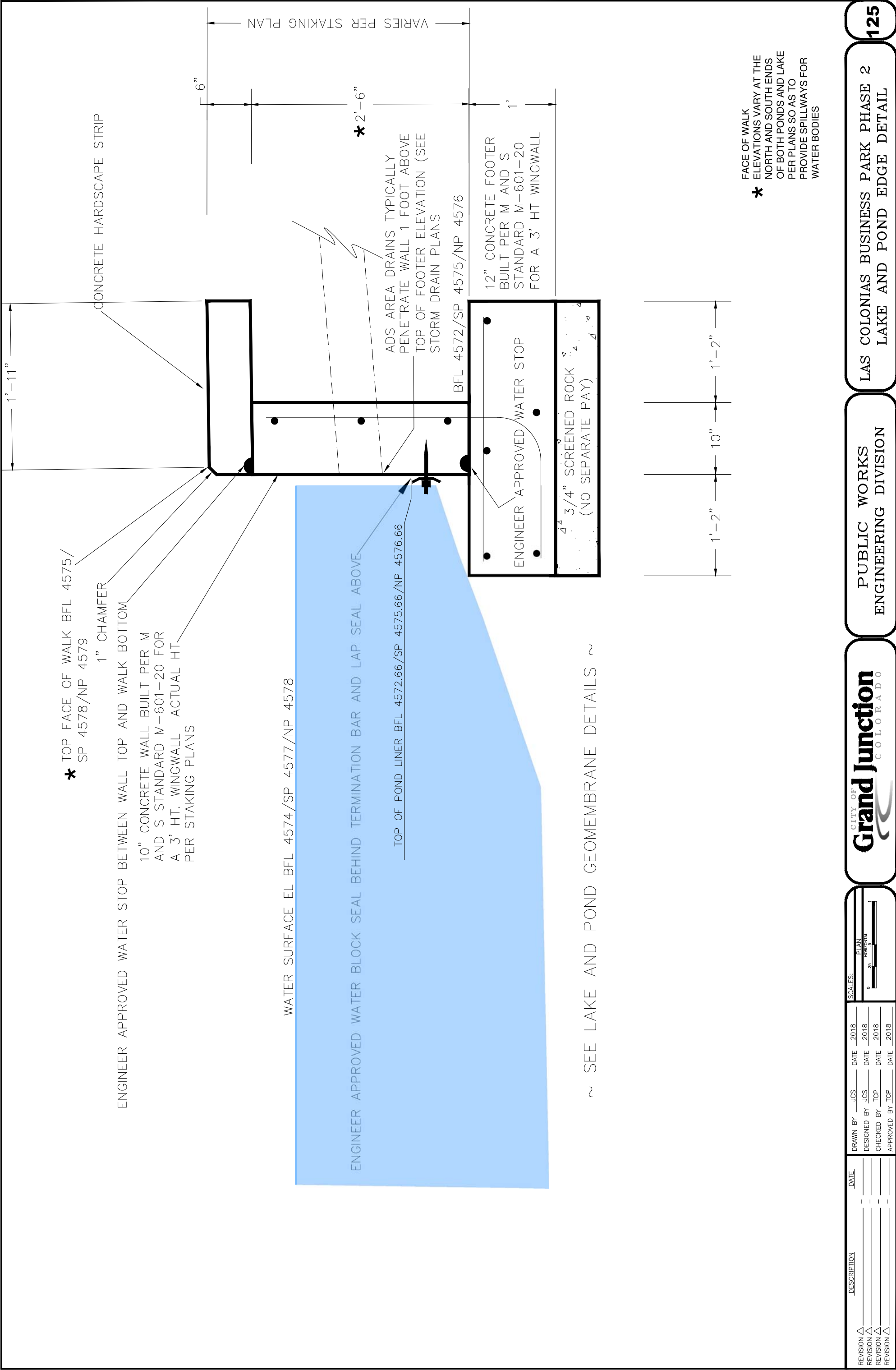


#5 REBAR 12" OC IN BOTH DIRECTIONS FOR 5' EITHER SIDE OF CL OF BOX. COST SHALL BE INCLUDED IN COST OF BOX. NO SEPARATE PAY.

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	DESIGNED BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
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REVISION Δ										



PUBLIC WORKS
ENGINEERING DIVISION



REVISION	△	DESCRIPTION	DATE
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REVISION	△		

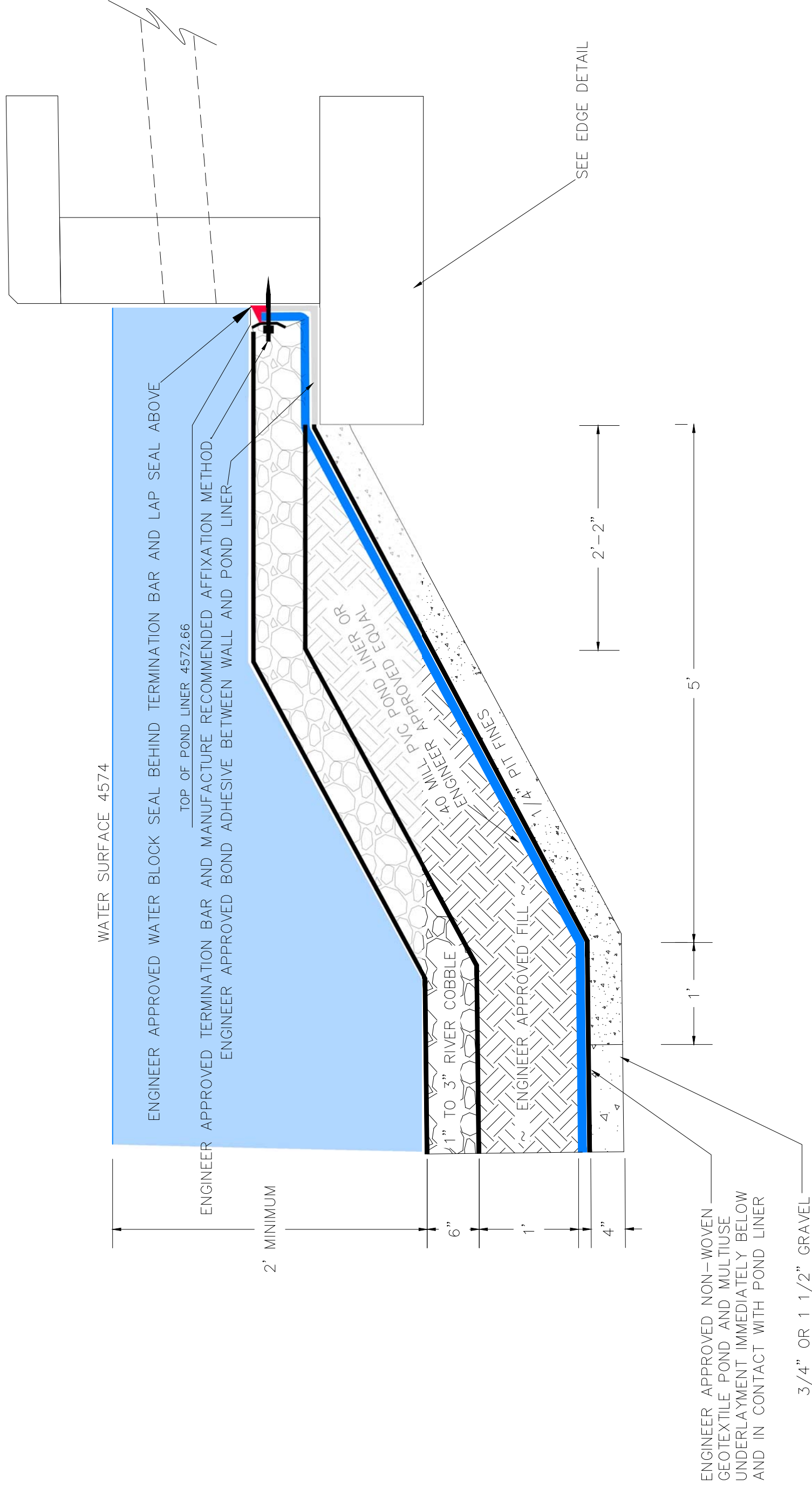
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APPROVED BY	TOP	DATE	2018

PLAN
HORIZONTAL
0 25



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ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
LAKE AND POND EDGE DETAIL



REVISION	DESCRIPTION	DATE
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REVISION Δ		
REVISION Δ		
REVISION Δ		

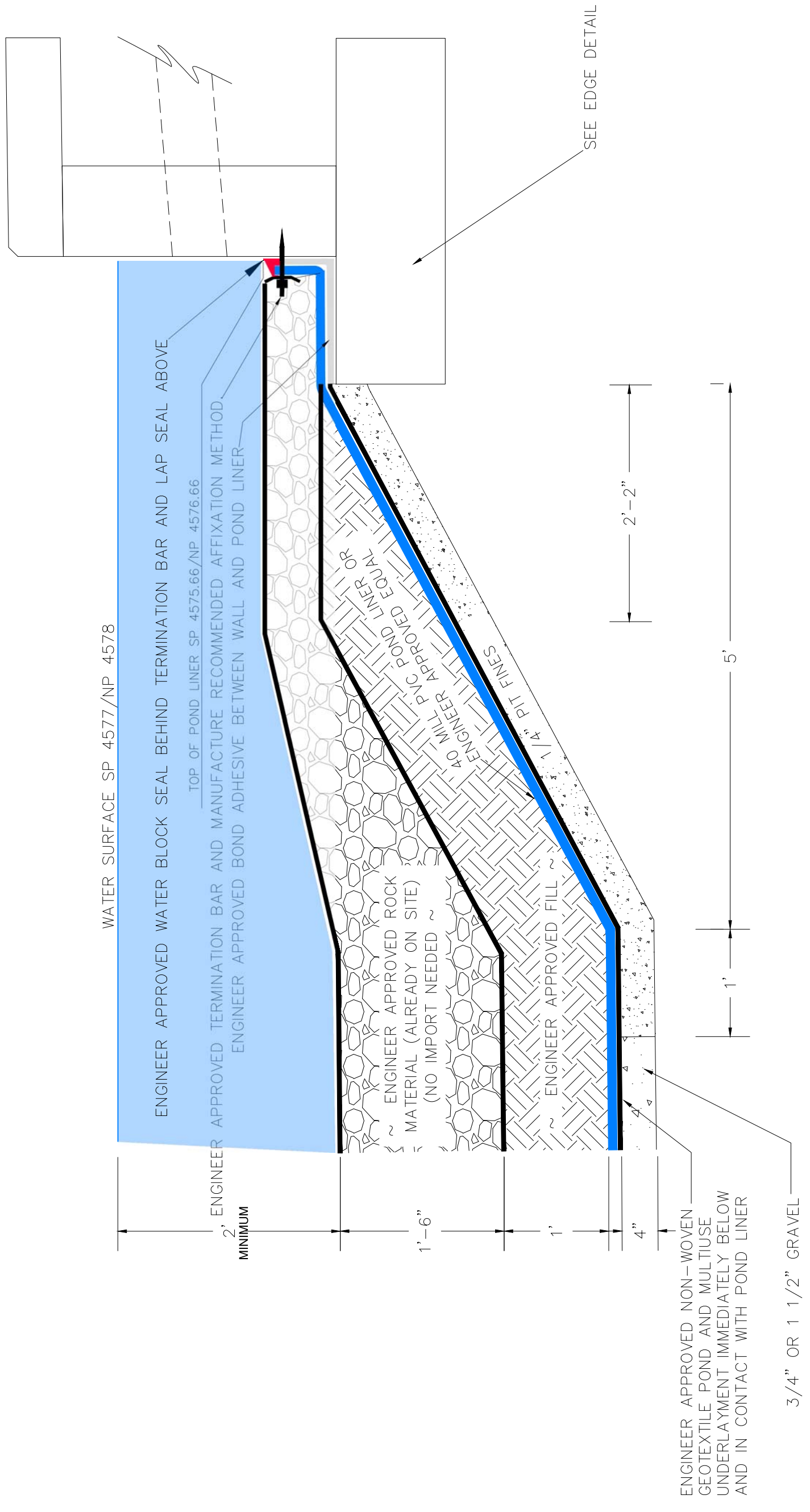
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DESIGNED BY	JCS	2018
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PLAN
HORIZONTAL
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SCALES:



PUBLIC WORKS
ENGINEERING DIVISION

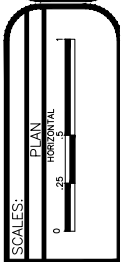


ENGINEER APPROVED NON-WOVEN GEOTEXTILE POND AND MULTIUSE UNDERLAYMENT IMMEDIATELY BELOW AND IN CONTACT WITH POND LINER

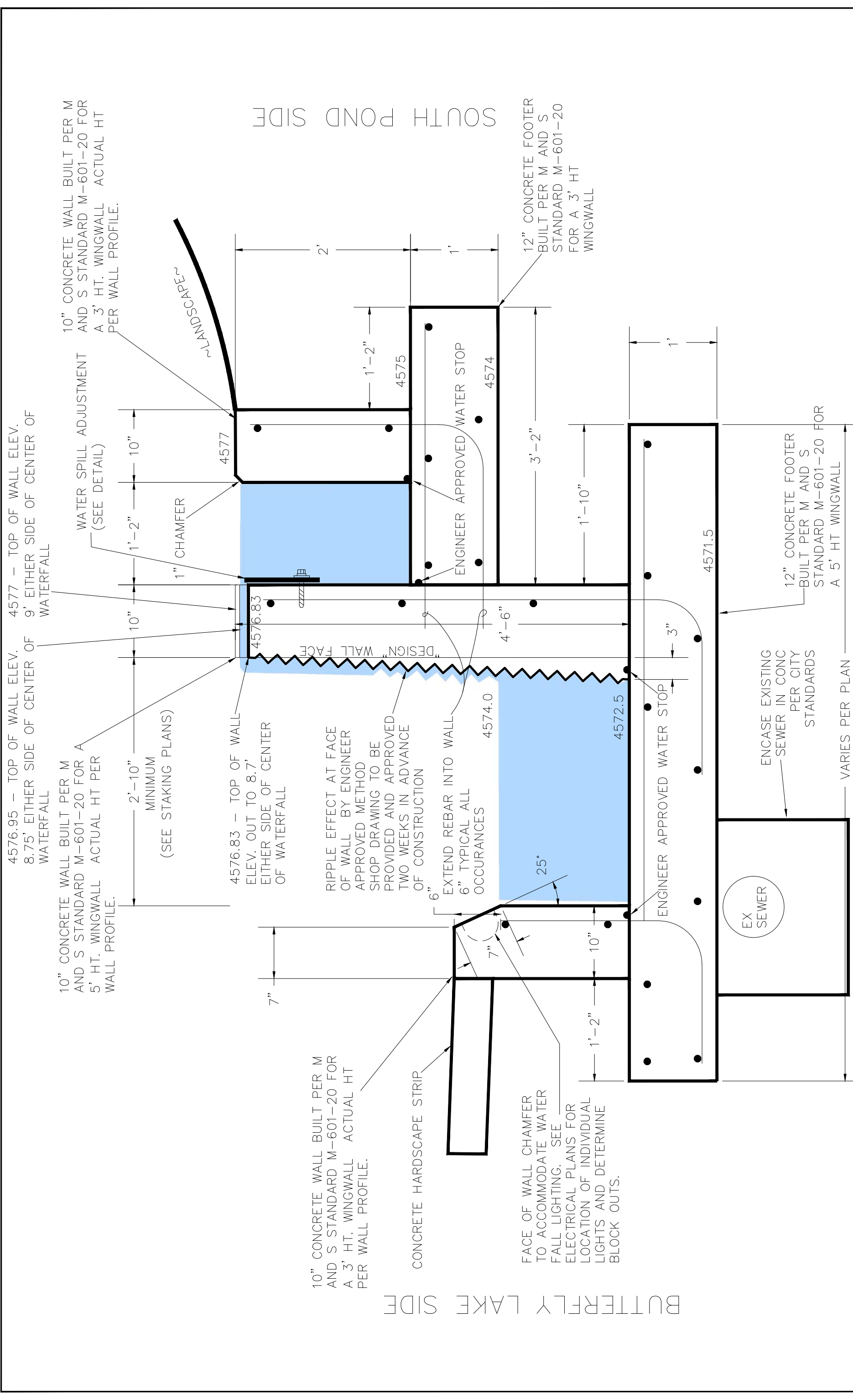
3/4" OR 1 1/2" GRAVEL

REVISION	DESCRIPTION	DATE

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DESIGNED BY	JCS	DATE	2018
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ENGINEERING DIVISION

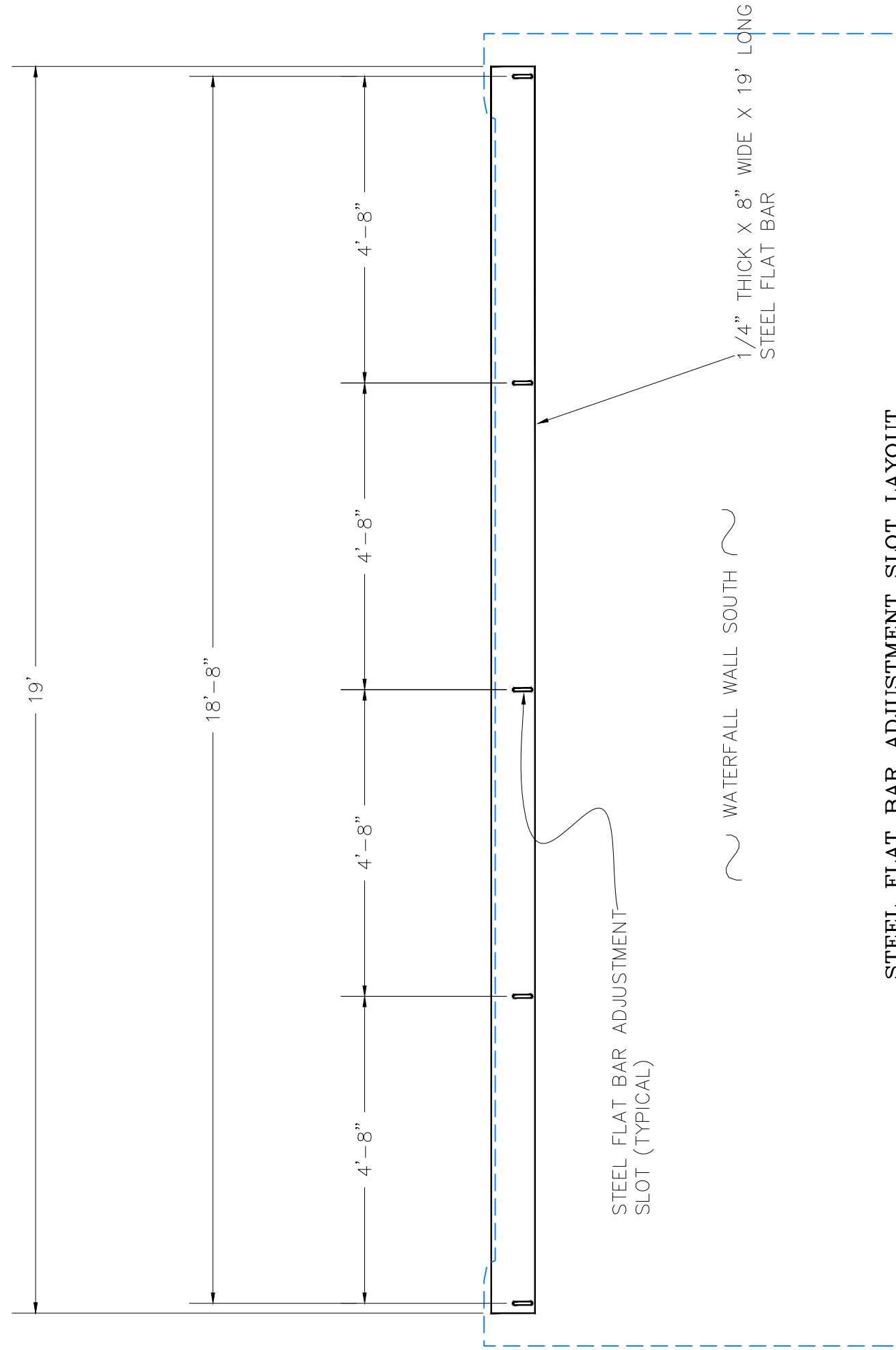
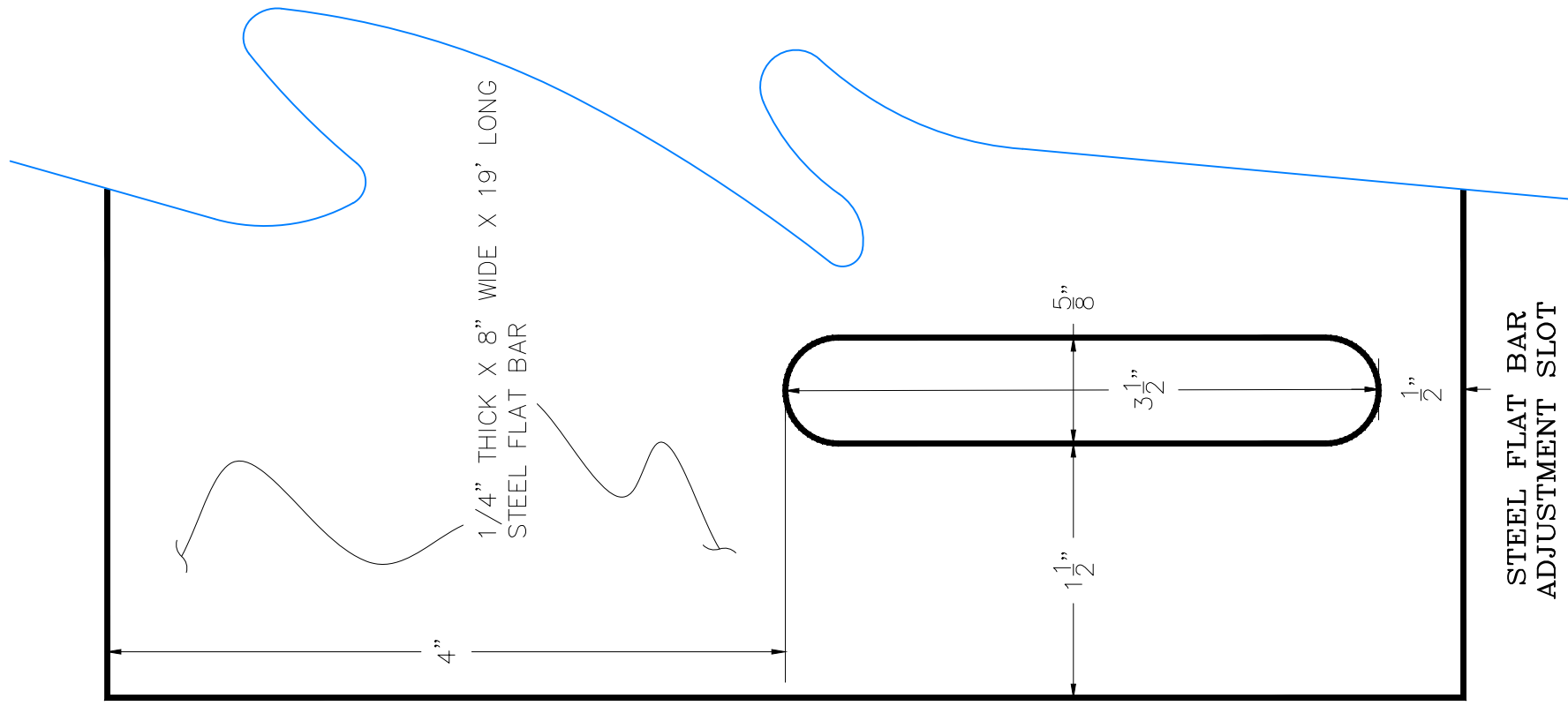


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REVISION Δ		2018	JCS	2018
REVISION Δ		2018	JCS	2018

SCALE: PLAN HORIZONTAL 0 25 50

Grand Junction
CITY OF COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

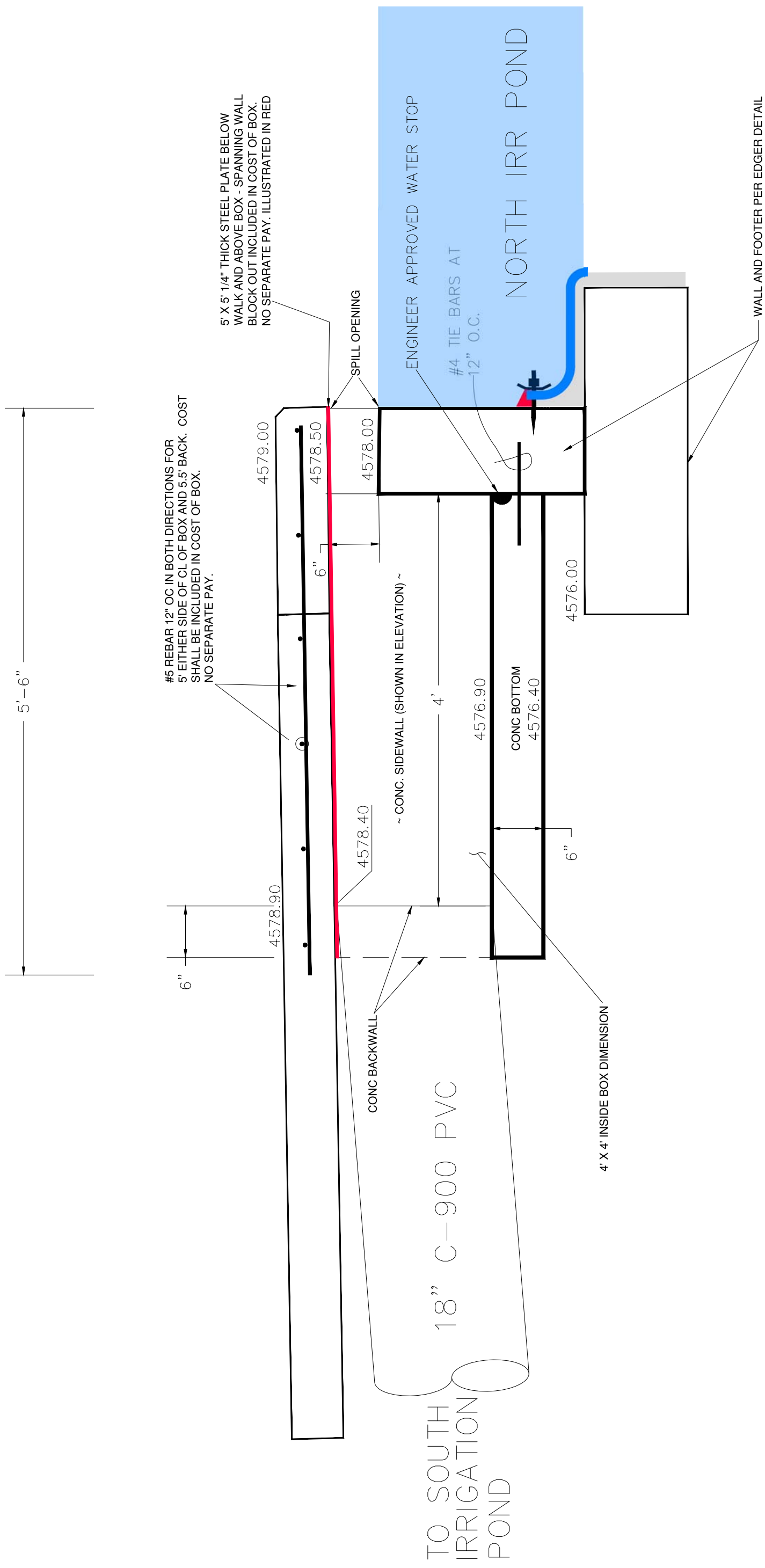


STEEL FLAT BAR ADJUSTMENT SLOT LAYOUT

REVISION	△	DESCRIPTION	DATE	DRAWN BY	JCS	DATE	2018
REVISION	△			DESIGNED BY	JCS	DATE	2018
REVISION	△			CHECKED BY	TOP	DATE	2018
REVISION	△			APPROVED BY	TOP	DATE	2018



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ENGINEERING DIVISION



#5 REBAR 12" OC IN BOTH DIRECTIONS FOR 5' EITHER SIDE OF CL OF BOX AND 5.5' BACK. COST SHALL BE INCLUDED IN COST OF BOX. NO SEPARATE PAY.

5' X 5' 1/4" THICK STEEL PLATE BELOW WALK AND ABOVE BOX - SPANNING WALL BLOCK OUT INCLUDED IN COST OF BOX. NO SEPARATE PAY. ILLUSTRATED IN RED

TO SOUTH IRRIGATION POND
18" C-900 PVC

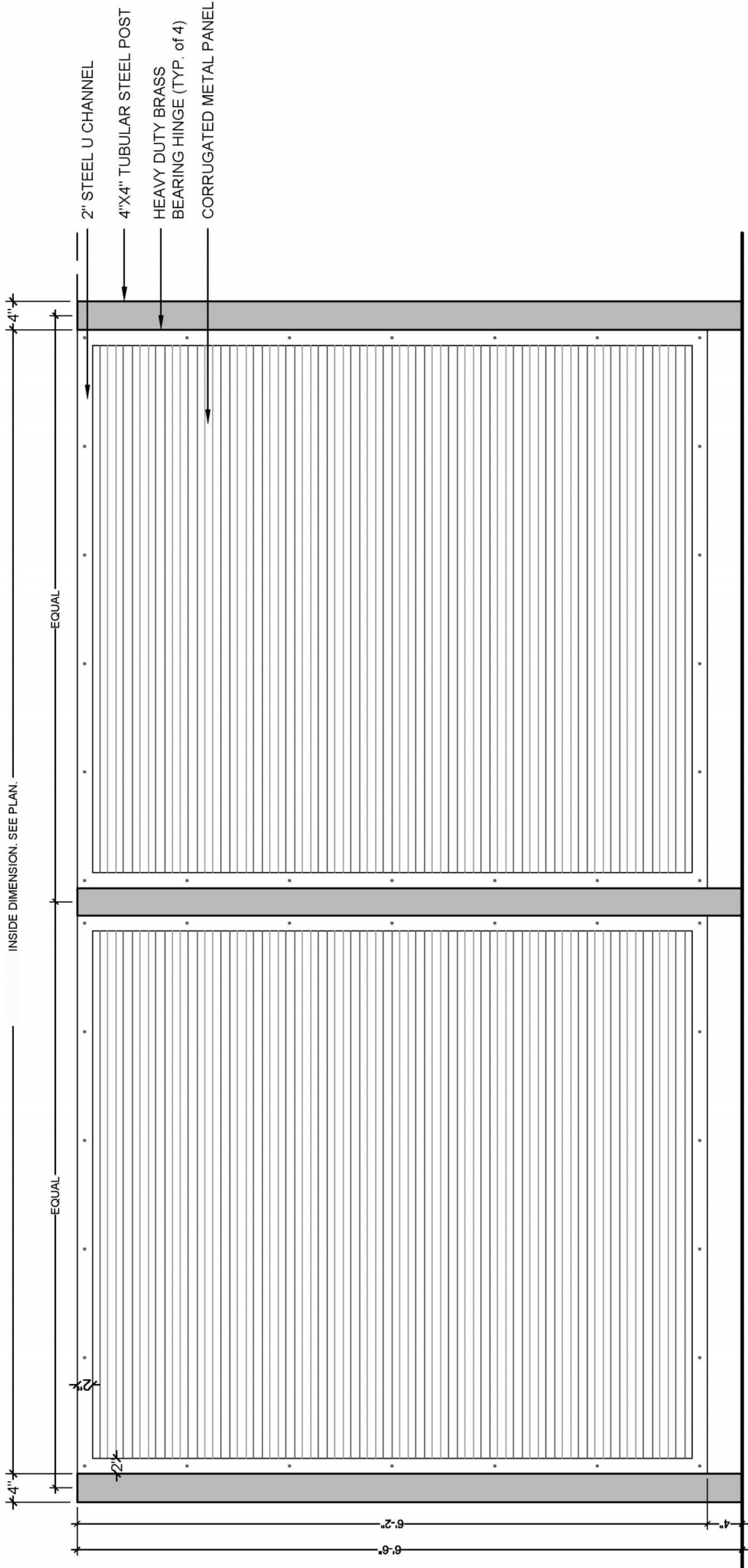
NORTH IRR POND
ENGINEER APPROVED WATER STOP
#4 TIE BARS AT 12" O.C.

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	SCALE
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REVISION Δ			TCP	2018	



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ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
POUR IN PLACE BOX - N1



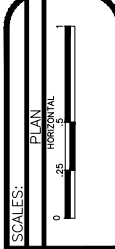
ELEVATION

NOTE
 CONTRACTOR SHALL SUPPLY SHOP
 DRAWINGS FOR FINAL DIMENSIONS

- NOTE:
1. INCLUDE ONE CROSS BRACE ON INSIDE FACE OF EACH FENCE PANEL. 2" WIDE X 1/4" THICK METAL BAR. WELD TO STEEL U CHANNEL..
 2. CONTRACTOR TO PROVIDE SHOP DRAWINGS.

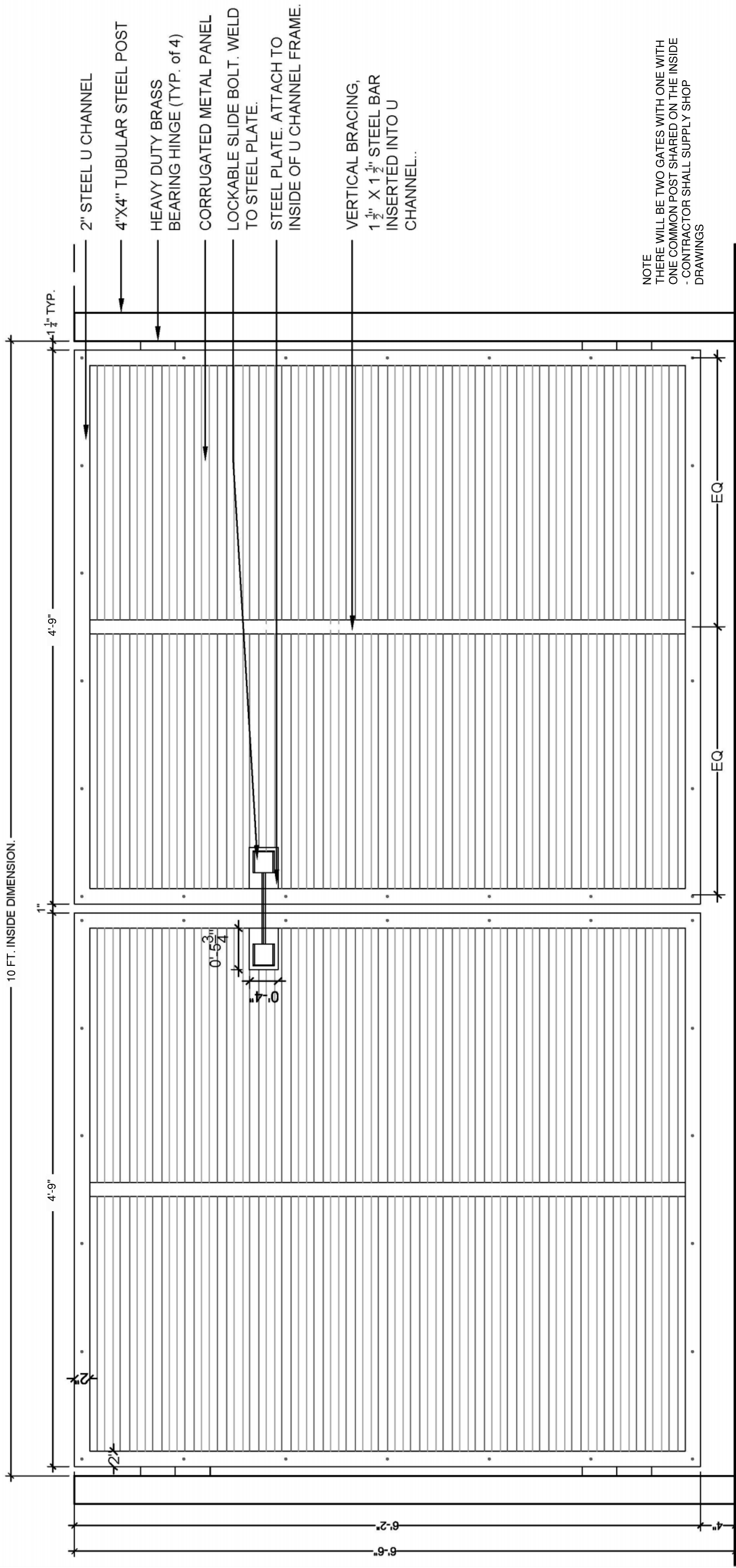
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DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
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APPROVED BY	TOP	DATE	2018



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 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
 DUMPSTER ENCLOSURE



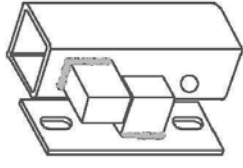
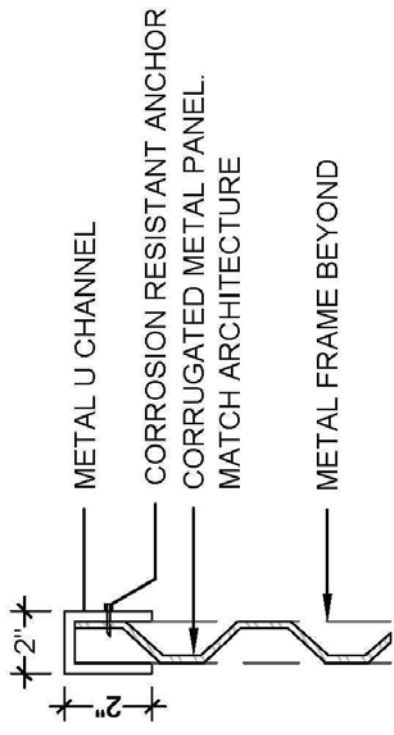
ELEVATION

- NOTE:
1. INCLUDE ONE CROSS BRACE ON INSIDE FACE OF EACH GATE DOOR. 2" WIDE X 1/4" THICK METAL BAR. WELD TO STEEL U CHANNEL..
 2. CONTRACTOR TO PROVIDE SHOP DRAWINGS.

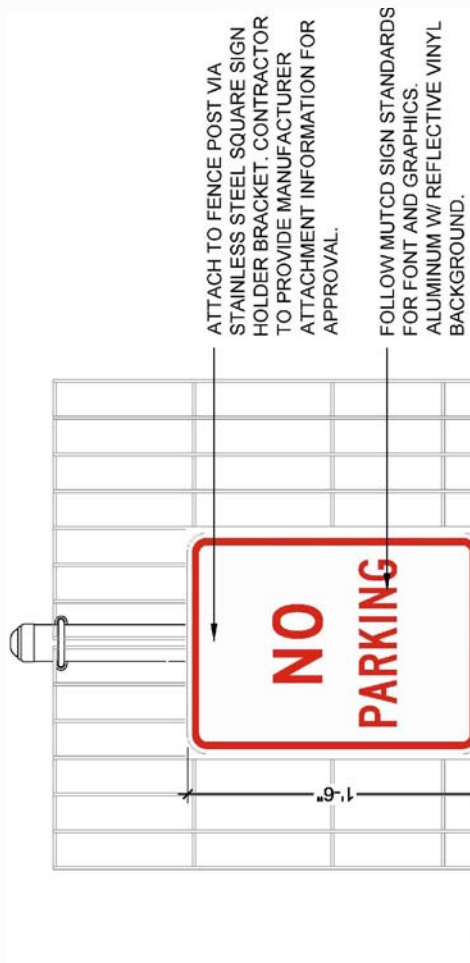
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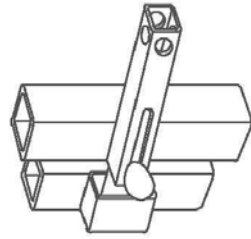
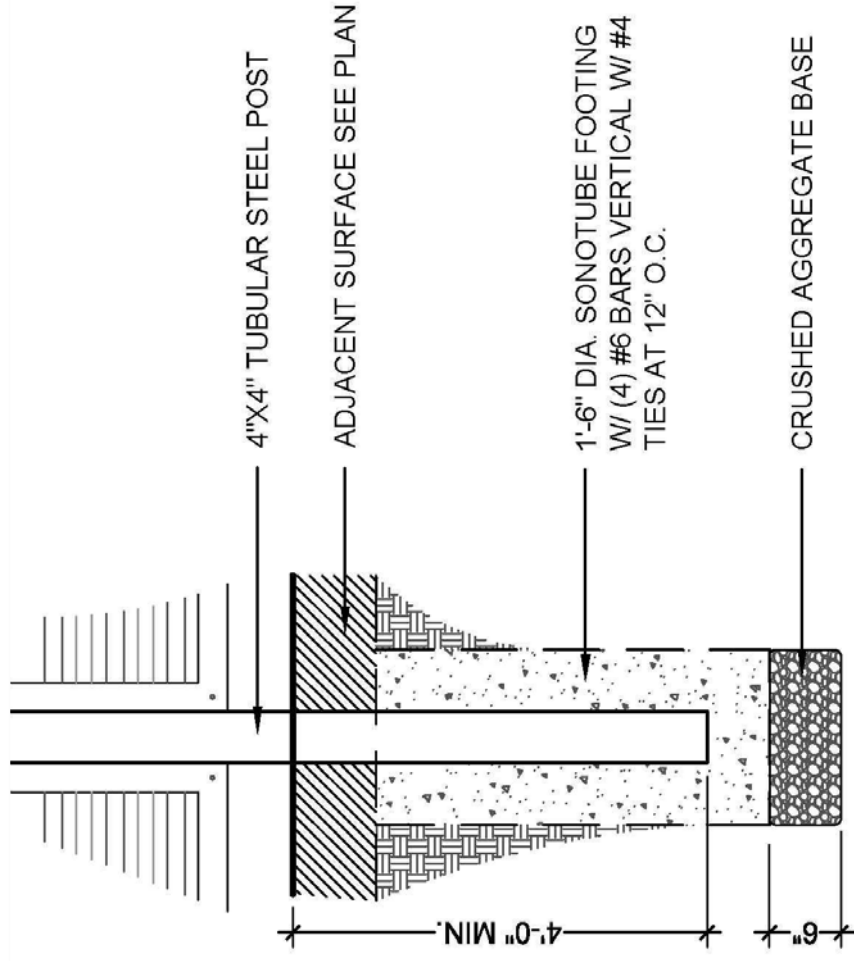
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ENGINEERING DIVISION



CROSS SECTION FRAME ENLARGEMENT HINGE ENLARGEMENT



SIGN- NO PARKING
NTS

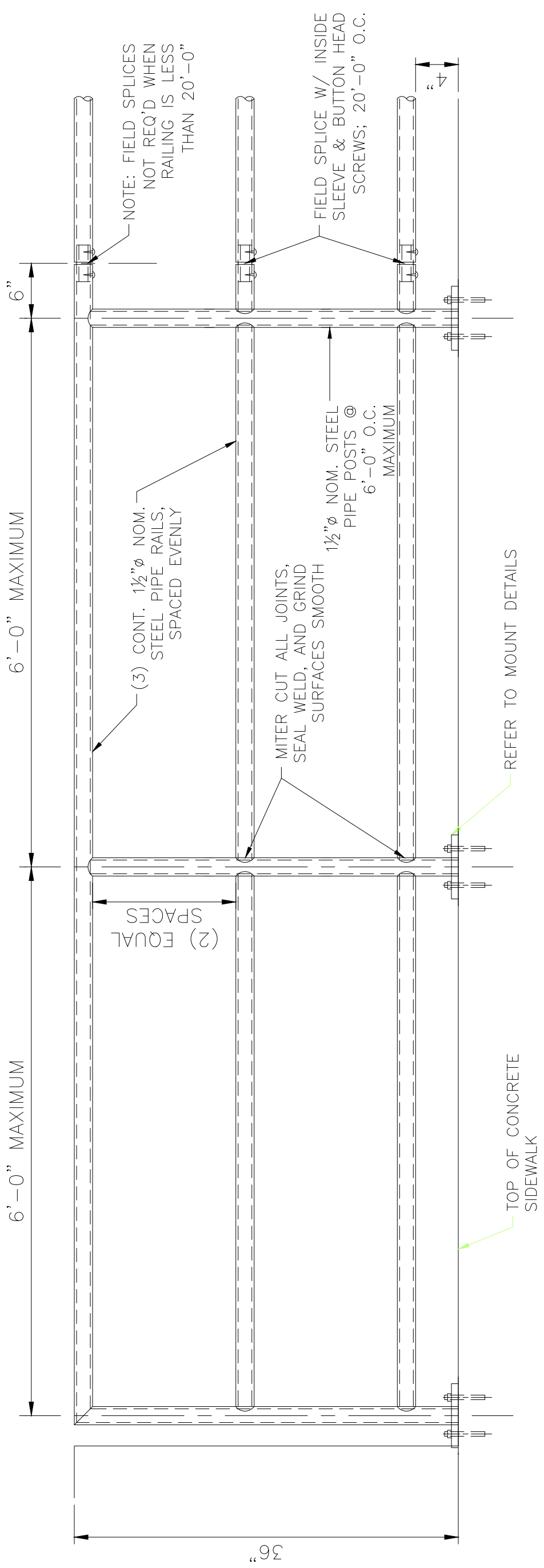


SLIDE BOLT TYPICAL POST FOOTING DETAIL

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE
REVISION			JCS	2018
REVISION			JCS	2018
REVISION			TOP	2018
REVISION			TOP	2018



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ENGINEERING DIVISION



NOTE:
 RAILING SHALL BE HOT-DIPPED GALVANIZED PER SUBSECTION 509.22 OF THE CDOT STANDARD SPECIFICATIONS

REVISION Δ	DESCRIPTION	DATE

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
CHECKED BY	TOP	DATE	2018
APPROVED BY	TOP	DATE	2018

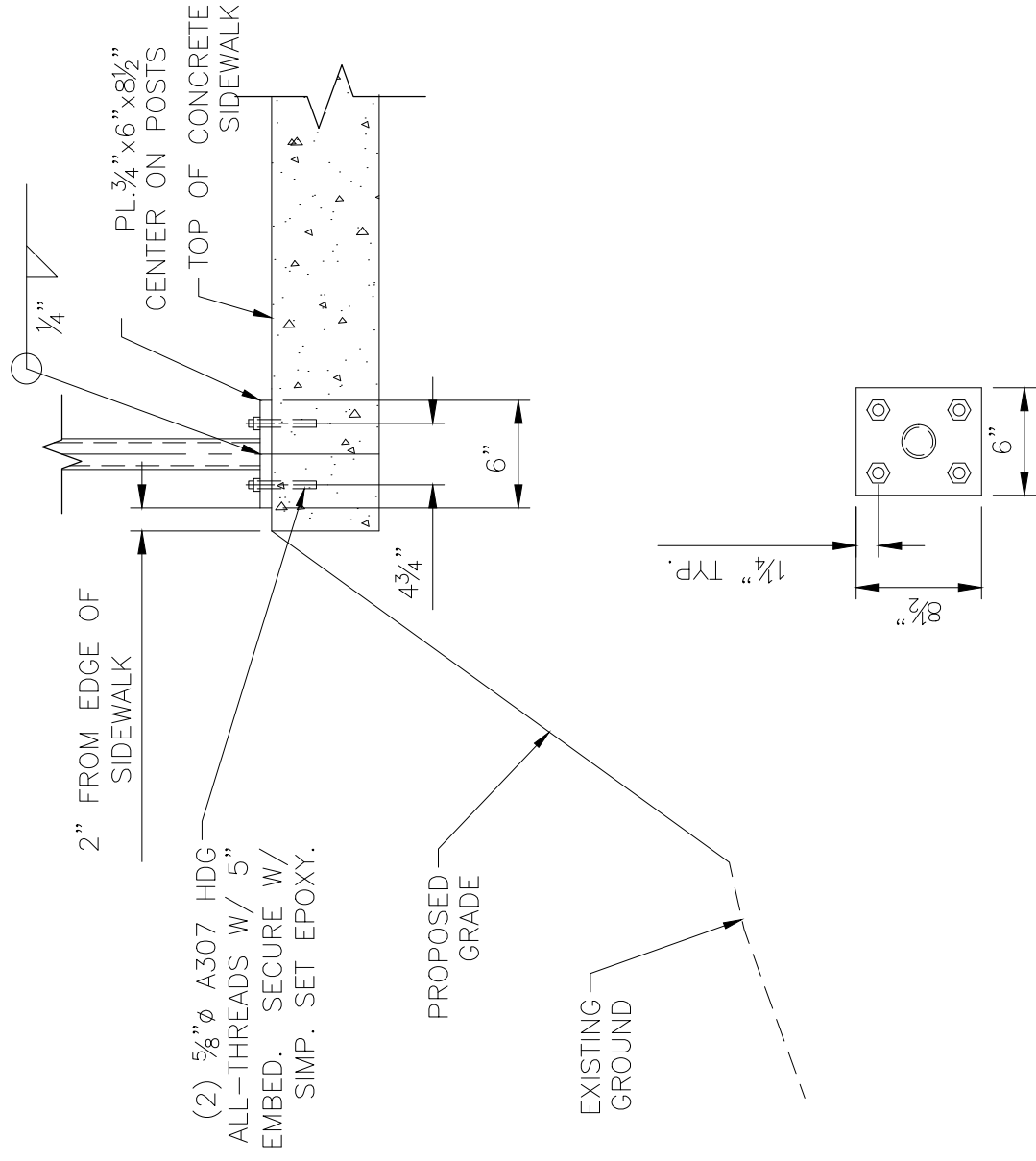
SCALES:	PLAN
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 ENGINEERING DIVISION

NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF THE CDOT STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION.
2. STEEL PIPE TO BE ASTM A53 GRADE B; WITH $F_y = 35$ KSI.
3. STEEL PLATES, CHANNELS & ANGLES TO BE ASTM A36; WITH $F_y = 36$ KSI.
4. ALL WELDING TO CONFORM TO CURRENT AWS D1.1 REQUIREMENTS.
5. COMPLETE ASSEMBLY OR SUB-ASSEMBLIES, BRACKETS, RAILINGS, MESH, AND MISCELLANEOUS STEEL PIECES SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
6. STRUCTURAL BOLTS, NUTS & WASHERS SHALL BE HOT-DIP GALVANIZED.
7. EXPANSION ANCHORS TO BE HILTI KWIK-BOLT II OR APPROVED EQUAL. INSTALL EXPANSION ANCHORS PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
8. EXPANSION ANCHOR BOLTS, NUTS & WASHERS SHALL BE STAINLESS STEEL.
9. GALVANIZED AREAS THAT ARE DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH A APPROVED COLD-GALVANIZING COMPOUND AT NO ADDITIONAL COST.
10. EPOXY SET ANCHORS SHALL UTILIZE HILTI HIT HY 150 CONSTRUCTION ADHESIVE AND HAVE GALVANIZED OR STAINLESS STEEL THREADED RODS.
11. FIELD SPLICES SHALL BE MADE UTILIZING GALVANIZED STEEL PIPE SLEEVE INSERTS AND HOT-DIP GALVANIZED STEEL BOLTS, NUTS, AND WASHERS.
12. CROSS REFERENCE ASSOCIATED STANDARD DETAILS AS NECESSARY FOR STEEL FABRICATIONS.

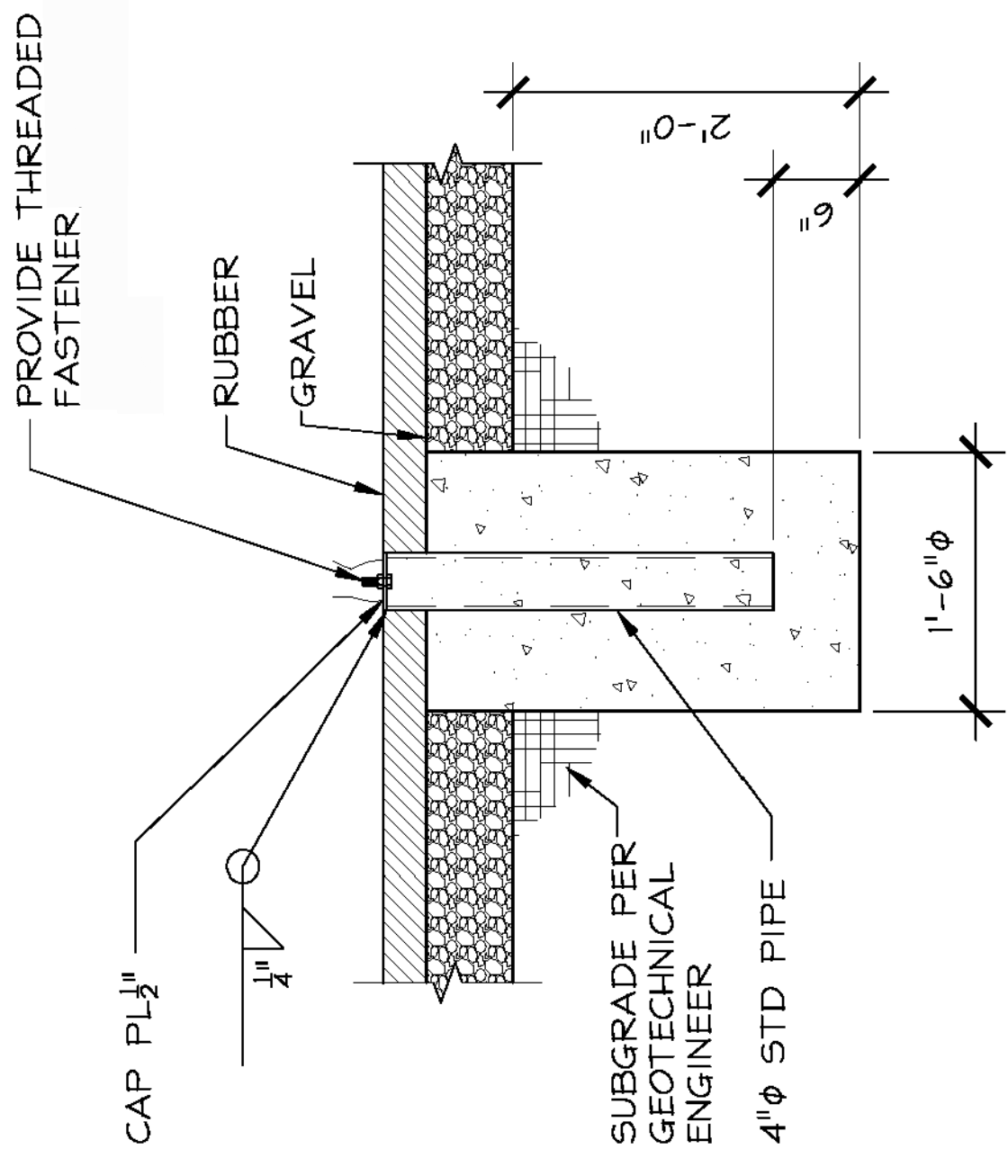


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REVISION Δ			JCS	2018
REVISION Δ			TOP	2018
REVISION Δ			TOP	2018



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK PHASE 2
HAND RAILING NEAR HVOHP POLE



REVISION Δ	DESCRIPTION	DATE
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REVISION Δ		
REVISION Δ		

DRAWN BY	JCS	DATE	2018
DESIGNED BY	JCS	DATE	2018
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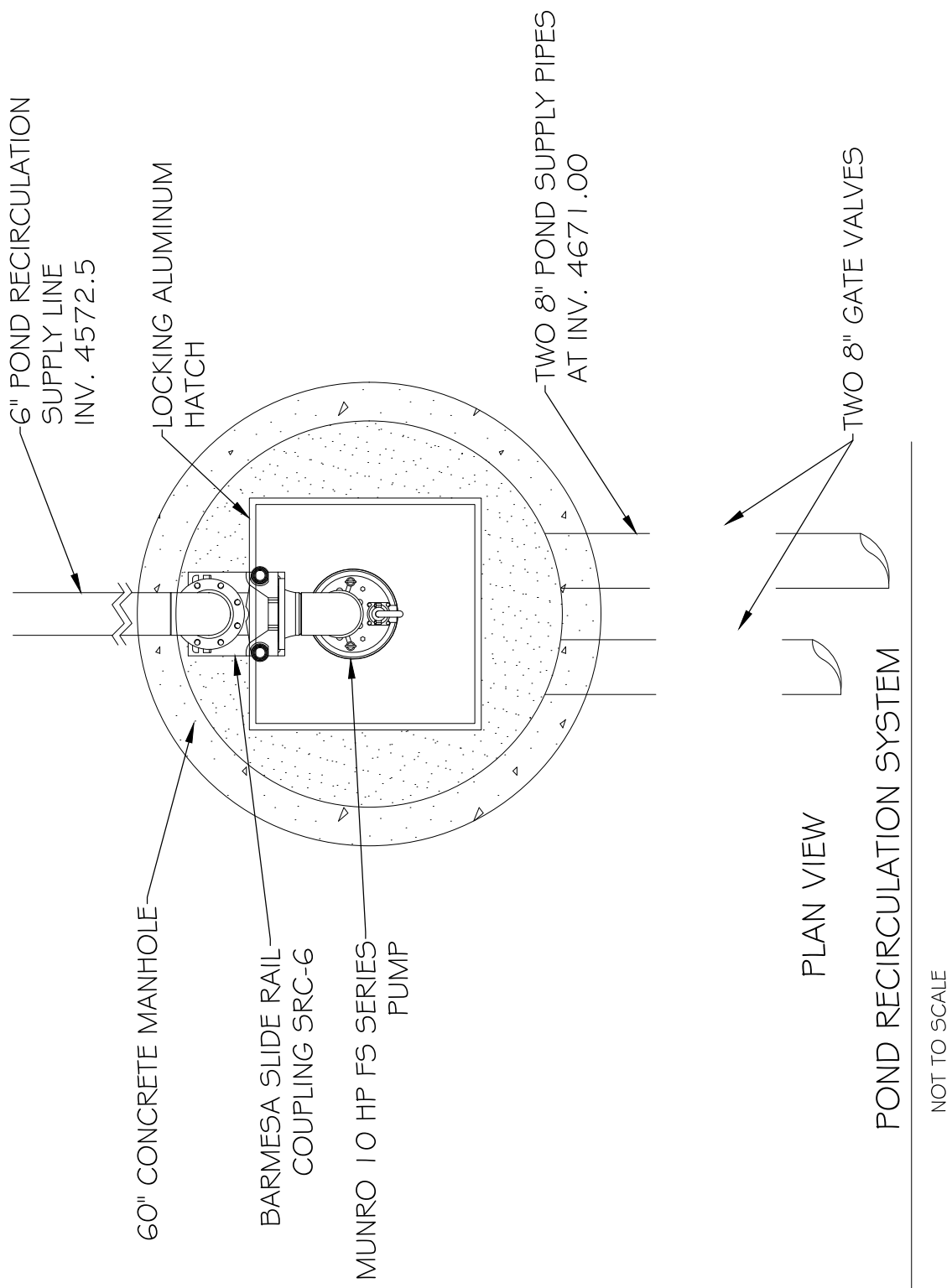
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SCALE:



PUBLIC WORKS
ENGINEERING DIVISION

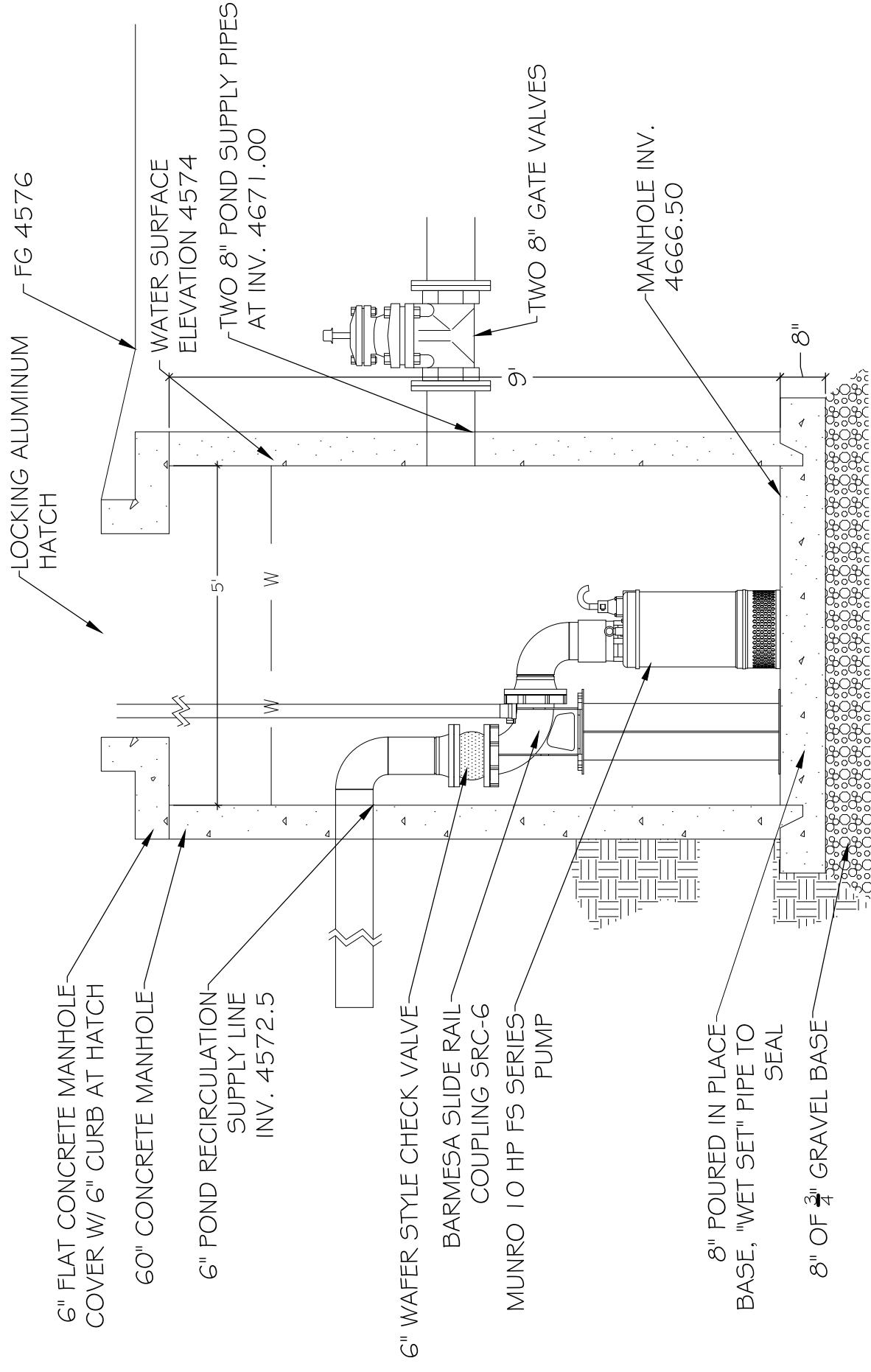
LAS COLONIAS BUSINESS PARK PHASE 2
ART BASES BUTTERFLY PLAZAS



REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	SCALE
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REVISION Δ			JCS	2018	0
REVISION Δ			TCP	2018	25
REVISION Δ			TCP	2018	



PUBLIC WORKS
ENGINEERING DIVISION



ELEVATION

REVISION	DESCRIPTION	DATE
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DESIGNED BY	JCS	DATE	2018
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APPROVED BY	TOP	DATE	2018

PLAN	SCALE:
HORIZONTAL	0
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PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS PARK SHORELINE AMENITIES PROJECT COLORADO RIVER GRAND JUNCTION, CO JULY 8, 2018

CONTACTS

Traci Wieland
 Recreation Superintendent
 Grand Junction Parks and Recreation
 (970) 254-3846

Mr. Scott Prins, P.E.
 Project Engineer
 RiverRestoration.org, LLC.
 (970)-947-9568

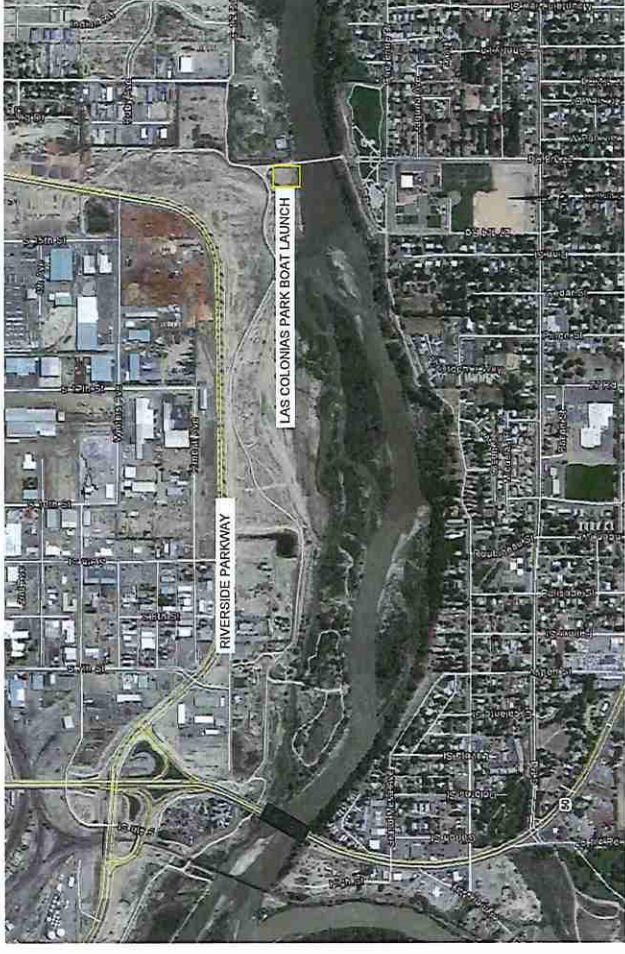
General Notes:

- The Contractor shall conform to the Technical Specifications dated July 8, 2018. In the case of any discrepancy between the Drawings and Technical Specifications, the Technical Specifications shall prevail.
- The Contractor shall conform to all City of Grand Junction rules, regulations and stipulations while accessing through or working within the site.
- Utilities marked on Plans are approximate. The Contractor is wholly responsible for field locating any and all utilities and their protection. The Contractor is made aware that conflicts with existing utilities may occur. The Contractor shall be responsible for obtaining all necessary permits from all appropriate utility companies for line locations, and Contractor shall then locate all utilities (including depth). Utilities that are damaged by the Contractor shall be repaired by the Contractor at no expense to the Owner or Engineer.
- The Contractor shall obtain all permits and inspections which are necessary to perform the proposed work.
- Contractor shall not scale drawings for construction purposes. Any missing dimensions of the drawings shall be provided by the Engineer. If the Contractor proceeds with the work without notifying the Engineer, he does so at his own risk.
- Observations of the work in progress and on-site visits are not to be construed as a guarantee or warranty by the Engineer of the Contractor's contractual responsibilities.
- The Contractor is responsible for all coordination of stockpiling of materials. The Contractor shall coordinate with the Owner and the material supplier.
- Initial Construction Staking shall be provided by the Owner. The Contractor is responsible for maintaining or restaking.
- Safety is the responsibility of the Contractor. The Engineer is not responsible for safety in, on, or around the project site, nor for compliance by the appropriate party with any regulations relating thereto.
- All fill material to be compacted and tested per Technical Specifications.
- The Contractor shall take all appropriate precautions to significantly reduce any potential pollution from the project site. The Contractor shall have identified procedures for handling potential pollutants and have identified spill prevention and response procedures prior to any activities at the project site.
- The Contractor shall keep 2 sets of contract drawings marked to fully indicate as-built conditions. These drawings shall be provided to the Owner and RiverRestoration upon completion of this work. These as-builts tie to all services, fittings, valves and manholes to physical monuments are to be provided by the Contractor.
- The construction of all roads, sidewalks, curbs, earthwork and other infrastructure development not specifically specified by separate utility companies, shall be constructed to the latest editions and latest revisions of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction and CDOT Traffic Standard Project Plans. The Contractor shall obtain copies of these specifications and plans. The Contractor shall have one copy of the plans and one copy of the specifications at the job site at all times.
- All site development will be constructed to the above mentioned Colorado Department of Transportation Standard Specifications for Road and Bridge Construction and CDOT Traffic Standard Project Plans, as applicable. When standards conflict, the standard judged most appropriate by the Engineer shall prevail. The Contractor shall obtain copies of the Mesa County Land Use Regulations in its most current edition and have that copy on the site at all times.
- All utility construction shall be in compliance with respective utility company standards specifications and details. When standards conflict, the standard judged most appropriate by the Engineer shall prevail.
- Road subgrade and finished aggregate base courses shall be proof rolled and free of deflection meeting a required specification or to the satisfaction of the Owner. Any failing areas shall be repaired and proof rolled again until accepted by Engineer, with no additional cost to Owner.
- Topsoil shall be stripped and stockpiled.
- Contractor is responsible for daily cleaning of public streets and paths necessitated by his activities on the site.
- Contractor is responsible for dust control of the construction site at all times.
- Contractor shall employ "Best Management Practices" at all times.
- All temporary discharges are subject to the provisions of the Colorado Water Quality Act and the Colorado Discharge Permit Regulations. The Owner shall obtain at their expense any and all discharge permits necessary to perform the proposed work.

SHEET INDEX

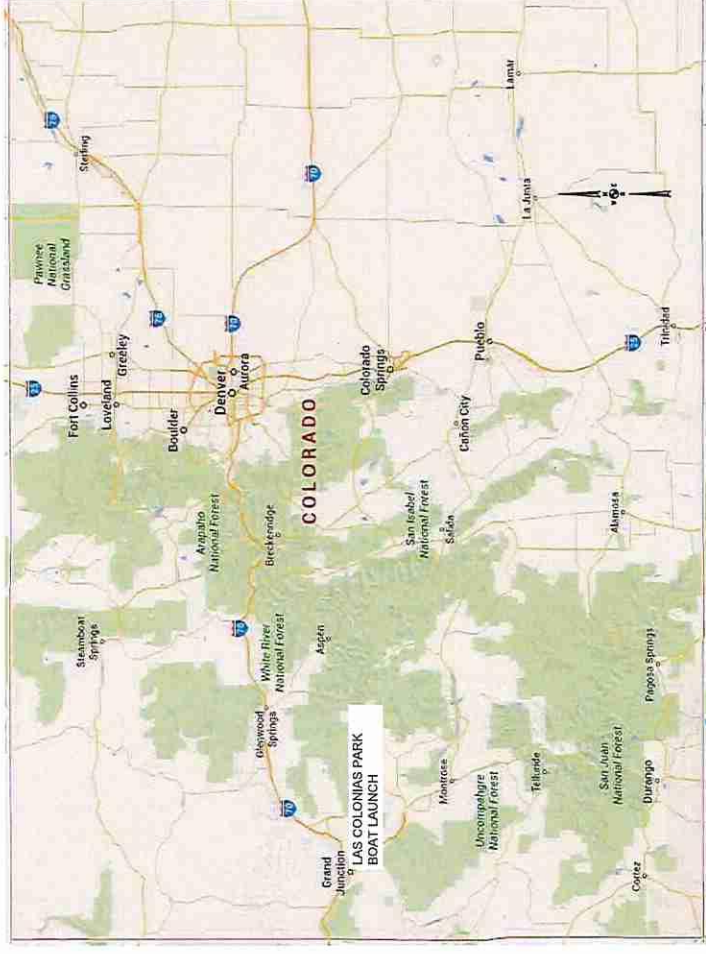
SHEET NO.	SHEET TITLE
G01	COVER SHEET
EC01	E.C. AND C.O.W. PLAN
EC02	E.C. AND C.O.W. DETAILS
EC03	E.C. AND C.O.W. DETAILS
R01	CONSTRUCTION SITE PLAN
R02	BOAT RAMP PLAN AND PROFILE
R03	BOAT RAMP DESIGN SECTION
R04	TERRACED LANDING PLAN AND PROFILE
R05	PARKING LOT AND TURNAROUND PLAN AND PROFILE
R06	PARKING LOT AND TURNAROUND GRADING PLAN
D01	BOAT RAMP DETAILS 1
D02	BOAT RAMP DETAILS 2
D02	PARKING STALL DETAIL

LOCATION MAP



VICINITY MAP

State of Colorado



PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
 SHORELINE AMENITIES PROJECT
 COVER SHEET

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS



City of Grand Junction
 Parks and Recreation
 250 North 5th Street
 Grand Junction, CO 81501
 970.245.3866

DESIGN FIRM NAME AND ADDRESS



RiverRestoration
 P.O. Box 248
 Carbondale, CO 81623
 www.RiverRestoration.org

PROJECT NAME AND ADDRESS
 Las Colonias Park Slough
 Restoration Project
 Las Colonias Park
 Grand Junction, CO 81501

Project No. 11.CO24.003

Date JULY 2018

Scale NTS

Sheet

GO1

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NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK SHORELINE AMENITIES PROJECT OF EROSION CONTROL AND CARE OF WATER PLAN

No.	REVISION/UPDATE	Date



City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS



River Restoration
P.O. Box 248
Carbondale, CO 81623
www.RiverRestoration.org

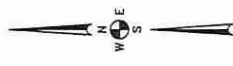
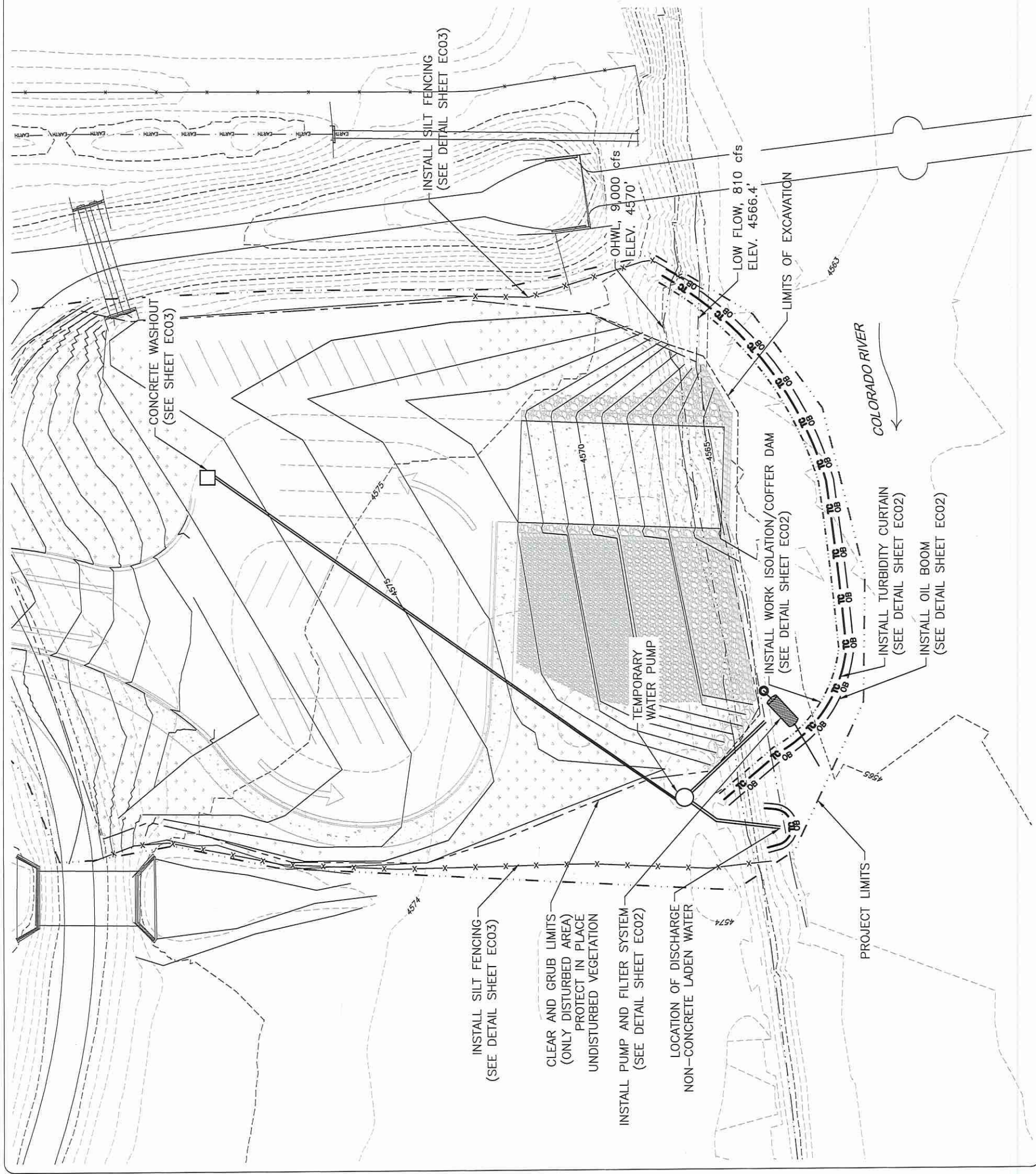
PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project	11.CO24.003	Sheet	ECO1
Date	JULY 2018	Scale	140

CONSTRUCTION NOTES:

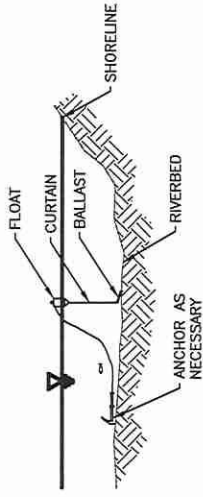
1. ALL CONCRETE LADEN WATER MUST BE CONTAINED OR EVAPORATED ONSITE AND NOT RETURNED TO THE COLORADO RIVER OR CONNECTING DRAINAGES
2. CONTRACTOR SHALL UPDATE CARE OF WATER PLANS PER ACTUAL IMPLEMENTATION
3. CONFORM TO ALL SPECIAL CONDITIONS AND ENCLOSURES OF PERMIT NUMBER SPK 2017-01049 PER LETTER DATED 6/27/2018

NOT FOR CONSTRUCTION

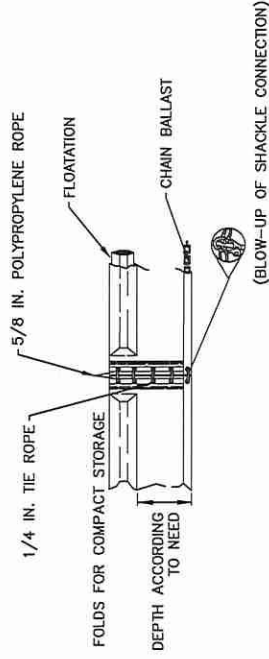


SCALE: 1" = 20'

ORIENTATION WHEN INSTALLED



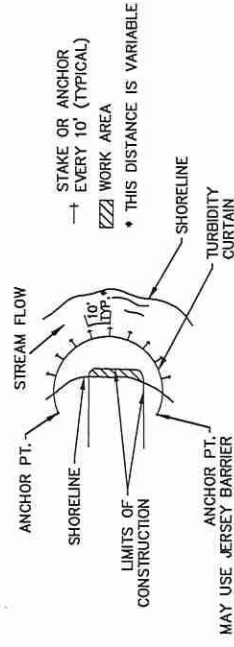
TURBIDITY CURTAIN (TYP.)
SECTION VIEW-NTS



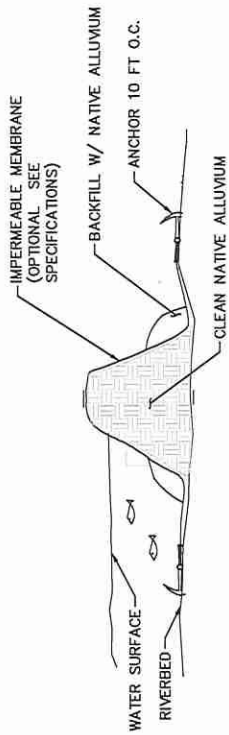
SILTMASTER II PERMEABLE GEOTEXTILE
DREDGE BARRIER NON-WOVEN DENW
BY PARKERSYSTEMS OR EQUIVALENT

TURBIDITY CURTAIN (TYP.)
PROFILE VIEW-NTS

TYPICAL LAYOUTS
STREAMS, PONDS, AND LAKES (PROTECTED AND NON-TIDAL)

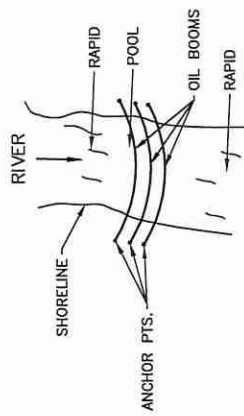


TURBIDITY CURTAIN (TYP.)
PLAN VIEW-NTS

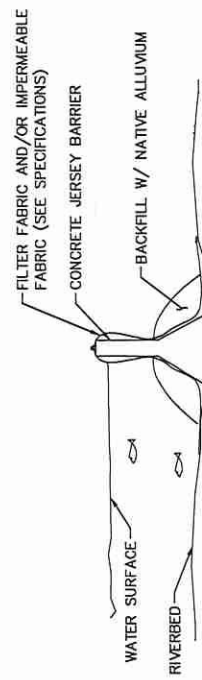


ALLUVIAL COFFER (TYP.)
SECTION VIEW-NTS

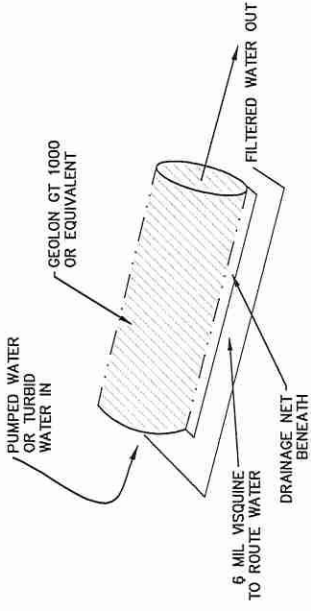
PLAN VIEW
TYPICAL LAYOUT FOR STREAMS AND RIVERS
TO BE PLACED DOWNSTREAM OF
ANY EQUIPMENT WORKING IN THE WET



OIL BOOM (TYP.)
PLAN VIEW-NTS

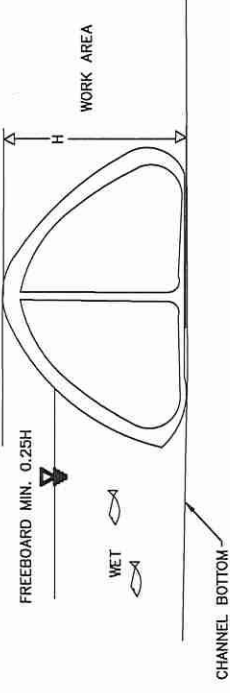


CONCRETE BARRIER COFFER DAM (TYP.)
SECTION VIEW-NTS



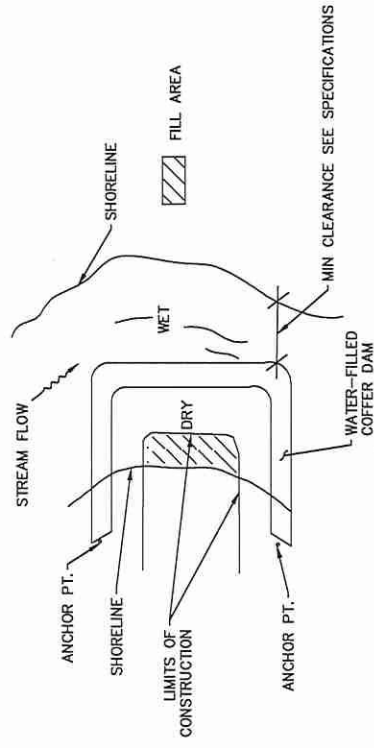
TO BE USED TO FILTER ALL PUMPED WATER

GEO-TUBEFILTER (TYPICAL)
NTS



WATER FILLED COFFER DAM (TYP.)
SECTION VIEW-NTS

TYPICAL LAYOUTS
STREAMS AND RIVERS



WATER FILLED COFFER DAM (TYP.)
PLAN VIEW-NTS

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL AND
CARE OF WATER DETAILS

No.	REVISION/UPDATE	Date

CREDIT NAME AND ADDRESS



City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866

DESIGN FIRM NAME AND ADDRESS



River Restoration
P.O. Box 2418
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

PROJECT NO.

11-CO24-003

DATE

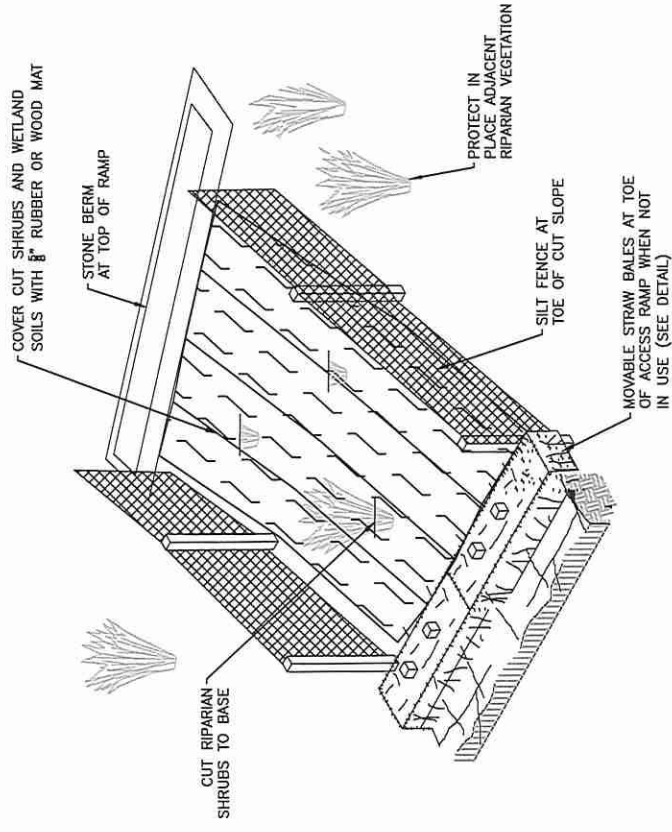
JULY 2018

SHEET

6

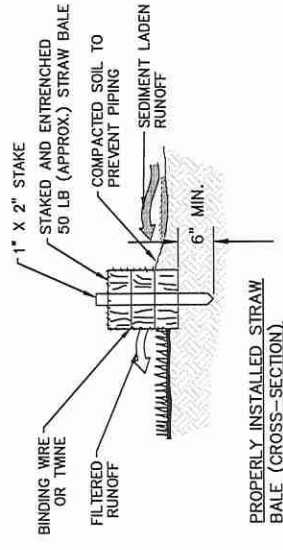
ECO2
141

NOT FOR CONSTRUCTION



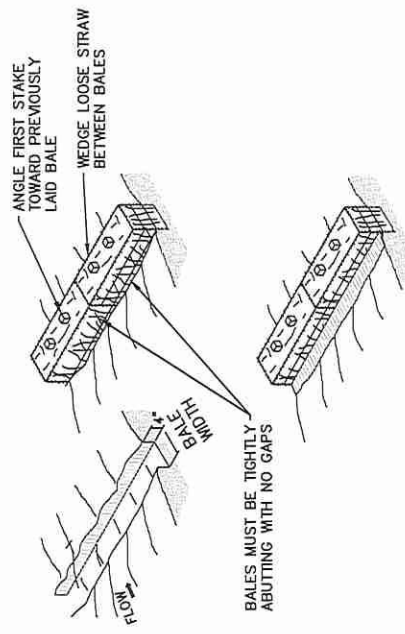
TEMPORARY EQUIPMENT ACCESS (TYP.)
NTS

1
EC03



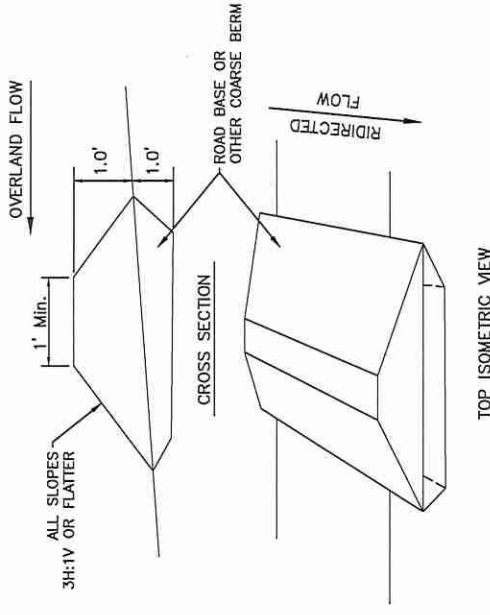
INSTALLATION STEPS:

1. EXCAVATE THE TRENCH
2. PLACE AND STAKE STRAW BALES



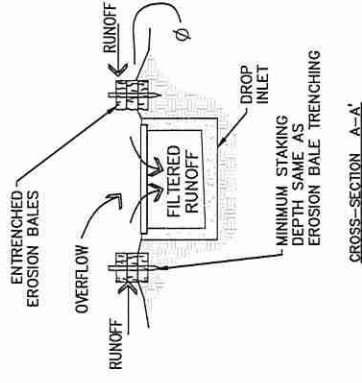
STRAW BALE (TYP.)
NTS

2
EC03

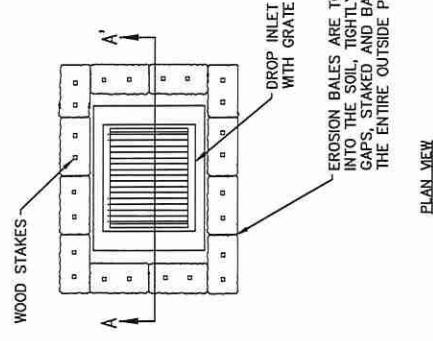


STONE BERM (TYP.)
NTS

3
EC03

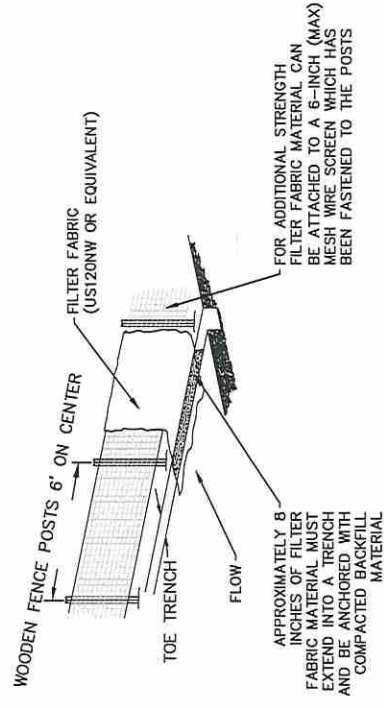
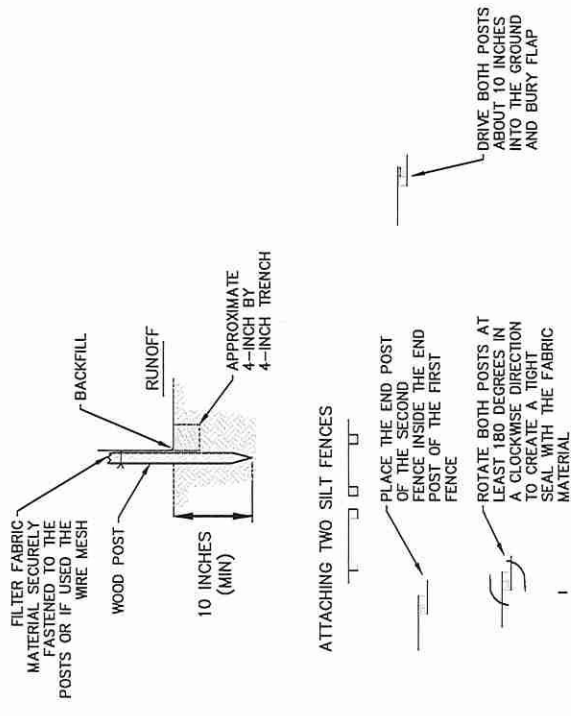


DROP INLET EROSION BALE FILTER
CROSS SECTION VIEW-NTS



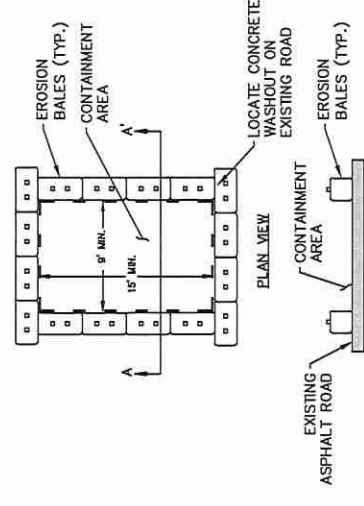
DROP INLET EROSION BALE FILTER
PLAN VIEW-NTS

4
EC03



SILT FENCE (TYP.)
NTS

5
EC03



CONCRETE WASHOUT (TYP.)
NTS

6
EC03

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL AND
CARE OF WATER DETAILS

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

CITY OF
Grand Junction
COLORADO

City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS



RiverRestoration
P.O. Box 248
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project 11.CO24.CO03

Date JULY 2018

Sheet

ECO3
142

NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
CONSTRUCTION SITE PLAN

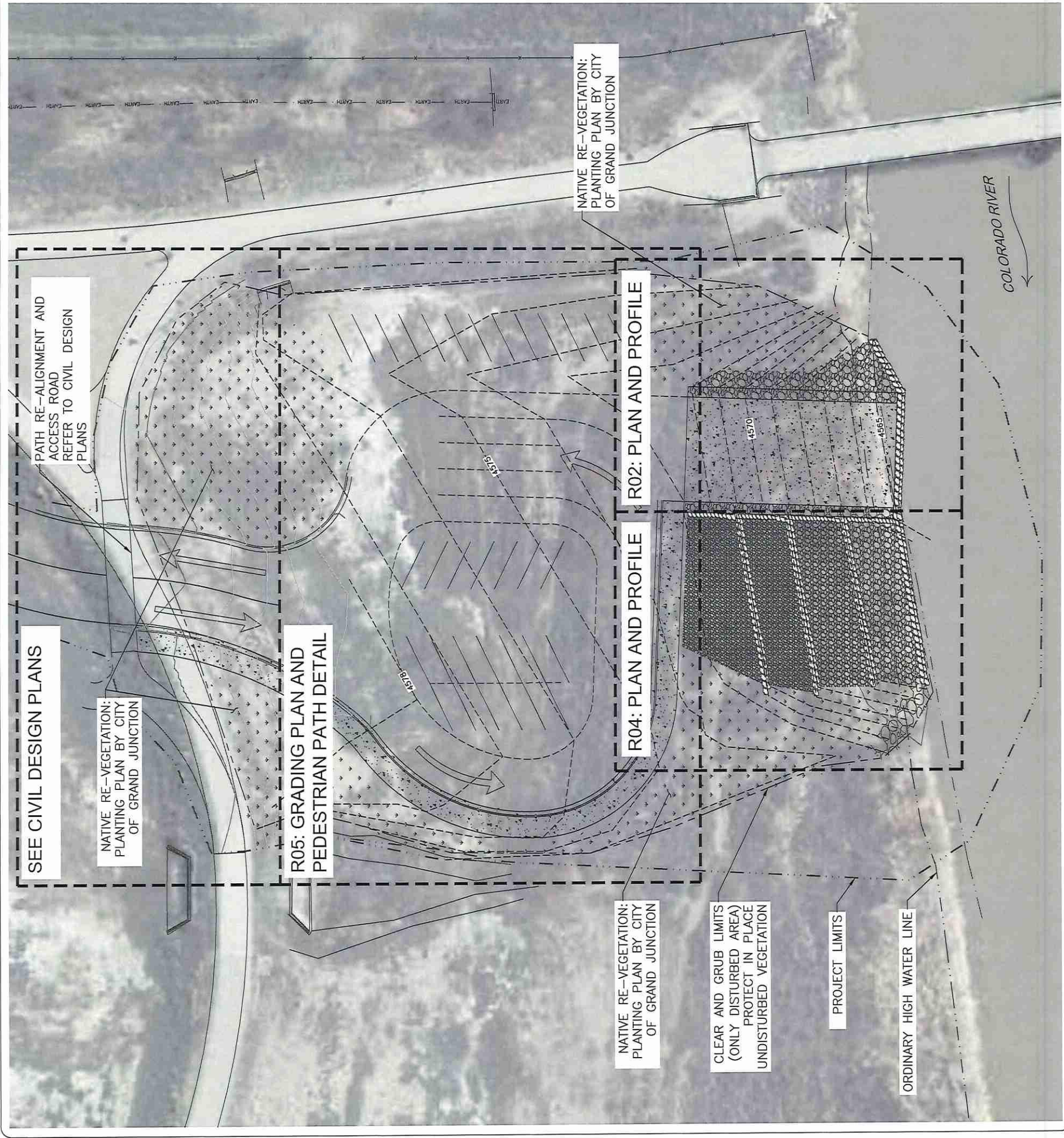
No.	REVISION/UPDATE	Date

CITY OF Grand Junction COLORADO
City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS
RIVER RESTORATION
RiverRestoration
P.O. Box 2418
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project	11.CO24.003	Sheet	ROI
Date	JULY 2018		143
Scale			

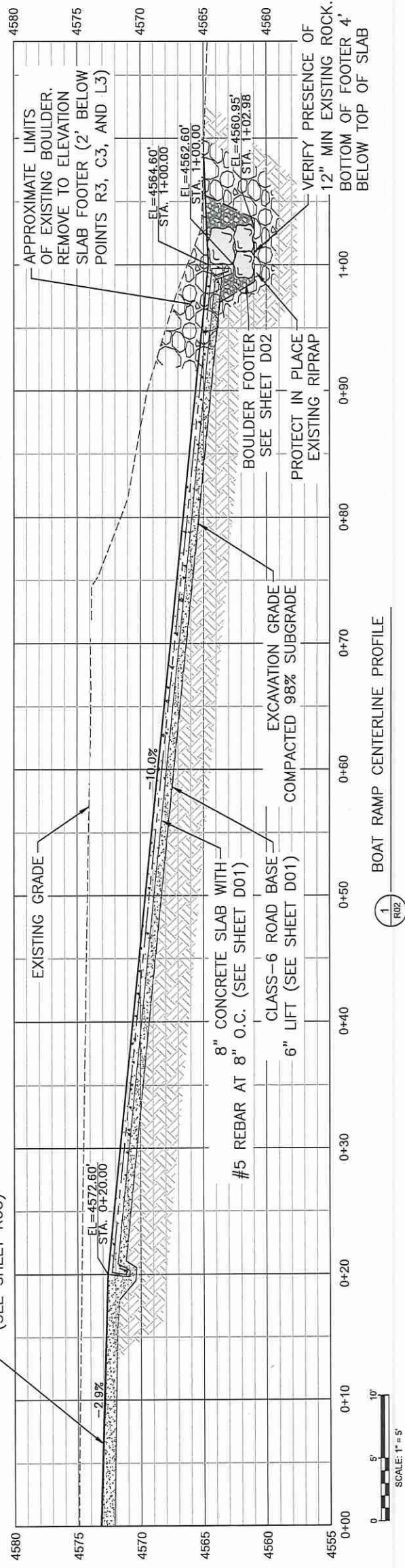
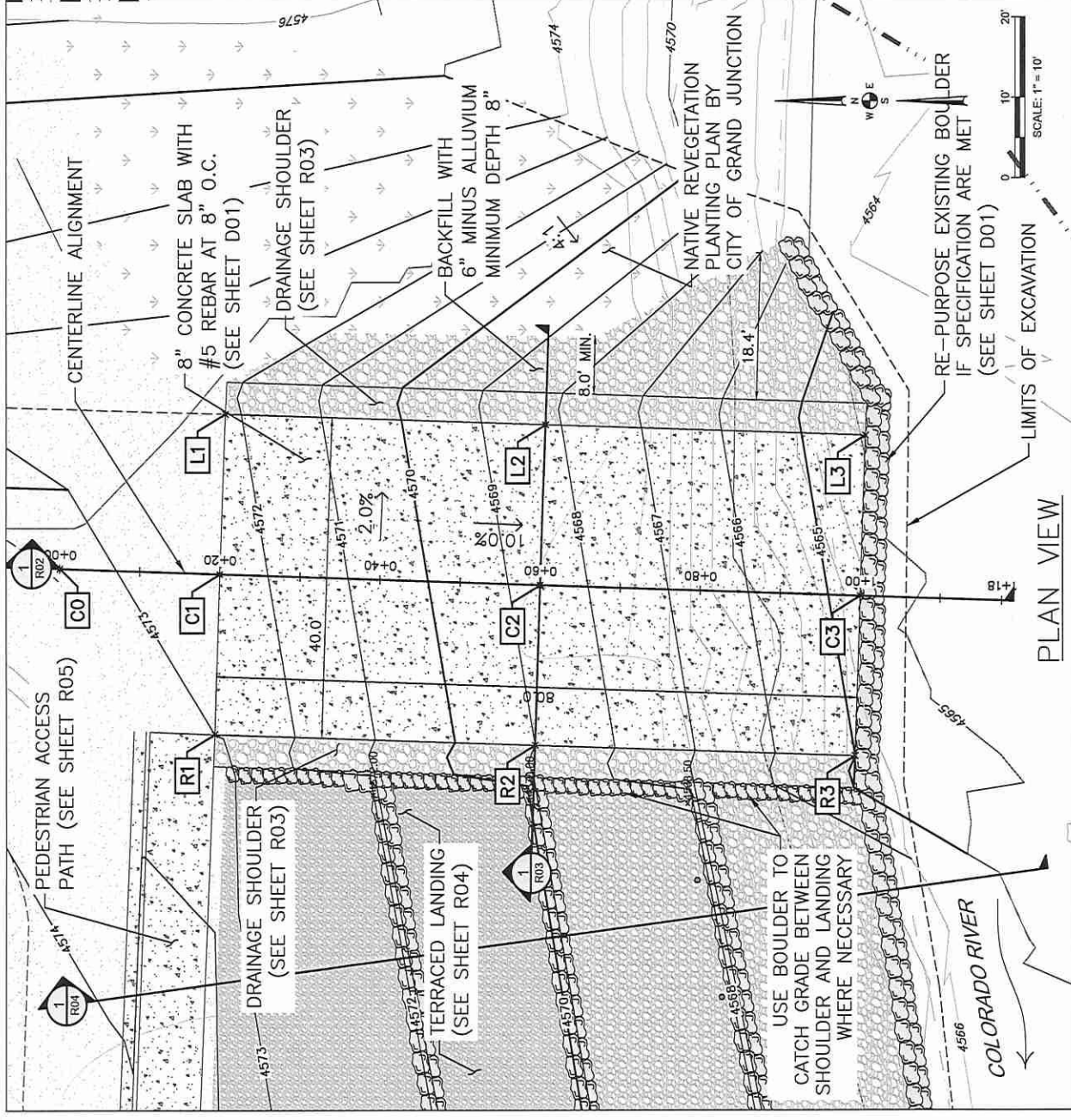


NOT FOR CONSTRUCTION

CONSTRUCTION NOTES:

- SCALE OF PLAN IS 1"=10'; SCALE OF PROFILE IS 1" = 5'
- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
- ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR

POINT	STATION OFFSET	FINISHED GRADE ELEVATION	LOCATION
C0	STA. 0+00.00 (0.00',)	4573.20	N=31,078.00 E=96,546.76
C1	STA. 0+20.00 (0.00',)	4572.60	N=31,058.01 E=96,546.10
C2	STA. 0+60.00 (0.00',)	4568.60	N=31,018.04 E=96,544.77
C3	STA. 1+00.00 (0.00',)	4564.60	N=30,878.08 E=96,543.44
R1	STA. 0+20.00 (20.00', R)	4573.00	N=31,058.68 E=96,526.11
R2	STA. 0+60.00 (20.00', R)	4569.00	N=31,019.70 E=96,524.78
R3	STA. 1+00.00 (20.00', R)	4565.00	N=30,879.72 E=96,523.45
L1	STA. 0+20.00 (20.00', L)	4572.20	N=31,058.35 E=96,556.09
L2	STA. 0+60.00 (20.00', L)	4568.20	N=31,018.37 E=96,554.76
L3	STA. 1+00.00 (20.00', L)	4564.20	N=30,978.39 E=96,553.43



PROFESSIONAL ENGINEER STAMP
NOT FOR CONSTRUCTION

LAG COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP PLAN AND PROFILE

No.	REVISION/UPDATE	Date

CITY OF Grand Junction COLORADO
City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

RIVER RESTORATION
RiverRestoration
P.O. Box 246
Carbondale, CO 81623
www.RiverRestoration.org

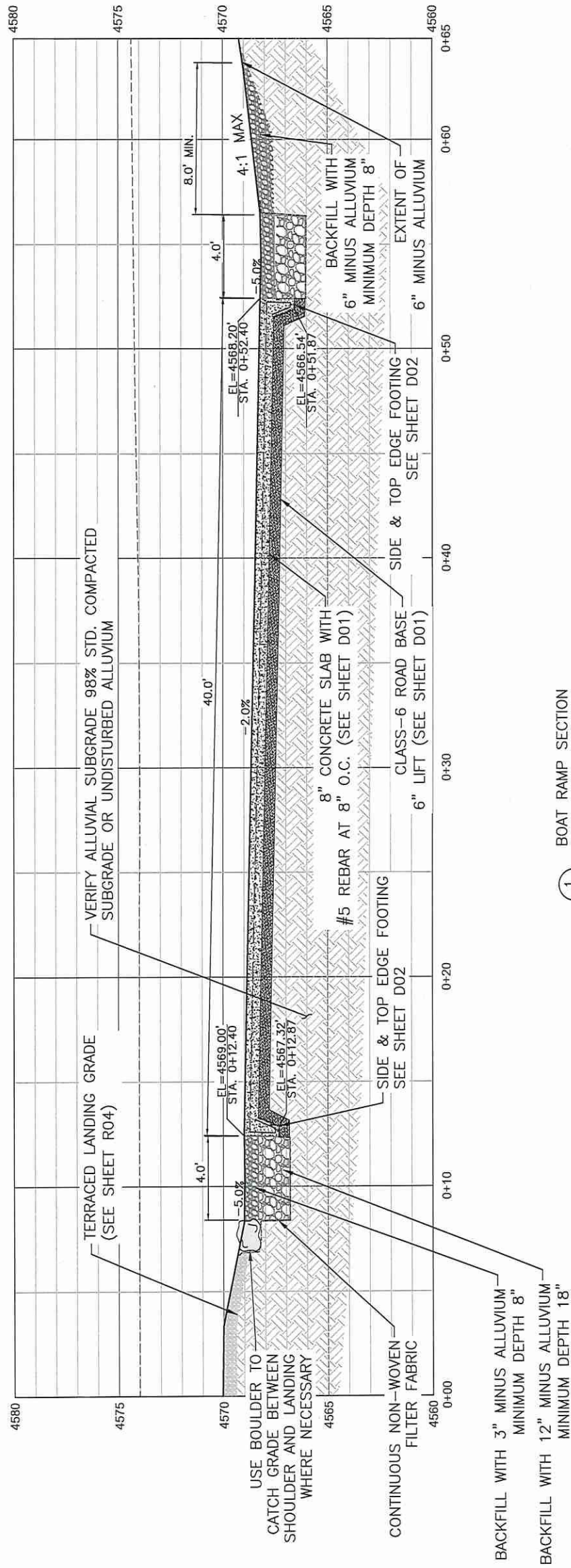
PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project I I.C024.003
Date JULY 2018
Scale VARIES
Sheet **RO2**
144

NOT FOR CONSTRUCTION

CONSTRUCTION NOTES:

1. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
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1 BOAT RAMP SECTION
R03



NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP DESIGN SECTION

No.	REVISION/UPDATE	Date

CITY OF Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866

DESIGN FROM NAME AND ADDRESS



RiverRestoration
P.O. Box 246
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project	11.CO24.003	Sheet	R03
Date	JULY 2018		
Scale	1" = 3' (FULL SIZE)		145

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
TERRACED LANDING
PLAN AND PROFILE

CITY OF Grand Junction
COLORADO

City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866

RIVER
RESTORATION

RiverRestoration
P.O. Box 2448
Carbondale, CO 81623
www.RiverRestoration.org

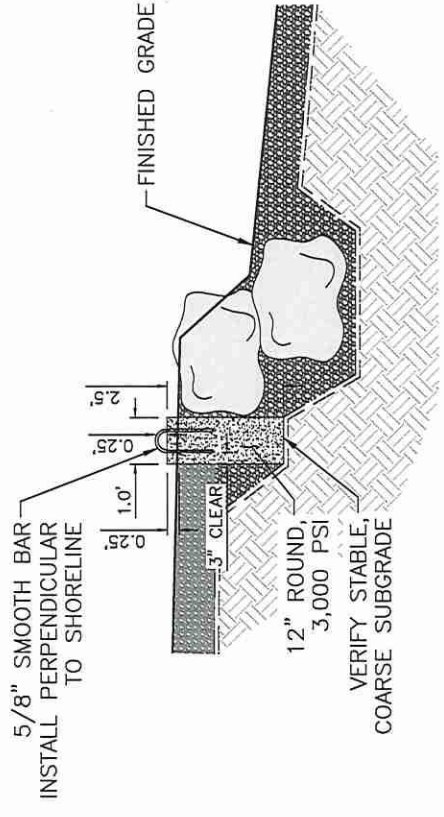
PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project 111.CO241.003 Sheet
Date JULY 2018
Scale VARIES

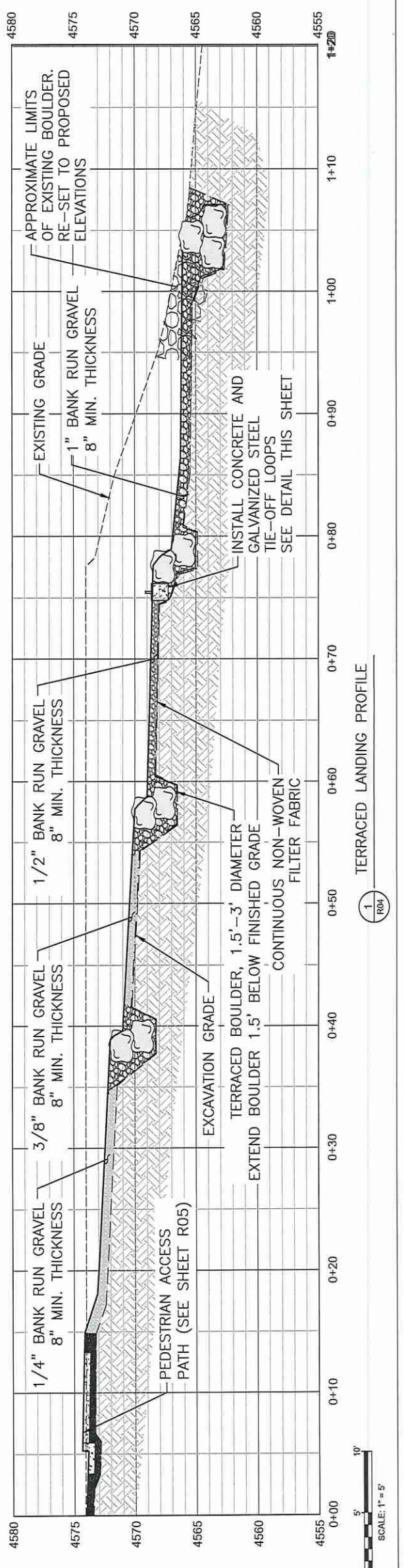
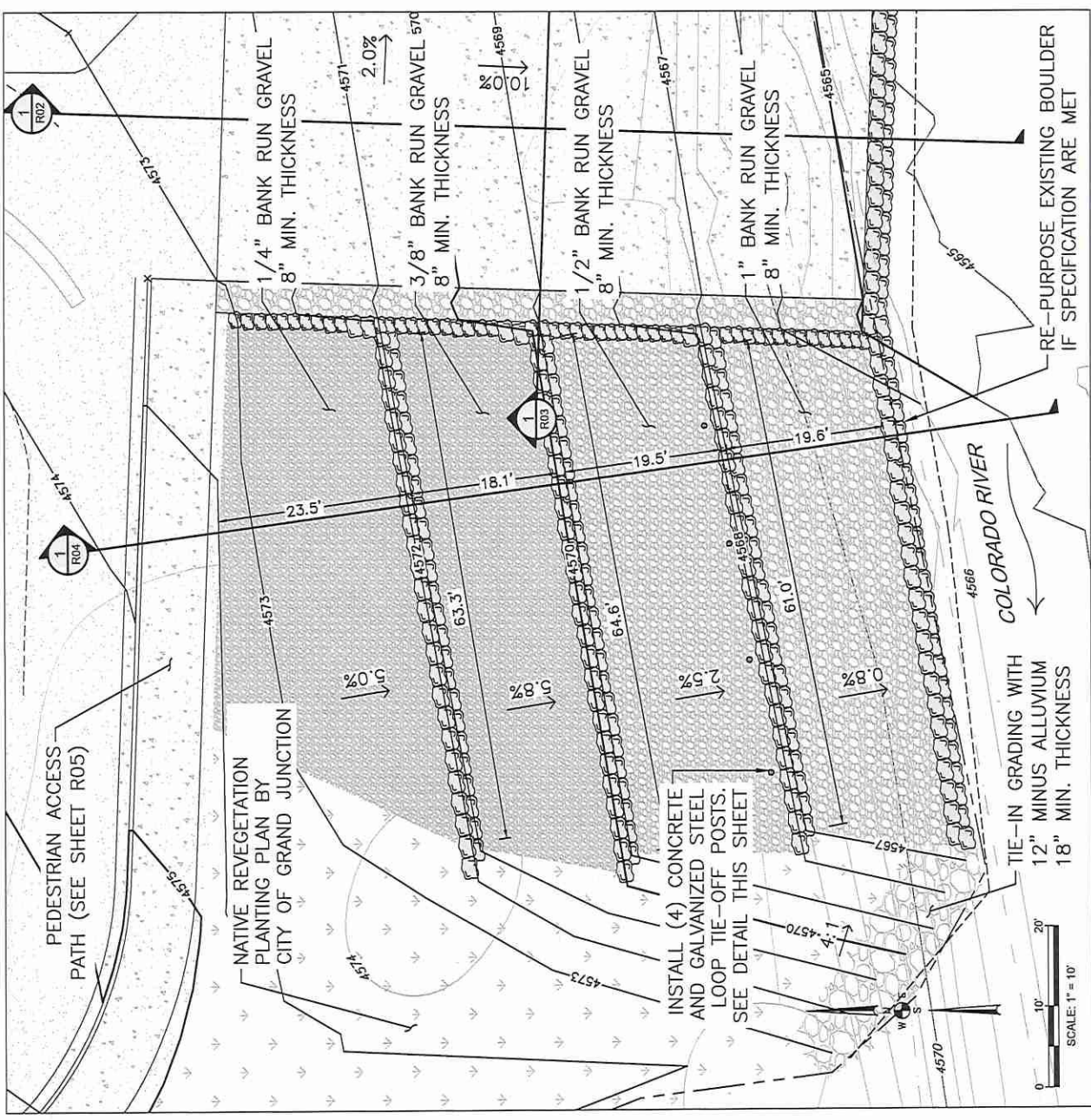
RO4
146

CONSTRUCTION NOTES:

- SCALE OF PLAN IS 1"=10'; SCALE OF PROFILE IS 1" = 5'
- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
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 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR



2 TIE-OFF LOOP DETAIL, TYPICAL
NTS



1 TERRACED LANDING PROFILE
NTS

NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK SHORELINE AMENITIES PROJECT PARKING LOT AND TURNAROUND PLAN AND PROFILE

CITY OF GRAND JUNCTION COLORADO
City of Grand Junction Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866

DESIGN FIRM NAME AND ADDRESS
RIVER RESTORATION
P.O. Box 248
Carbonade, CO 81623
www.RiverRestoration.org

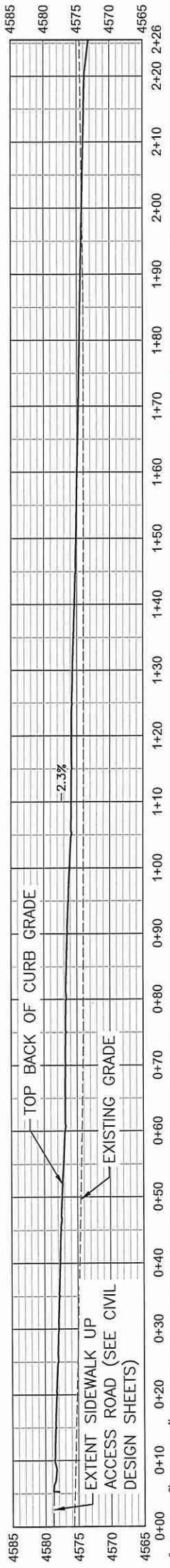
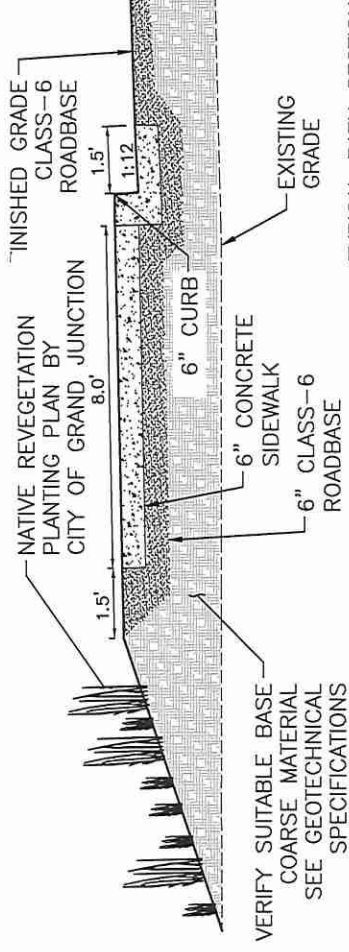
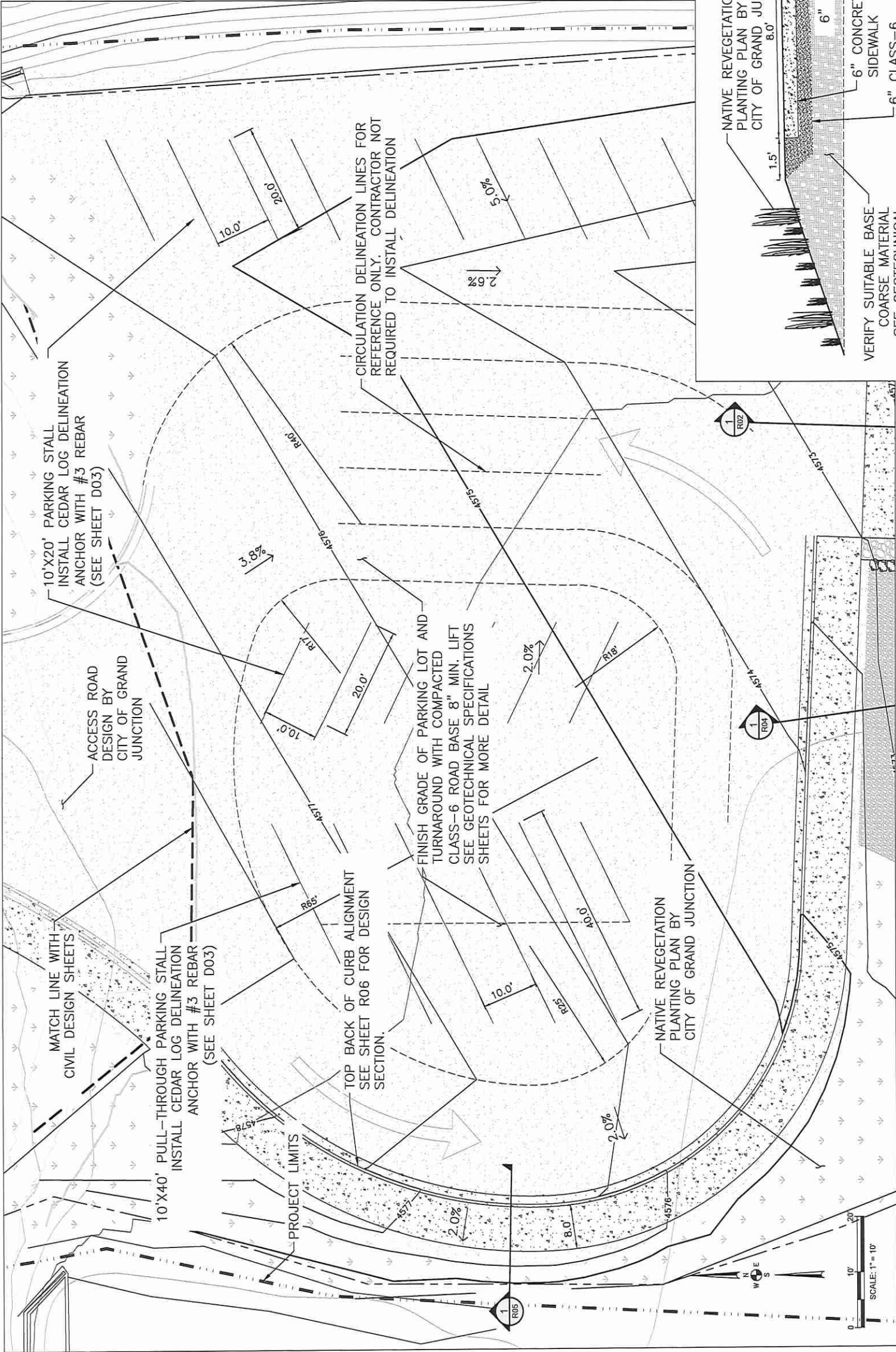
PROJECT NAME AND ADDRESS
Las Colonias Park Slough Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project 111.CO24.003
Date JULY 2018
Scale 1" = 10' (FULL SIZE)

Sheet R05
147

CONSTRUCTION NOTES:

- SEE SHEET R06 FOR STAKING ALIGNMENTS FOR SIDEWALK AND GRADE BREAKS AND PARKING STALL DELINEATION
- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
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 - DIMENSIONS AND SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR



NOT FOR CONSTRUCTION

SCALE: 1" = 2'

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
PARKING LOT AND TURNAROUND
GRADING PLAN



City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS



RiverRestoration
P.O. Box 248
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project I.I.CO24.003

Date JULY 2018

Sheet

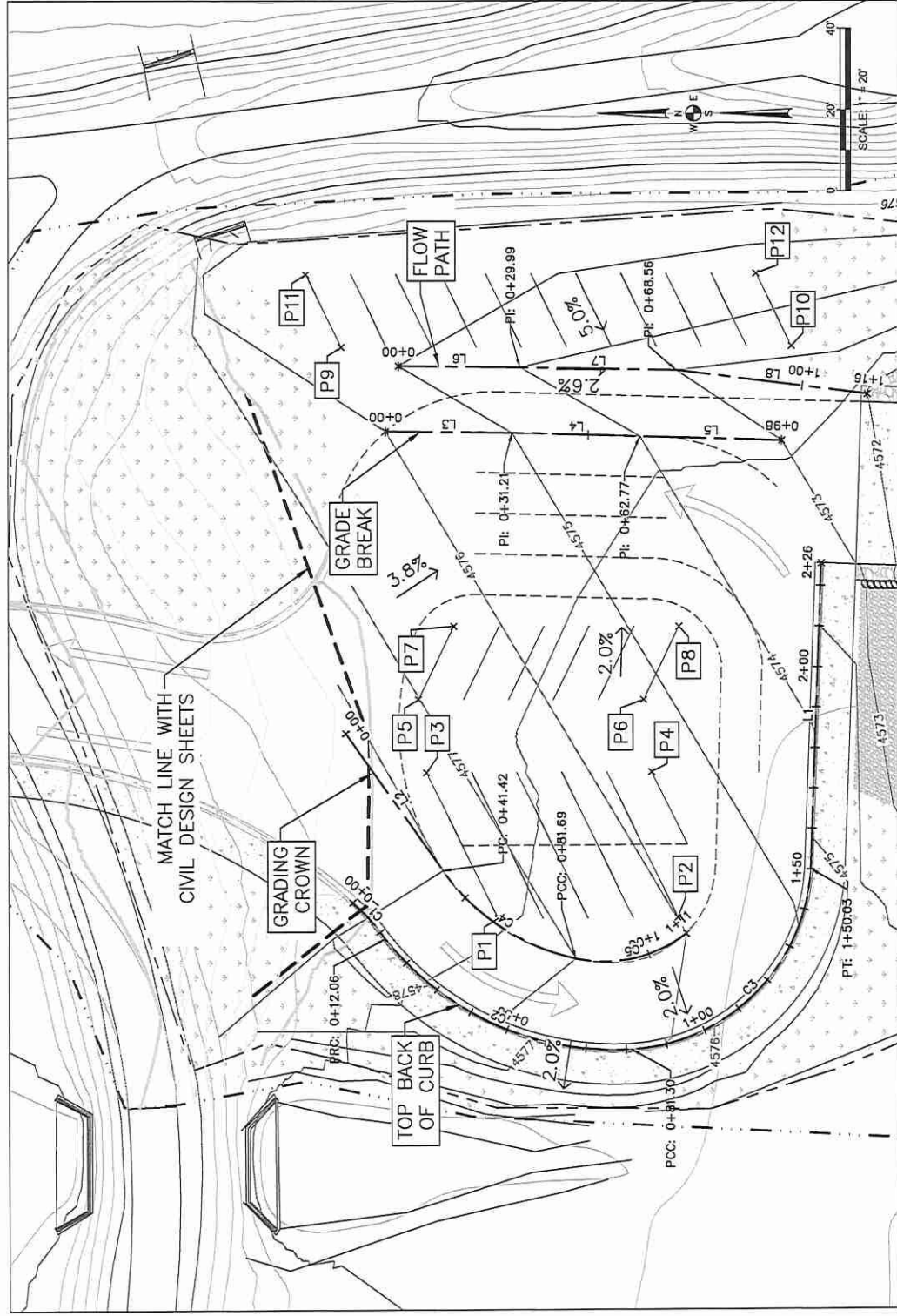
ROG

148

CONSTRUCTION NOTES:

- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.

POINT	LOCATION
P1	N=31,146.30 E=86,433.05
P2	N=31,103.87 E=86,439.13
P3	N=31,165.80 E=86,475.01
P4	N=31,110.25 E=86,475.12
P5	N=31,167.77 E=86,493.09
P6	N=31,112.22 E=86,492.89
P7	N=31,159.02 E=86,511.07
P8	N=31,103.47 E=86,510.97
P9	N=31,166.71 E=86,579.79
P10	N=31,075.60 E=86,560.02
P11	N=31,185.46 E=86,597.78
P12	N=31,084.35 E=86,597.98



Number	Length	Radius	Line/Chord	Direction	A Value
C1	12.061	49.5	S48° 36'	50.84°W	
C2	69.239	72.5	S24° 20'	49.81°W	
C3	68.733	47.1	S45° 01'	59.18°E	
L1	75.5		S87° 52'	47.62°E	

START OF ALIGNMENT COORDINATES: N=31,184.07
E=86,443.05
END OF ALIGNMENT COORDINATES: N=31,068.24
E=86,526.43

Number	Length	Radius	Line/Chord	Direction	A Value
L2	41.4		S54° 52'	14.08°W	
C4	40.266	54.5	S33° 42'	40.28°W	
C5	26.928	32.9	S12° 39'	12.28°E	

START OF ALIGNMENT COORDINATES: N=31,165.69
E=86,484.71
END OF ALIGNMENT COORDINATES: N=31,101.79
E=86,435.12

Number	Length	Radius	Line/Chord	Direction	A Value
L3	31.2		S00° 41'	20.72°W	
L4	31.6		S01° 41'	27.18°W	
L5	35.1		S01° 44'	18.44°W	

START OF ALIGNMENT COORDINATES: N=31,125.79
E=86,559.03
END OF ALIGNMENT COORDINATES: N=31,077.88
E=86,556.66

Number	Length	Radius	Line/Chord	Direction	A Value
L6	30.0		S00° 42'	34.07°W	
L7	38.6		S01° 00'	50.34°W	
L8	47.6		S07° 17'	12.45°W	

START OF ALIGNMENT COORDINATES: N=31,172.61
E=86,575.17
END OF ALIGNMENT COORDINATES: N=31,056.84
E=86,568.08

NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK SHORELINE AMENITIES PROJECT
BOAT RAMP DETAILS 1

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS



City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS



RiverRestoration
P.O. Box 2416
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project 11.CO24.003

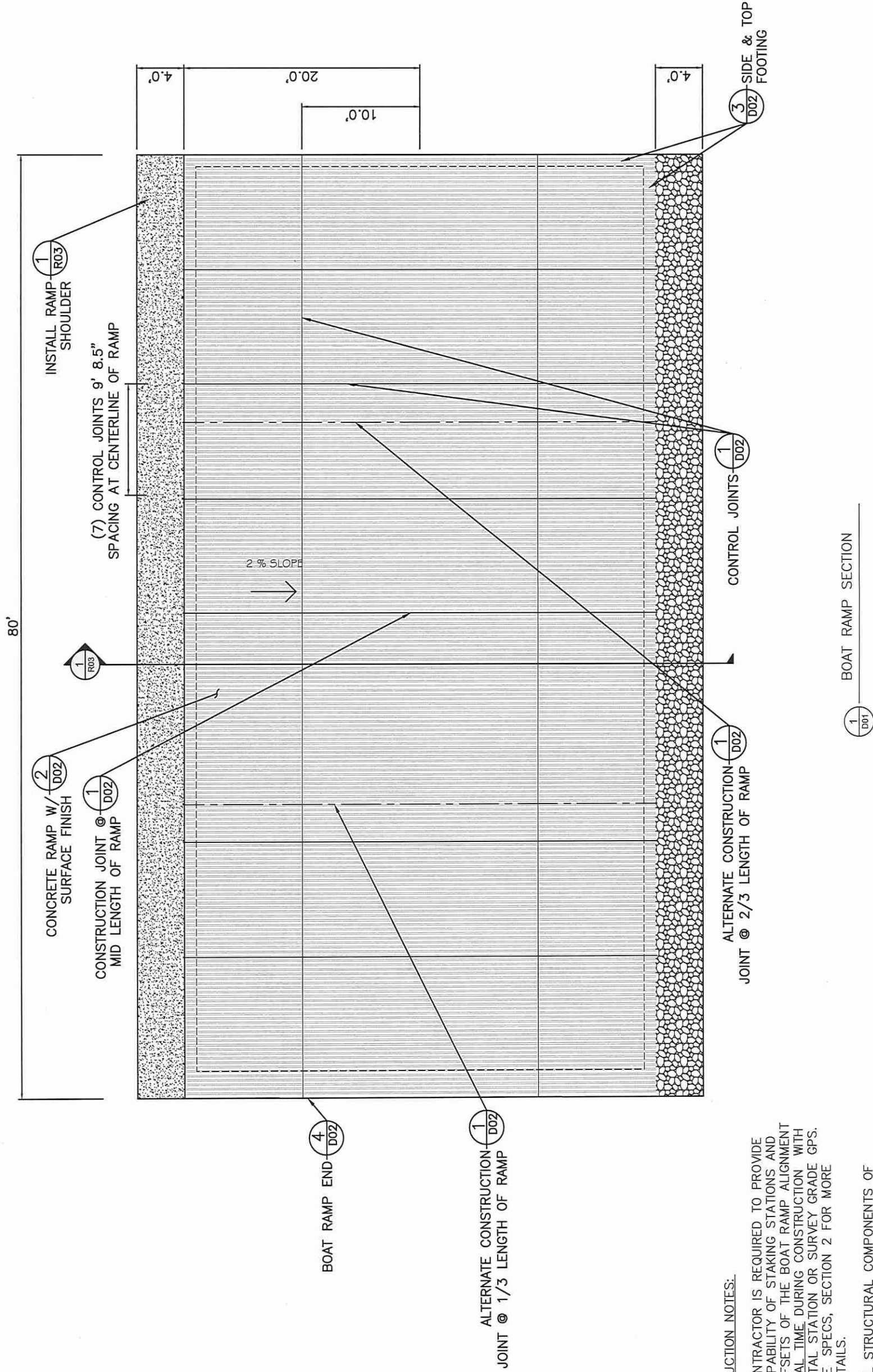
Date JULY 2018

Sheet

DOI

149

NOT FOR CONSTRUCTION



1 BOAT RAMP SECTION

CONSTRUCTION NOTES:

- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
- ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
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PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP DETAILS 2

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS



City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3666

DESIGN FIRM NAME AND ADDRESS



River Restoration
P.O. Box 246
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

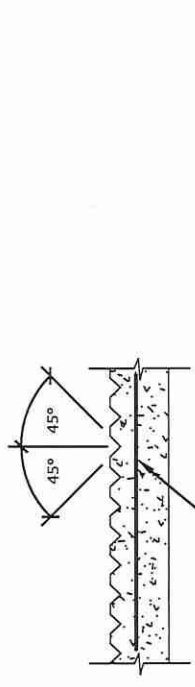
Project: 11.CO24.003

Date: JULY 2018

Sheet: D02

150

NOT FOR CONSTRUCTION



#5 BARS @ 8" O.C.
EACH WAY

2 CONCRETE RAMP SURFACE FINISH
D02 SECTION

#5 BARS @ 8" O.C.
EACH WAY

CLASS 6 ROAD BASE
(2) #5 TOP & BOTTOM

3 SIDE & TOP EDGE FOOTING
D02 SECTION

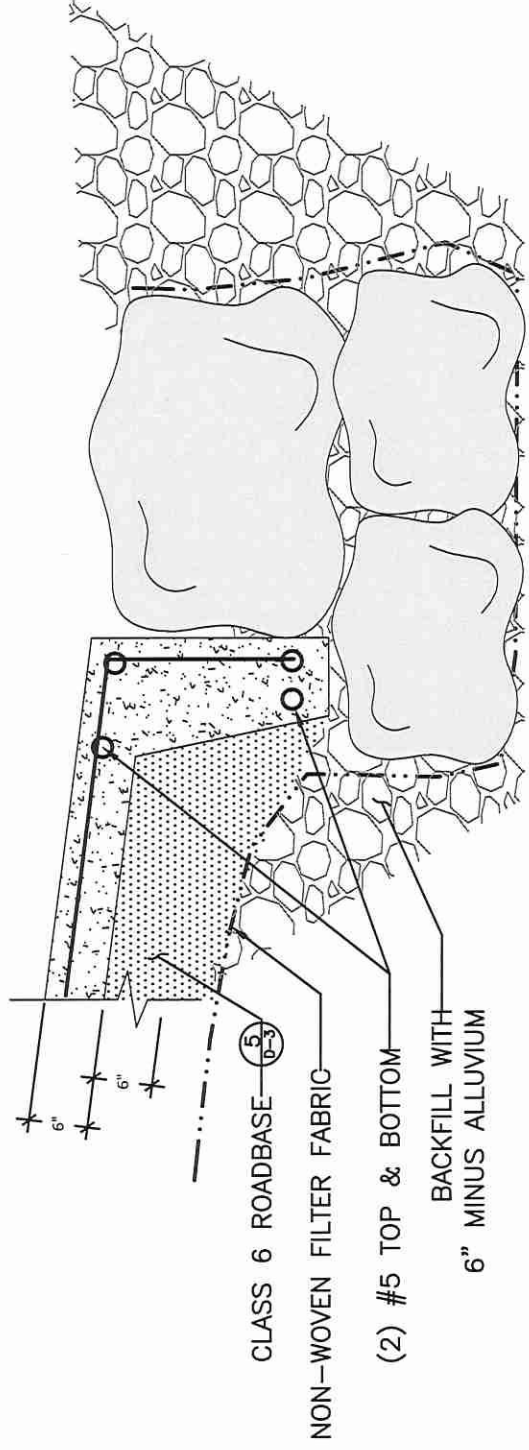
1/8" x 1" DEEP SAW CUT
FILL W/ SPECIFIED
EPOXY JOINT FILLER

APPLY BOND BREAKER

1/2" Ø X 24" LONG SMOOTH
DOWELS @ 12" O.C.
SET AT MID DEPTH OF SLAB
(#5 BARS @ 14" O.C.
EACH WAY NOT SHOWN)

SLEEVE OR PRE-ATTACHED
POLYETHYLENE COVERING
TO ASSURE SLIPPAGE

1 CONSTRUCTION JOINT
D02 SECTION



CLASS 6 ROADBASE
NON-WOVEN FILTER FABRIC

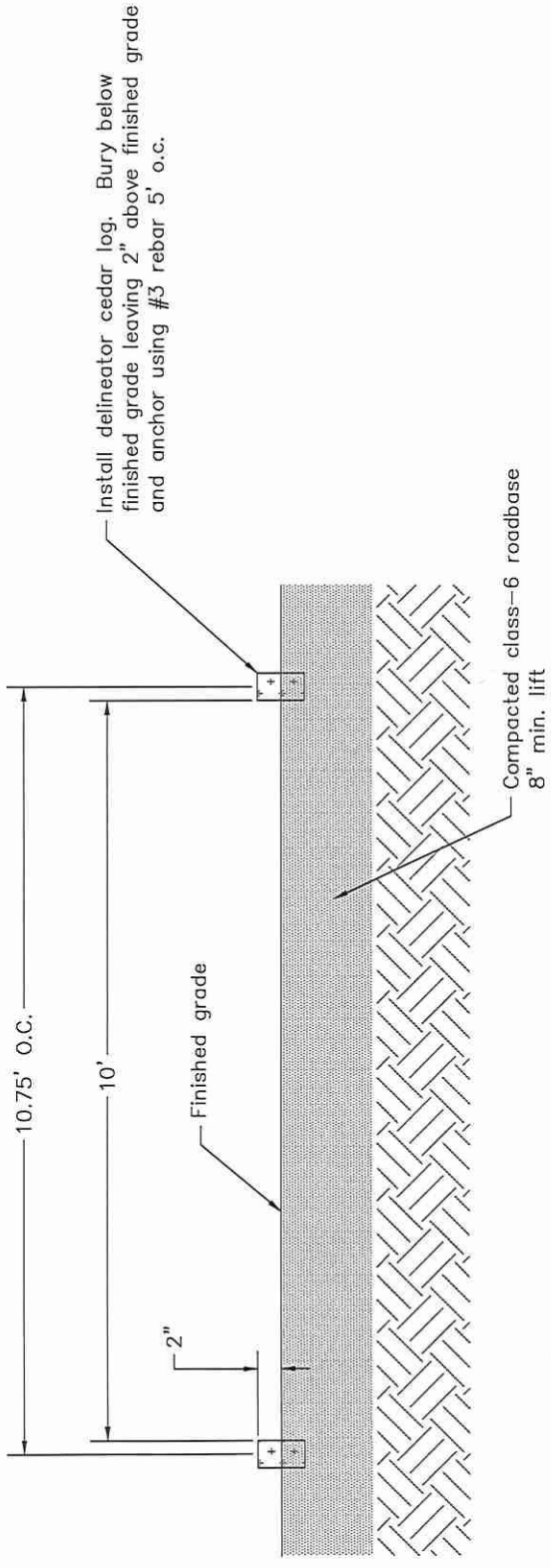
(2) #5 TOP & BOTTOM
BACKFILL WITH
6" MINUS ALLUVIUM

4 BOAT RAMP END
D02 SECTION

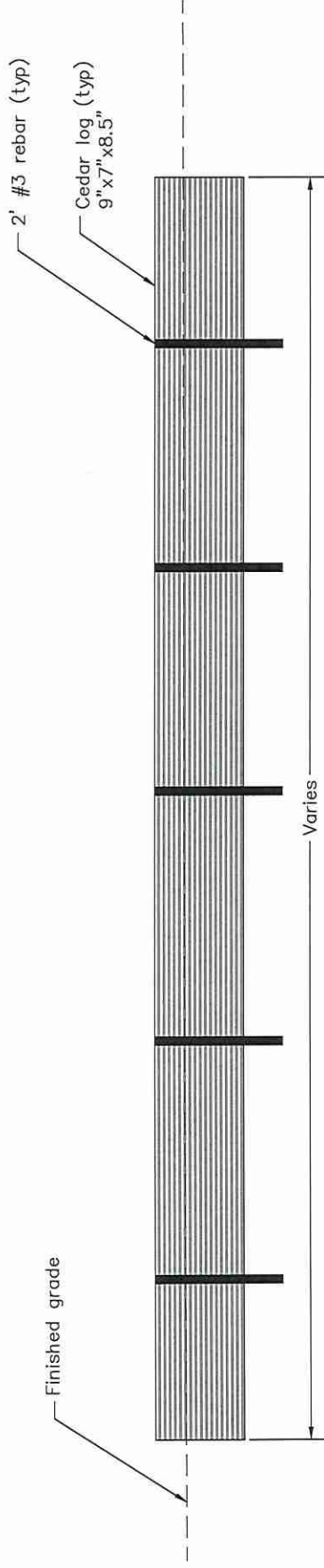
CONSTRUCTION NOTES:

- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
- ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR

NOTE:
ONLY REMOVE EXISTING BOULDER TOE TO ELEVATION OF BOTTOM OF CONCRETE FOOTER RE-PURPOSE BOULDER IF SPECIFICATION ARE MET (SEE TECHNICAL SPECIFICATION FOR MORE INFORMATION)



Parking Stall Cross-Section



Cedar Log Cross-Section

- Note:
1. Install 2' #3 rebar evenly spaced through cedar log to fasten to ground 5' o.c.
 2. Set top of rebar even with top of wood

1
D03

PARKING STALL DETAIL

PROFESSIONAL ENGINEER STAMP

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
PARKING STALL DETAIL

No.	REVISION/UPDATE	Date

CREDIT NAME AND ADDRESS

CITY OF
Grand Junction
COLORADO

City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866

DESIGN FIRM NAME AND ADDRESS



RiverRestoration
P.O. Box 248
Carbonade, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS

Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

PROJECT No.

11.CO24.003

DATE

JULY 2018

SHEET

D03

151

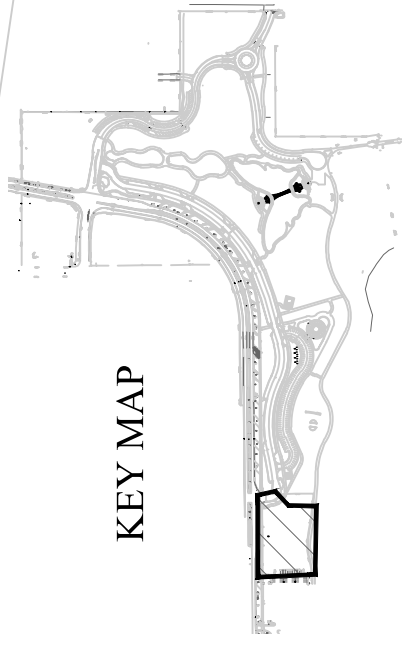
NOT FOR CONSTRUCTION

THIS SHEET NOT INCLUDED IN THIS DOCUMENT
MATERIALS QUANTITIES NOT INCLUDED IN BID DOCUMENT

IRRIGATION VALVE SCHEDULE

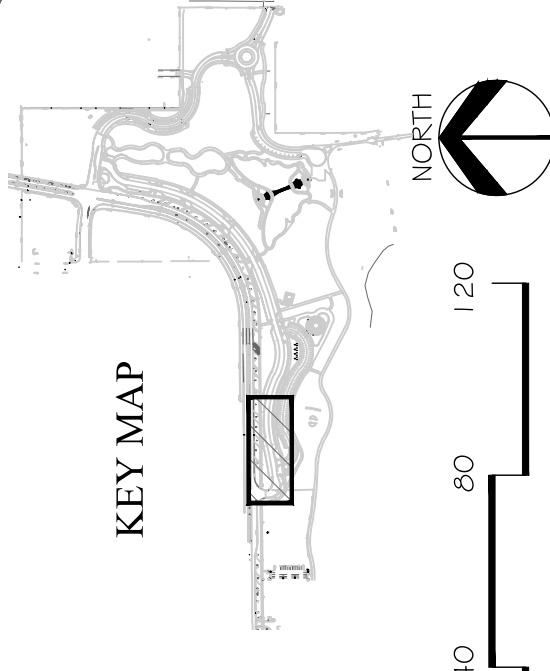
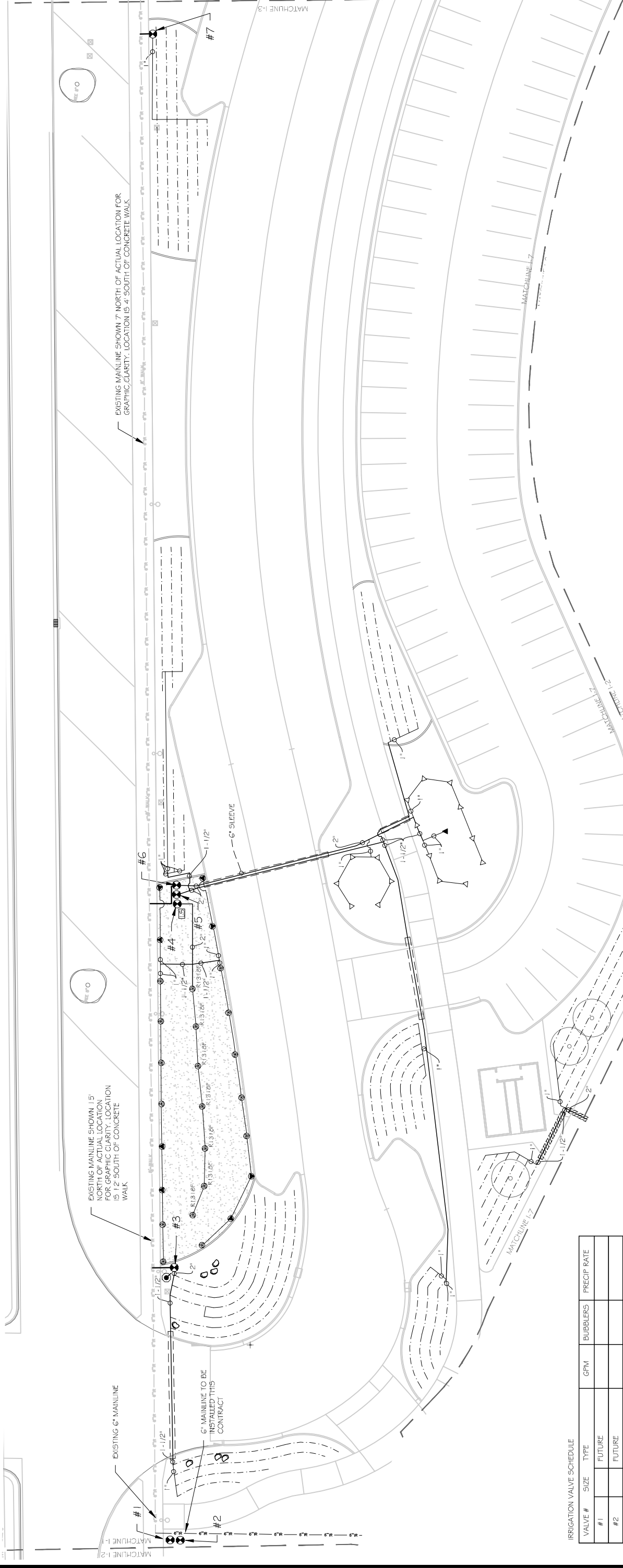
VALVE #	SIZE	TYPE	GPM	BUBBLERS	FRECIP RATE
#1		FUTURE			
#2		FUTURE			
#3	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#4	1-1/2"	R-VAN5000 MFR	33.7		0.61 in/hr
#5	2"	1401 BUBBLERS	57.5	230	1.5 in/hr
#6	1-1/2"	TREE SPRAY	33.3		1.5 in/hr
#7	1-1/2"	1401 BUBBLERS	23.25	93	1.5 in/hr
#8	1-1/2"	TREE SPRAY	33.3		1.5 in/hr
#9	2"	R-VAN5000 MFR	74.51		0.61 in/hr
#10	1-1/2"	TREE SPRAY	33.3		1.5 in/hr
#11	1-1/2"	1401 BUBBLERS	24.5	96	1.5 in/hr
#12	2"	R-VAN5000 MFR	51.56		0.61 in/hr
#13	2"	TREE SPRAY	55.15		1.5 in/hr
#14	2"	1401 BUBBLERS	62	326	1.5 in/hr
#15	2"	1401 BUBBLERS	69.5	276	1.5 in/hr
#16	1-1/2"	1401 BUBBLERS	47.75	191	1.5 in/hr
#17	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#18	1-1/2"	R-VAN5000 MFR	40.50		0.61 in/hr
#19		FUTURE			
#20	1-1/2"	R-VAN5000 MFR	36.80		0.61 in/hr
#21	1-1/2"	1401 BUBBLERS	27.75	111	1.5 in/hr
#22		FUTURE			
#23		FUTURE			
#24		FUTURE			
#25		FUTURE			

- LEGEND**
- C900 DR. 1.8 PVC MAIN (EXISTING)
 - C900 DR. 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BH-6
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - ISOLATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AH-14
 - MANUAL DRAIN VALVE DETAIL AH-13
 - RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AH-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - 1.5P-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - RAINBIRD 1.804 SERIES SPRAY HEADS, DETAIL BH-2
 - WITH RAINBIRD SPRAY NOZZLE
 - ▲ 1.5 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - ▲ 1.5 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - ▲ 1.0 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - ▲ 1.0 SERIES VAN SPRAY NOZZLE SET TO 120 DEG

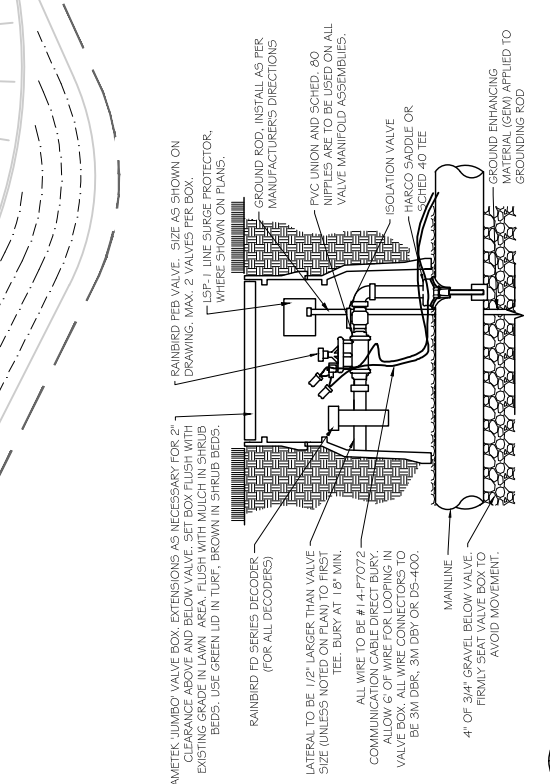


GIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

	<p>PUBLIC WORKS ENGINEERING DIVISION</p>	<p>LAS COLONIAS BUSINESS PARK LANDSCAPE IRRIGATION PLAN</p>	<p>I-1 152</p>
<p>REVISION Δ</p> <p>REVISION Δ</p> <p>REVISION Δ</p> <p>REVISION Δ</p>	<p>DESCRIPTION</p> <p>DATE</p>	<p>DRAWN BY CR</p> <p>DESIGNED BY CR</p> <p>CHECKED BY MH</p> <p>APPROVED BY ZZ</p>	<p>DATE 2018</p> <p>DATE 2018</p> <p>DATE 2018</p> <p>DATE 2018</p>
<p>SCALES:</p> <p>PLAN</p> <p>1" = 20' (VERTICAL)</p> <p>1" = 40' (HORIZONTAL)</p>			



- LEGEND**
- C900 DR 1.8 PVC MAIN (EXISTING)
 - C900 DR 1.8 PVC MAIN THIS CONTRACT
 - - - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - - - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AH-14
 - MANUAL DRAIN VALVE DETAIL AH-13
 - RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AH-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - RAINBIRD 1804 SERIES SPRAY HEADS, DETAIL BH-2
 - WITH RAINBIRD SPRAY NOZZLE
 - ▲ 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - ▲ 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - WITH RAINBIRD R-VAN ROTARY NOZZLE
 - R-VAN 14
 - R-VAN 16
 - R-VAN 13-18 FULL CIRCLE
 - R-VAN 1724
 - R-VAN 17-24 FULL CIRCLE



IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#1		FUTURE			
#2		FUTURE			
#3	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#4	1-1/2"	R-VAN5000 MPR	33.7		0.61 in/hr
#5	2"	1401 BUBBLERS	57.5	230	1.5 in/hr
#6	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#7	1-1/2"	1401 BUBBLERS	23.25	93	1.5 in/hr
#8	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#9	2"	R-VAN5000 MPR	74.51		0.61 in/hr
#10	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#11	1-1/2"	1401 BUBBLERS	24.5	98	1.5 in/hr
#12	2"	R-VAN5000 MPR	51.58		0.61 in/hr
#13	2"	TREE SPRAY	55.15		1.6 in/hr
#14	2"	1401 BUBBLERS	82	328	1.5 in/hr
#15	2"	1401 BUBBLERS	69.5	278	1.5 in/hr
#16	1-1/2"	1401 BUBBLERS	47.75	191	1.5 in/hr
#17	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#18	1-1/2"	R-VAN5000 MPR	40.50		0.61 in/hr
#19		FUTURE			
#20	1-1/2"	R-VAN5000 MPR	36.80		0.61 in/hr
#21	1-1/2"	1401 BUBBLERS	27.75	111	1.5 in/hr
#22		FUTURE			
#23		FUTURE			
#24		FUTURE			
#25		FUTURE			

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

DRAWN BY CR DATE 7/7/2018

DESIGNED BY CR DATE 7/7/2018

CHECKED BY MH DATE 7/7/2018

APPROVED BY ZZ DATE 2018

SCALE: PLAN 1" = 20' (HORIZONTAL)

DESCRIPTION _____ DATE _____

PLAN I-2

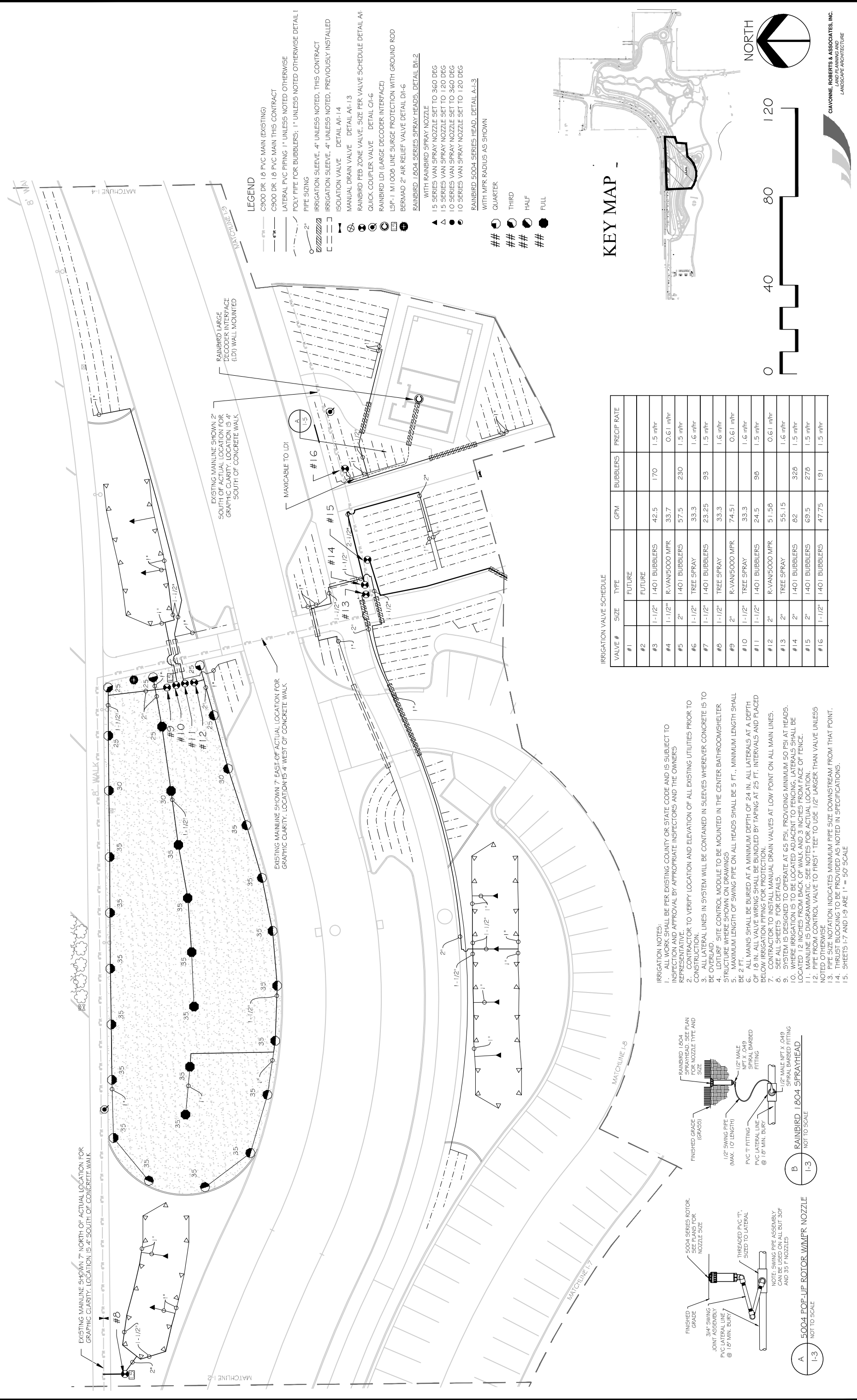
153

CITY OF **Grand Junction** COLORADO

PUBLIC WORKS ENGINEERING DIVISION

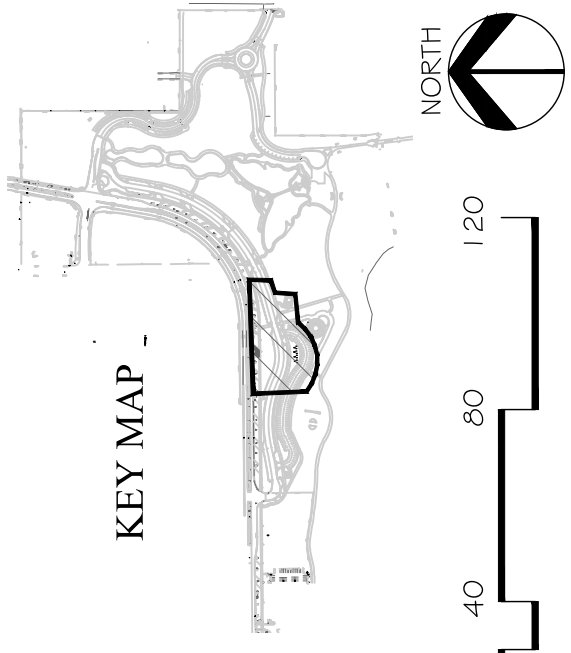
LAS COLONIAS BUSINESS PARK IRRIGATION PLAN

GIVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND LANDSCAPE ARCHITECTURE



- LEGEND**
- C900 DR 1.8 PVC MAIN (EXISTING)
 - C900 DR 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL I
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AI-14
 - MANUAL DRAIN VALVE DETAIL AI-13
 - RAINBIRD FIB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI
 - RAINBIRD LD (LARGE DECODER INTERFACE) DETAIL CI-6
 - RAINBIRD LD (LARGE DECODER INTERFACE) DETAIL CI-6
 - LSP-1 M1 008 LINE SURGE PROTECTION WITH GROUND ROD
 - BERMAD 2" AIR RELIEF VALVE DETAIL DI-6
 - RAINBIRD 1804 SERIES SPRAY HEADS, DETAIL BI-2 WITH RAINBIRD SPRAY NOZZLE
 - 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - RAINBIRD 5004 SERIES HEAD, DETAIL A-I-3 WITH MPR RADIUS AS SHOWN
 - QUARTER
 - THIRD
 - HALF
 - FULL

KEY MAP



IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	BUBBLERS	GPM	PRECIP RATE
#1		FUTURE			
#2		FUTURE			
#3	1-1/2"	1401 BUBBLERS	170	42.5	1.5 in/hr
#4	1-1/2"	R-VAN5000 MPR	230	33.7	0.61 in/hr
#5	2"	1401 BUBBLERS	230	57.5	1.5 in/hr
#6	1-1/2"	TREE SPRAY	93	33.3	1.6 in/hr
#7	1-1/2"	1401 BUBBLERS	93	23.25	1.5 in/hr
#8	1-1/2"	TREE SPRAY		33.3	1.6 in/hr
#9	2"	R-VAN5000 MPR		74.51	0.61 in/hr
#10	1-1/2"	TREE SPRAY		33.3	1.6 in/hr
#11	1-1/2"	1401 BUBBLERS	98	24.5	1.5 in/hr
#12	2"	R-VAN5000 MPR		51.58	0.61 in/hr
#13	2"	TREE SPRAY		55.15	1.6 in/hr
#14	2"	1401 BUBBLERS	328	82	1.5 in/hr
#15	2"	1401 BUBBLERS	276	69.5	1.5 in/hr
#16	1-1/2"	1401 BUBBLERS	191	47.75	1.5 in/hr

- IRRIGATION NOTES:**
- ALL WORK SHALL BE PER EXISTING COUNTY OR STATE CODE AND IS SUBJECT TO INSPECTION AND APPROVAL BY APPROPRIATE INSPECTORS AND THE OWNER'S REPRESENTATIVE.
 - CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
 - ALL LATERAL LINES IN SYSTEM WILL BE CONTAINED IN SLEEVES WHEREVER CONCRETE IS TO BE OVERLAIN.
 - LDITURF SITE CONTROL MODULE TO BE MOUNTED IN THE CENTER BATHROOM/SHELTER STRUCTURE WHERE SHOWN ON DRAWINGS
 - MAXIMUM LENGTH OF SWING PIPE ON ALL HEADS SHALL BE 5 FT., MINIMUM LENGTH SHALL BE 2 FT.
 - ALL MAINS SHALL BE BURIED AT A MINIMUM DEPTH OF 24 IN. ALL LATERALS AT A DEPTH OF 18 IN. ALL VALVE WIRING SHALL BE BUNDLED BY TAPING AT 25 FT. INTERVALS AND PLACED BELOW IRRIGATION PIPING FOR PROTECTION.
 - CONTRACTOR TO INSTALL MANUAL DRAIN VALVES AT LOW POINT ON ALL MAIN LINES.
 - ALL SLEEVES SHALL BE TAPED AT 25 FT. INTERVALS TO PERMIT ACCESS TO MAIN LINES.
 - WHERE NECESSARY, SLEEVES SHALL BE LOCATED ADJACENT TO FENCING. LATERALS SHALL BE LOCATED 12 INCHES FROM BACK OF WALK AND 3 INCHES FROM FACE OF FENCE.
 - MANUAL IS DIAGRAMMATIC. SEE NOTES FOR ACTUAL LOCATION.
 - PIPE FROM CONTROL VALVE TO FIRST "TEE" TO USE 1/2" LARGER THAN VALVE UNLESS NOTED OTHERWISE
 - PIPE SIZE NOTATION INDICATES MINIMUM PIPE SIZE DOWNSTREAM FROM THAT POINT.
 - THRUST BLOCKING TO BE PROVIDED AS NOTED IN SPECIFICATIONS.
 - SHEETS 1-7 AND 1-9 ARE 1" = 50' SCALE



REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

DESCRIPTION _____ DATE _____

DRAWN BY CR DATE 7/7/2018

DESIGNED BY CR DATE 7/7/2018

CHECKED BY MH DATE 7/7/2018

APPROVED BY ZZ DATE 2018

SCALES: PLAN 1" = 50'

CITY OF Grand Junction COLORADO

PUBLIC WORKS ENGINEERING DIVISION

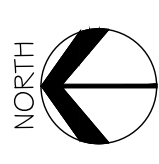
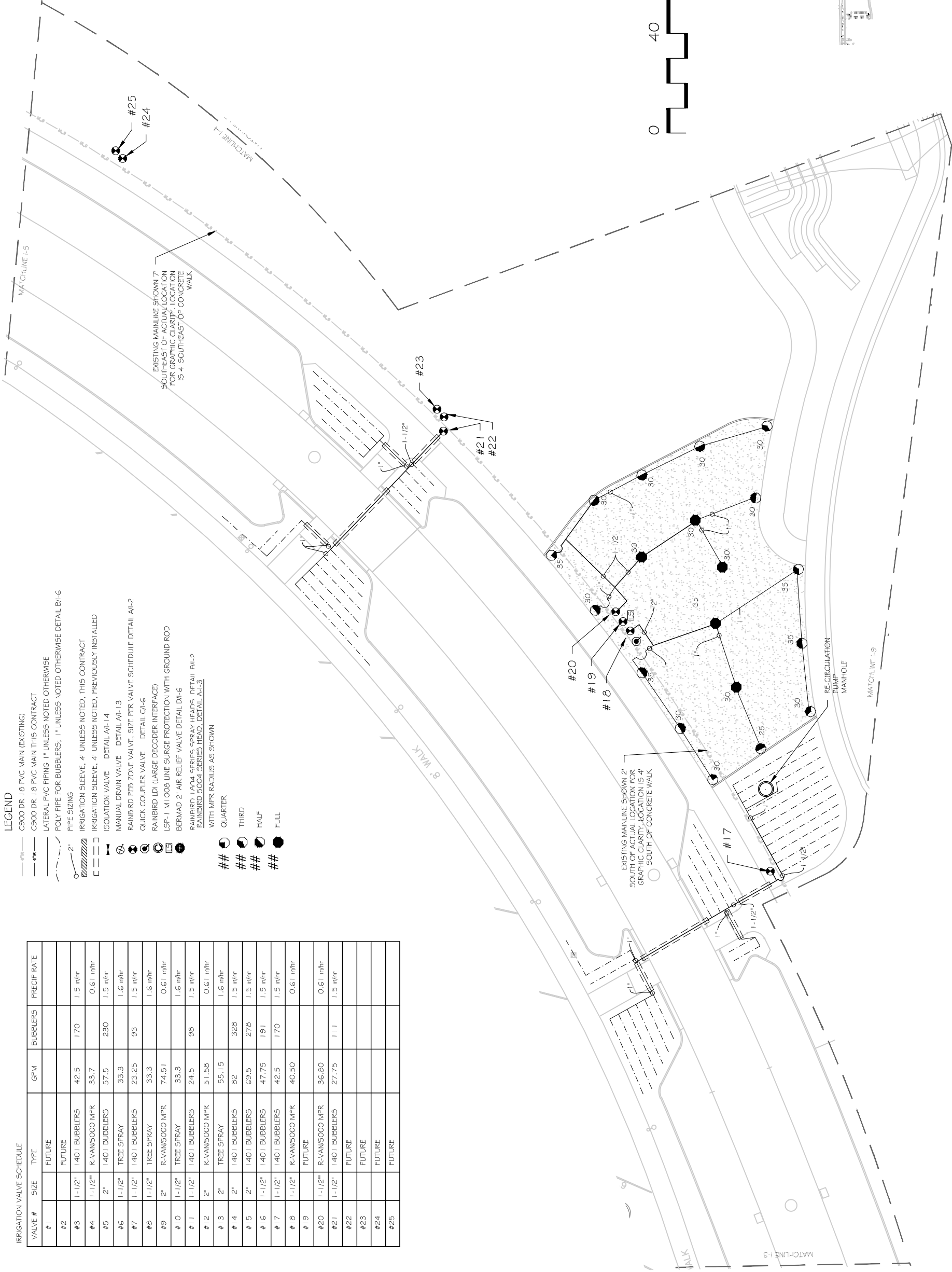
LAS COLONIAS BUSINESS PARK IRRIGATION PLAN

CIAYONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND LANDSCAPE ARCHITECTURE

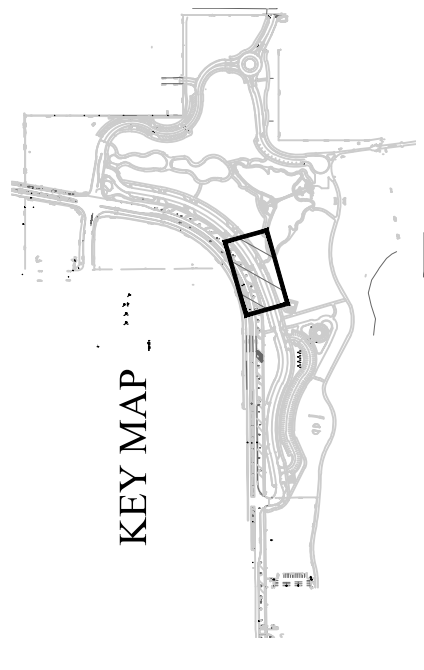
I-3
154

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#1		FUTURE			
#2		FUTURE			
#3	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#4	1-1/2"	R-VAN5000 MFR	33.7		0.61 in/hr
#5	2"	1401 BUBBLERS	57.5	230	1.5 in/hr
#6	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#7	1-1/2"	1401 BUBBLERS	23.25	93	1.5 in/hr
#8	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#9	2"	R-VAN5000 MFR	74.51		0.61 in/hr
#10	1-1/2"	TREE SPRAY	33.3		1.6 in/hr
#11	1-1/2"	1401 BUBBLERS	24.5	98	1.5 in/hr
#12	2"	R-VAN5000 MFR	51.58		0.61 in/hr
#13	2"	TREE SPRAY	55.15		1.6 in/hr
#14	2"	1401 BUBBLERS	82	328	1.5 in/hr
#15	2"	1401 BUBBLERS	69.5	278	1.5 in/hr
#16	1-1/2"	1401 BUBBLERS	47.75	191	1.5 in/hr
#17	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#18	1-1/2"	R-VAN5000 MFR	40.50		0.61 in/hr
#19		FUTURE			
#20	1-1/2"	R-VAN5000 MFR	36.80		0.61 in/hr
#21	1-1/2"	1401 BUBBLERS	27.75	111	1.5 in/hr
#22		FUTURE			
#23		FUTURE			
#24		FUTURE			
#25		FUTURE			

- LEGEND**
- C900 DR 18" PVC MAIN (EXISTING)
 - C900 DR 18" PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BM-6
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AI-14
 - MANUAL DRAIN VALVE DETAIL AI-13
 - RAINBIRD FIB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
 - QUICK COUPLER VALVE DETAIL CI-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - BERMAD 2" AIR RELIEF VALVE DETAIL DM-6
 - RAINBIRD 1404 SERIES SPRAY HEADS, DETAIL BM-2
 - RAINBIRD 5004 SERIES HEAD, DETAIL AI-13
 - WITH MFR RADIUS AS SHOWN
 - ## QUARTER
 - ## THIRD
 - ## HALF
 - ## FULL



KEY MAP



CLAYTON ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION	DATE	DESCRIPTION

DRAWN BY	CR	DATE	7/17/2018
DESIGNED BY	CR	DATE	7/17/2018
CHECKED BY	MH	DATE	7/17/2018
APPROVED BY	ZZ	DATE	2018

SCALE:	PLAN	1" = 20'
	REVISION	1" = 10'

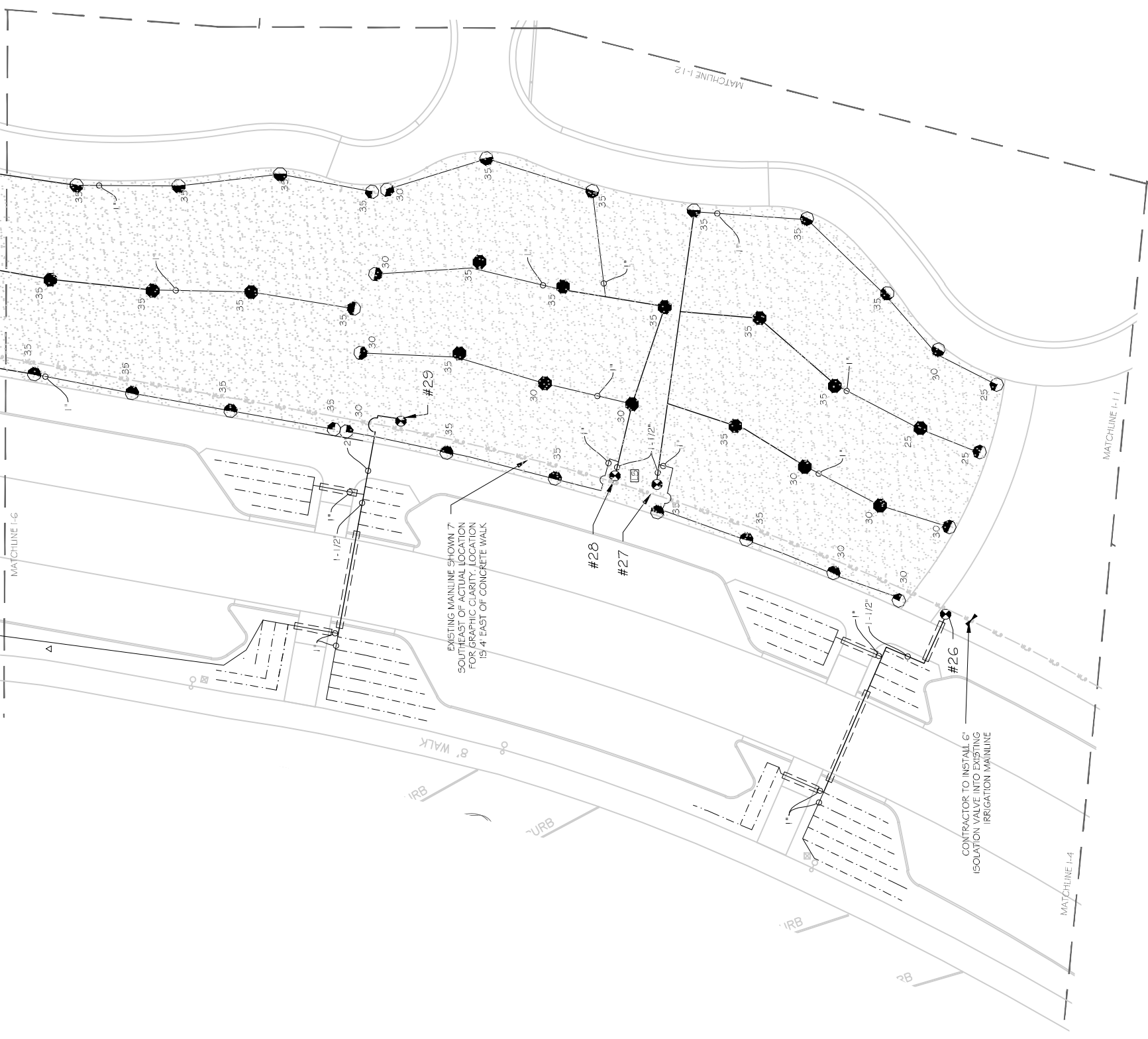
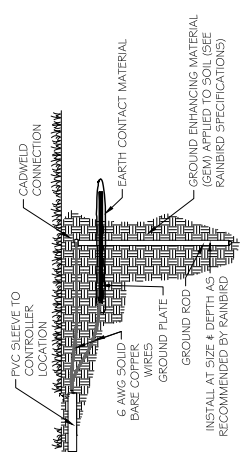


PUBLIC WORKS
ENGINEERING DIVISION

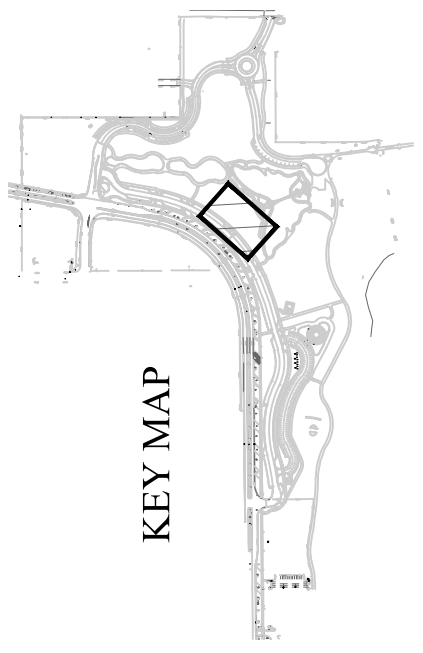
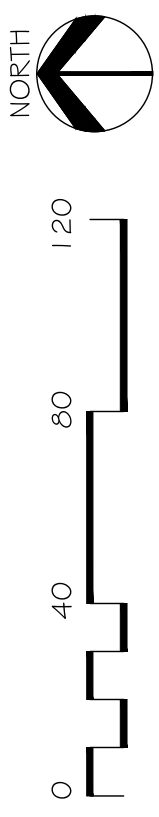
LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN

IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#26	1-1/2"	1401 BUBBLERS	28	112	1.5 in/hr
#27	2"	R-VAN5000 MFR	68.0		0.61 in/hr
#28	2"	R-VAN5000 MFR	62.3		0.61 in/hr
#29	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#30	2"	R-VAN5000 MFR	62.7		0.61 in/hr
#31	1-1/2"	R-VAN5000 MFR	44.3		0.61 in/hr
#32	2"	1401 BUBBLERS	64.25	257	1.5 in/hr
#33	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#34	2"	POND SUPPLY	100		
#35	1-1/2"	1401 BUBBLERS	33.25	133	1.5 in/hr
#36	1-1/2"	1401 BUBBLERS	38.25	153	1.5 in/hr
#37	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#38	2"	R-VAN5000 MFR	73.0		0.61 in/hr
#39	2"	R-VAN5000 MFR	80.2		0.61 in/hr
#40	2"	FUTURE	70.9		0.61 in/hr
#41	2"	R-VAN5000 MFR	74.5		0.61 in/hr
#42	2"	R-VAN5000 MFR	74.5		0.61 in/hr
#43	2"	R-VAN5000 MFR	74.7		0.61 in/hr
#44	2"	R-VAN5000 MFR	70.0		0.61 in/hr
#45	2"	R-VAN5000 MFR	61.4		0.61 in/hr
#46	2"	R-VAN5000 MFR	70.14		0.61 in/hr
#47		FUTURE			
#48		FUTURE			
#49	1-1/2"	1401 BUBBLERS	45.5	182	1.5 in/hr
#50	2"	6504 FALCON ROTOR	76.6		1.05 in/hr



- LEGEND**
- C900 DR 1.8 PVC MAIN (EXISTING)
 - C900 DR 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BH-6
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AH-14
 - MANUAL DRAIN VALVE DETAIL AH-13
 - RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AH-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - BERMAD 2" AIR RELIEF VALVE DETAIL DH-6
 - RAINBIRD 1804 SERIES SPRAY HEADS, DETAIL BH-2
 - WITH RAINBIRD SPRAY NOZZLE
 - 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 10 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - RAINBIRD 5004 SERIES HEAD, DETAIL AH-3
 - WITH MFR RADIUS AS SHOWN
 - QUARTER
 - THIRD
 - HALF
 - FULL

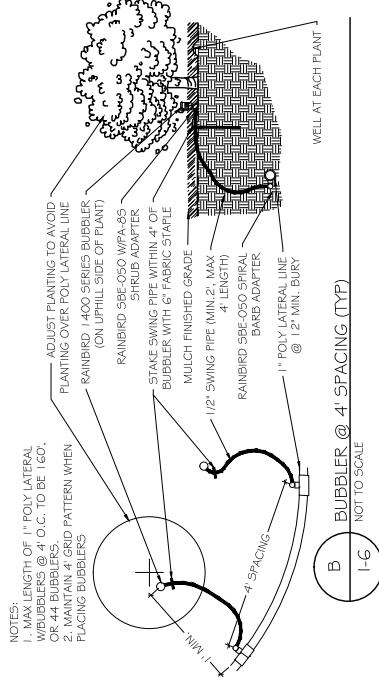
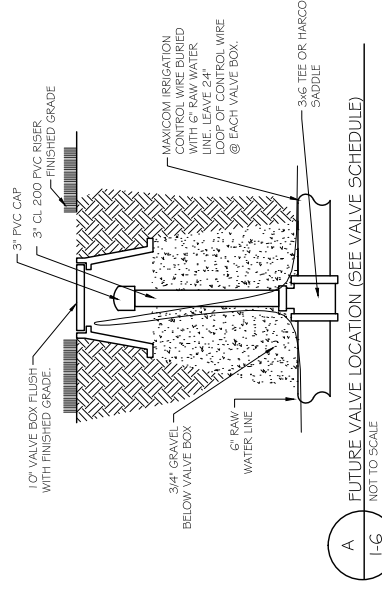


CIANNONE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

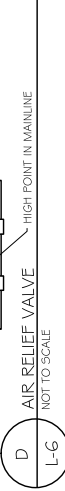
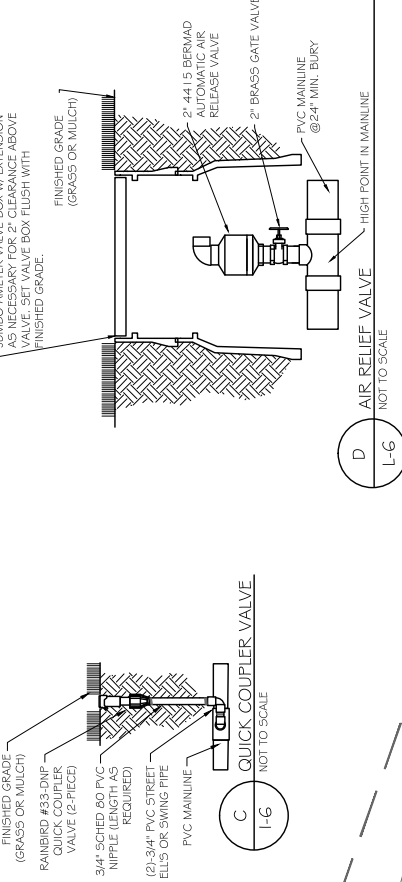
	PUBLIC WORKS ENGINEERING DIVISION	LAS COLONIAS BUSINESS PARK IRRIGATION PLAN	I-5 156
REVISION Δ REVISION Δ REVISION Δ REVISION Δ	DRAWN BY CR DESIGNED BY CR CHECKED BY MH APPROVED BY ZZ	DATE 7/7/2018 DATE 7/7/2018 DATE 7/7/2018 DATE 2018	SCALES: PLAN 1" = 20'

IRRIGATION VALVE SCHEDULE

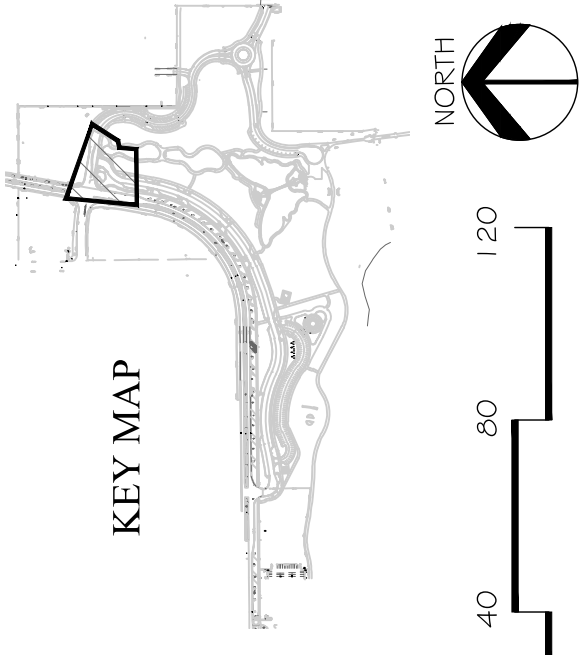
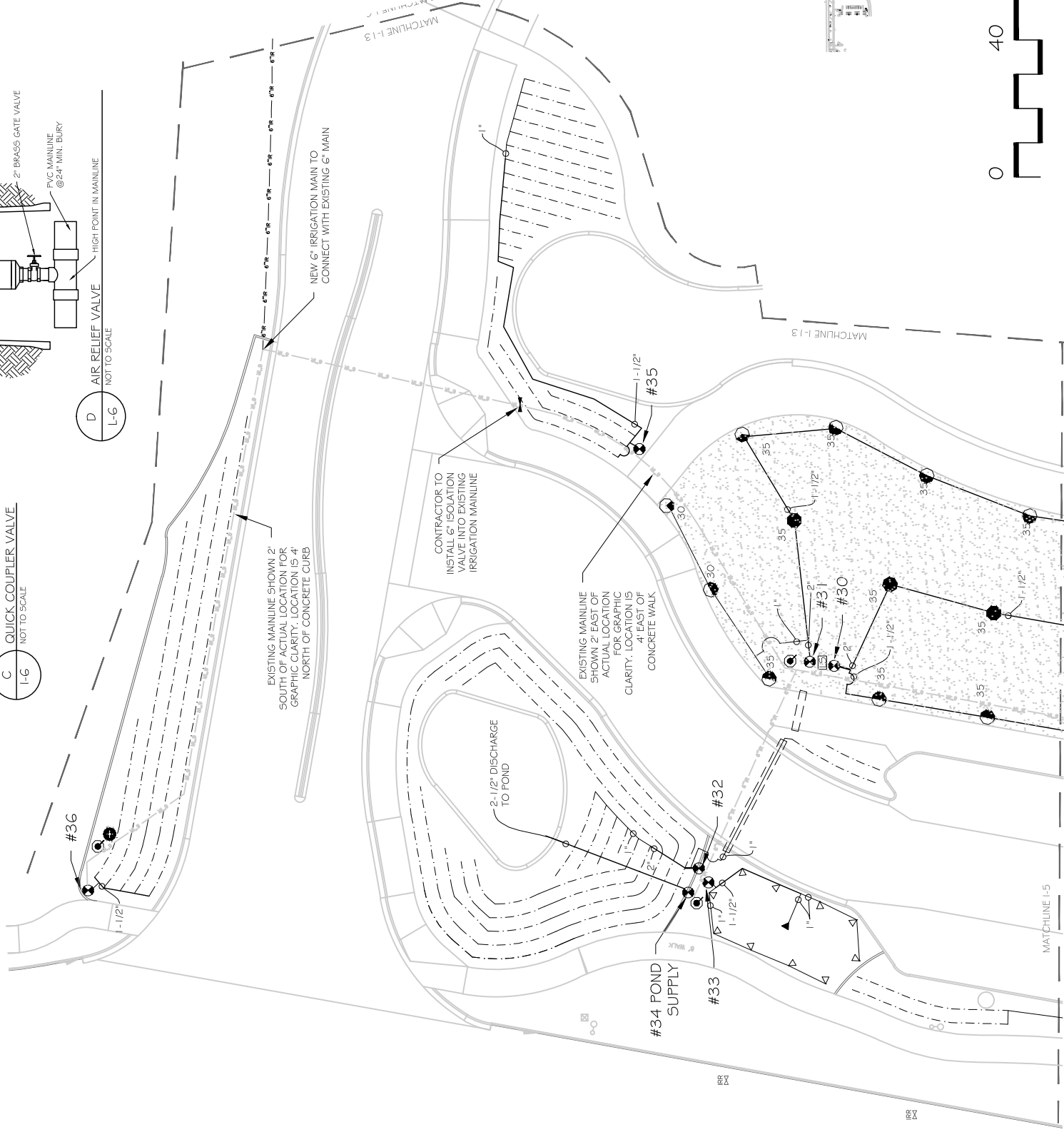
VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#26	1-1/2"	1401 BUBBLERS	28	112	1.5 in/hr
#27	2"	R-VAN5000 MPR	68.0		0.61 in/hr
#28	2"	R-VAN5000 MPR	62.3		0.61 in/hr
#29	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#30	2"	R-VAN5000 MPR	62.7		0.61 in/hr
#31	1-1/2"	R-VAN5000 MPR	44.3		0.61 in/hr
#32	2"	1401 BUBBLERS	64.25	257	1.5 in/hr
#33	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#34	2"	POND SUPPLY	100		
#35	1-1/2"	1401 BUBBLERS	33.25	133	1.5 in/hr
#36	1-1/2"	1401 BUBBLERS	38.25	153	1.5 in/hr
#37	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#38	2"	R-VAN5000 MPR	73.0		0.61 in/hr
#39	2"	R-VAN5000 MPR	80.2		0.61 in/hr
#40		FUTURE			
#41	2"	R-VAN5000 MPR	70.9		0.61 in/hr
#42	2"	R-VAN5000 MPR	74.5		0.61 in/hr
#43	2"	R-VAN5000 MPR	74.7		0.61 in/hr
#44	2"	R-VAN5000 MPR	70.0		0.61 in/hr
#45	2"	R-VAN5000 MPR	61.4		0.61 in/hr
#46	2"	R-VAN5000 MPR	70.14		0.61 in/hr
#47		FUTURE			
#48		FUTURE			
#49	1-1/2"	1401 BUBBLERS	45.5	182	1.5 in/hr
#50	2"	6504 FALCON ROTOR	76.6		1.05 in/hr



NOTES:
 1. MAX LENGTH OF 1\"/>



- LEGEND**
- C900 DR 1.8 PVC MAIN (EXISTING)
 - C900 DR 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1\"/>
 - POLY PIPE FOR BUBBLERS; 1\"/>
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4\"/>
 - ISOLATION VALVE DETAIL AI-14
 - MANUAL DRAIN VALVE DETAIL AI-13
 - RAINBIRD FEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - BERMAD 2\"/>
 - RAINBIRD 1804 SERIES SPRAY HEADS, DETAIL BI-2 WITH RAINBIRD SPRAY NOZZLE
 - 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG WITH MPR RADIUS AS SHOWN
 - RAINBIRD 5004 SERIES HEAD, DETAIL AI-1-3 WITH MPR RADIUS AS SHOWN
 - QUARTER
 - THIRD
 - HALF
 - FULL



REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

DRAWN BY CR DATE 7/7/2018

DESIGNED BY CR DATE 7/7/2018

CHECKED BY MH DATE 7/7/2018

APPROVED BY ZZ DATE 2018

SCALES: PLAN 1"=40'

HORIZONTAL 1"=80'

VERTICAL 1"=20'

Grand Junction
 COLORADO

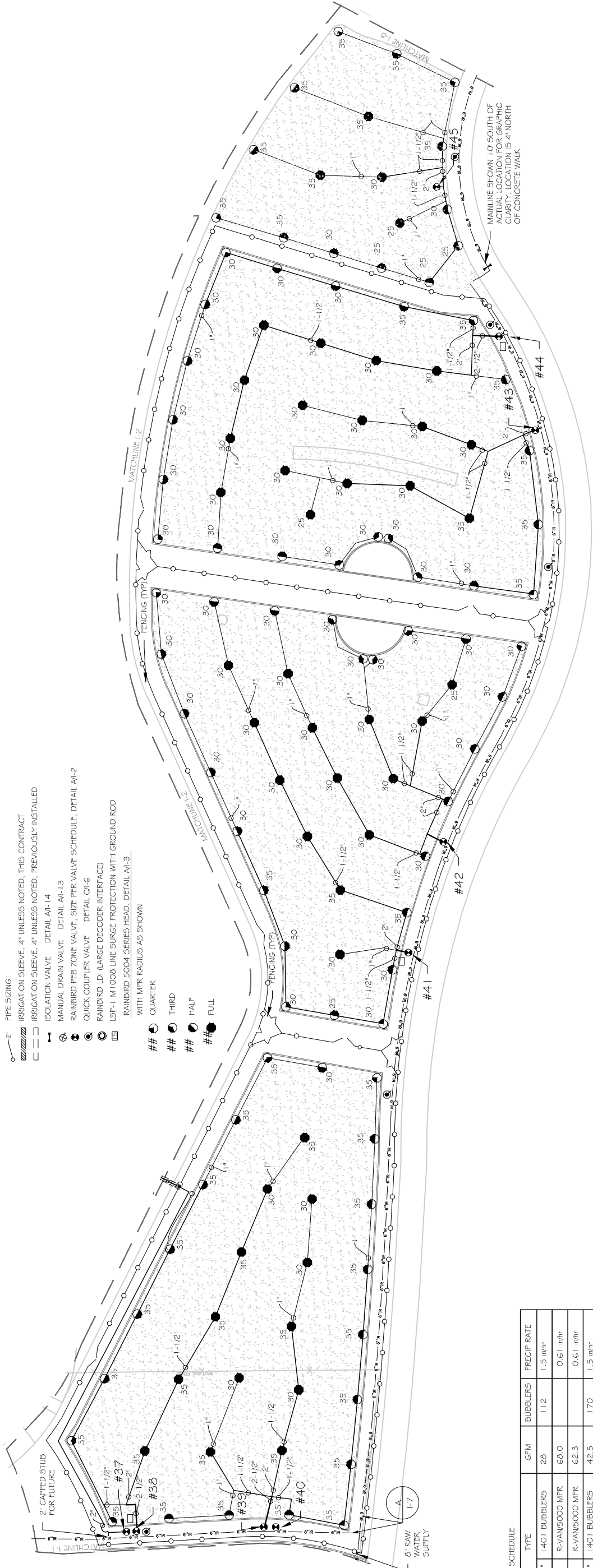
PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 IRRIGATION PLAN

1-6
157

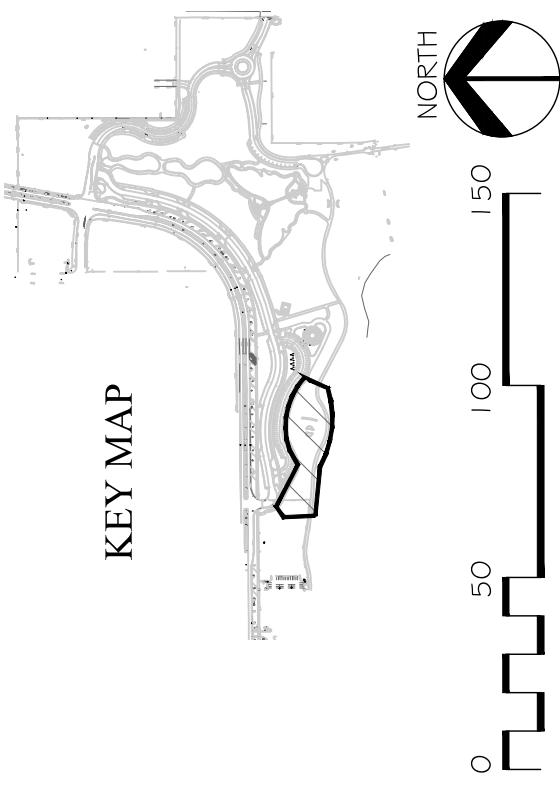
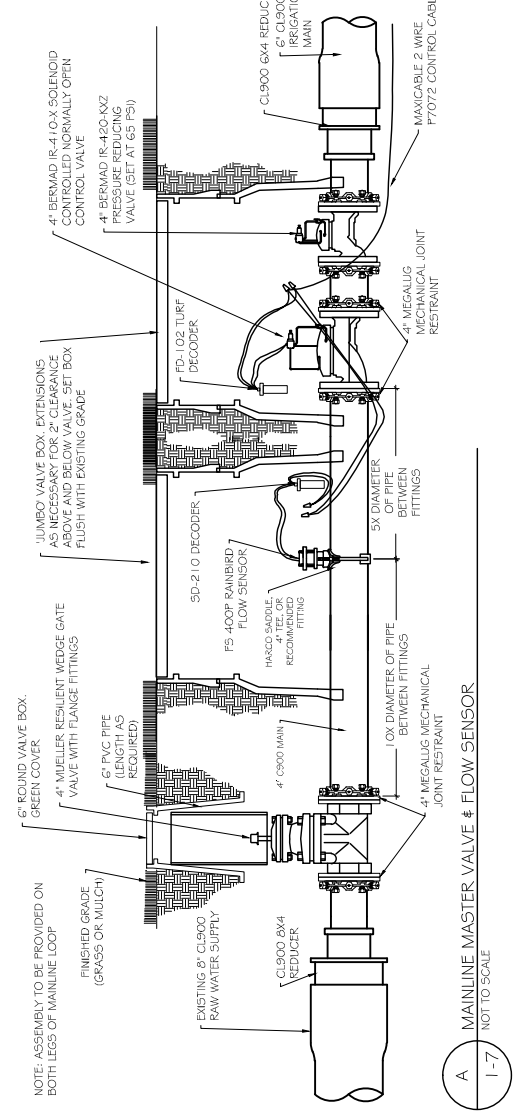
CAYONNE ROBERTS & ASSOCIATES, INC.
 LANDSCAPE ARCHITECTURE

- LEGEND**
- C900 DR 1.8 PVC MAIN (EXISTING)
 - C900 DR 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING - 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE, DETAIL BI-6
 - 2" PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AI-14
 - MANUAL DRAIN VALVE DETAIL AI-13
 - RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE, DETAIL AI-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LDI (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD WITH MFR RADIUS AS SHOWN
 - RAINBIRD 5004 SERIES HEAD, DETAIL AI-3
 - 2" CAPPED STUB FOR FUTURE
 - 8" RAW WATER SUPPLY
- ##** QUARTER
THIRD
HALF
FULL



IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#26	1-1/2"	140J BUBBLERS	28	112	1.5 in/hr
#27	2"	R-VAN5000 MFR	68.0		0.61 in/hr
#28	2"	R-VAN5000 MFR	62.3		0.61 in/hr
#29	1-1/2"	140J BUBBLERS	42.5	170	1.5 in/hr
#30	2"	R-VAN5000 MFR	62.7		0.61 in/hr
#31	1-1/2"	R-VAN5000 MFR	44.3		0.61 in/hr
#32	2"	140J BUBBLERS	64.25	257	1.5 in/hr
#33	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#34	2"	POND SUPPLY	100		
#35	1-1/2"	140J BUBBLERS	33.25	133	1.5 in/hr
#36	1-1/2"	140J BUBBLERS	38.25	153	1.5 in/hr
#37	1-1/2"	140J BUBBLERS	49.75	199	1.5 in/hr
#38	2"	R-VAN5000 MFR	73.0		0.61 in/hr
#39	2"	R-VAN5000 MFR	80.2		0.61 in/hr
#40		FUTURE			
#41	2"	R-VAN5000 MFR	70.9		0.61 in/hr
#42	2"	R-VAN5000 MFR	74.5		0.61 in/hr
#43	2"	R-VAN5000 MFR	74.7		0.61 in/hr
#44	2"	R-VAN5000 MFR	70.0		0.61 in/hr
#45	2"	R-VAN5000 MFR	61.4		0.61 in/hr
#46	2"	R-VAN5000 MFR	70.14		0.61 in/hr
#47		FUTURE			
#48		FUTURE			
#49	1-1/2"	140J BUBBLERS	45.5	182	1.5 in/hr
#50	2"	6504 FALCON ROTOR	76.6		1.05 in/hr



CLAVONNE, ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION

REVISION	DATE	DESCRIPTION

SCALES:

PLAN & PROFILE 1"=40'

A MAINLINE MASTER VALVE & FLOW SENSOR 1"=7'

CITY OF
Grand Junction
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

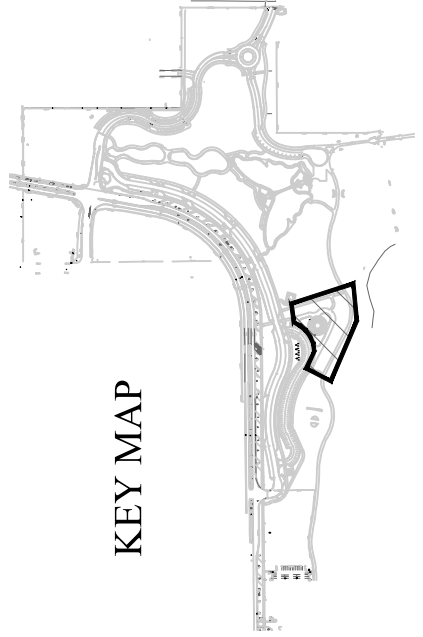
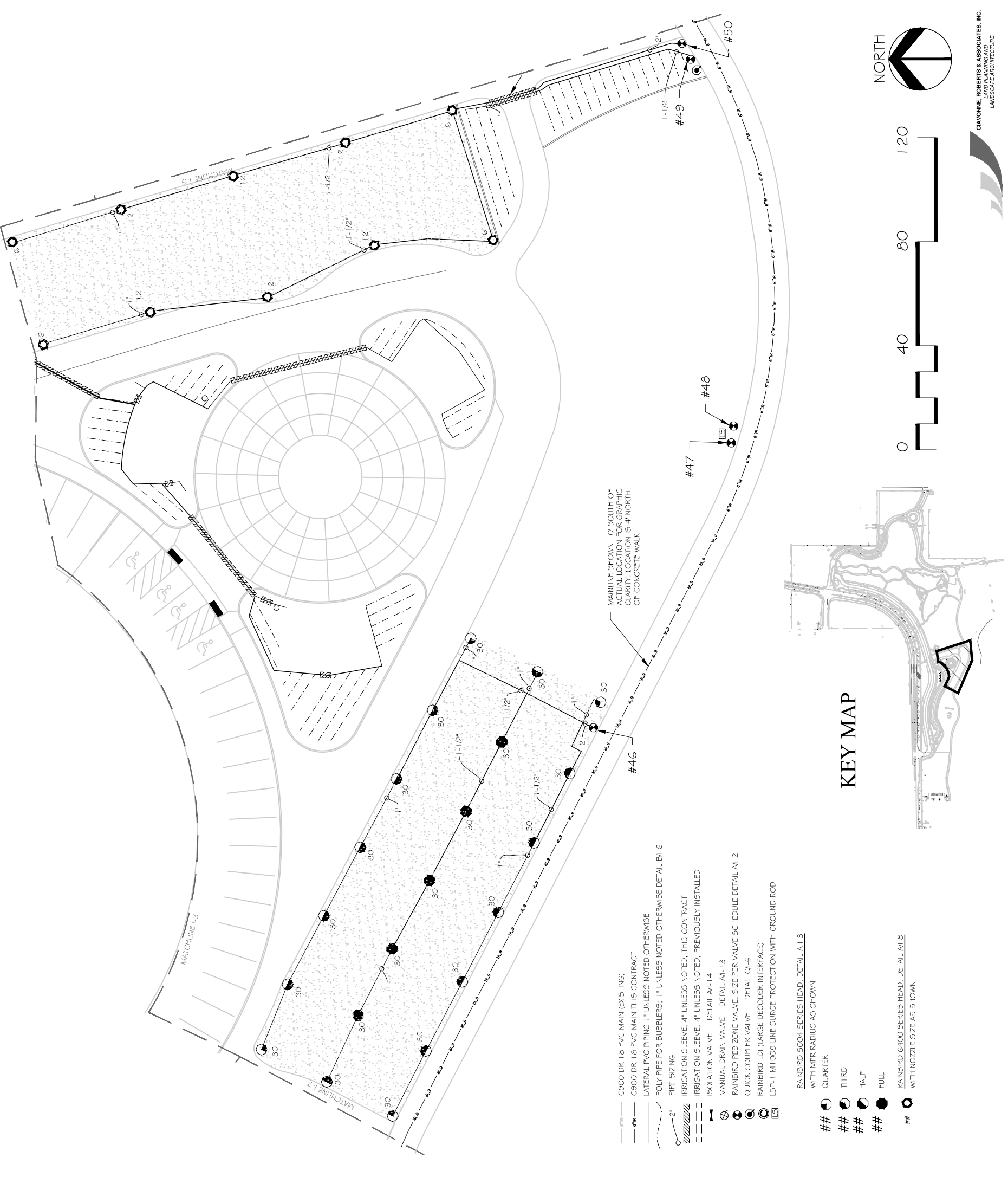
LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN

DRAWN BY MH
DATE 7/7/2018

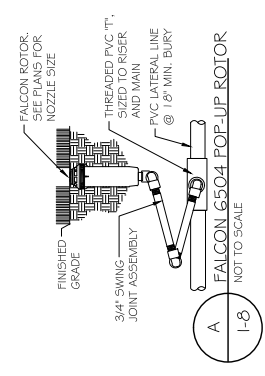
DESIGNED BY XX
DATE 7/7/2018

CHECKED BY YY
DATE 7/7/2018

APPROVED BY ZZ
DATE 2018



- 6\" C900 DR 1.8 PVC MAIN (EXISTING)
- 2\" C900 DR 1.8 PVC MAIN (THIS CONTRACT)
- 1\" LATERAL PVC PIPING, 1\" UNLESS NOTED OTHERWISE
- POLY PIPE FOR BUBBLERS; 1\" UNLESS NOTED OTHERWISE DETAIL BI-6
- PIPE SIZING
- IRIGATION SLEEVE, 4\" UNLESS NOTED, THIS CONTRACT
- ISOLATION VALVE DETAIL AI-13
- MANUAL DRAIN VALVE DETAIL AI-14
- RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
- QUICK COUPLER VALVE DETAIL CI-6
- RAINBIRD LD1 (LARGE DECODER INTERFACE)
- 15P-1 M1 008 LINE SURGE PROTECTION WITH GROUND ROD
- RAINBIRD 5004 SERIES HEAD, DETAIL AI-3 WITH MFR RADIUS AS SHOWN
- QUARTER
- THIRD
- HALF
- FULL
- RAINBIRD 6400 SERIES HEAD, DETAIL AI-8 WITH NOZZLE SIZE AS SHOWN



IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#26	1-1/2"	1401 BUBBLERS	28	112	1.5 in/hr
#27	2"	R-VAN5000 MFR	68.0		0.61 in/hr
#28	2"	R-VAN5000 MFR	62.3		0.61 in/hr
#29	1-1/2"	1401 BUBBLERS	42.5	170	1.5 in/hr
#30	2"	R-VAN5000 MFR	62.7		0.61 in/hr
#31	1-1/2"	R-VAN5000 MFR	44.3		0.61 in/hr
#32	2"	1401 BUBBLERS	64.25	257	1.5 in/hr
#33	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#34	2"	FOND SUPPLY	100		
#35	1-1/2"	1401 BUBBLERS	33.25	133	1.5 in/hr
#36	1-1/2"	1401 BUBBLERS	36.25	153	1.5 in/hr
#37	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#38	2"	R-VAN5000 MFR	73.0		0.61 in/hr
#39	2"	R-VAN5000 MFR	80.2		0.61 in/hr
#40		FUTURE			
#41	2"	R-VAN5000 MFR	70.9		0.61 in/hr
#42	2"	R-VAN5000 MFR	74.5		0.61 in/hr
#43	2"	R-VAN5000 MFR	74.7		0.61 in/hr
#44	2"	R-VAN5000 MFR	70.0		0.61 in/hr
#45	2"	R-VAN5000 MFR	61.4		0.61 in/hr
#46	2"	R-VAN5000 MFR	70.14		0.61 in/hr
#47		FUTURE			
#48		FUTURE			
#49	1-1/2"	1401 BUBBLERS	45.5	182	1.5 in/hr
#50	2"	6504 FALCON ROTOR	76.6		1.05 in/hr

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

REVISION Δ _____ DATE _____

DESCRIPTION _____ DATE _____

DRAWN BY _____ MH _____ DATE 7/7/2018

DESIGNED BY _____ XX _____ DATE 7/7/2018

CHECKED BY _____ YY _____ DATE 7/7/2018

APPROVED BY _____ ZZ _____ DATE 2018

SCALES: PLAN & PROFILE 1" = 10' HORIZONTAL

CITY OF **Grand Junction** COLORADO

PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK IRRIGATION PLAN

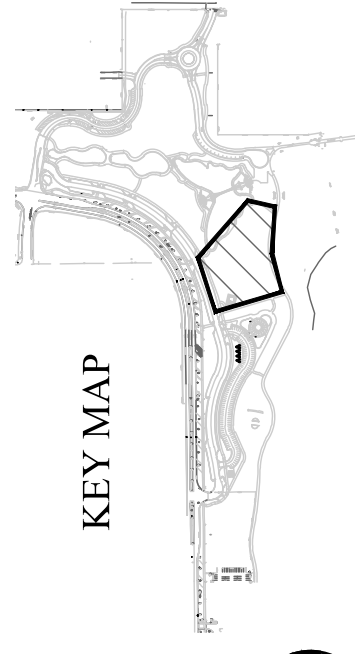
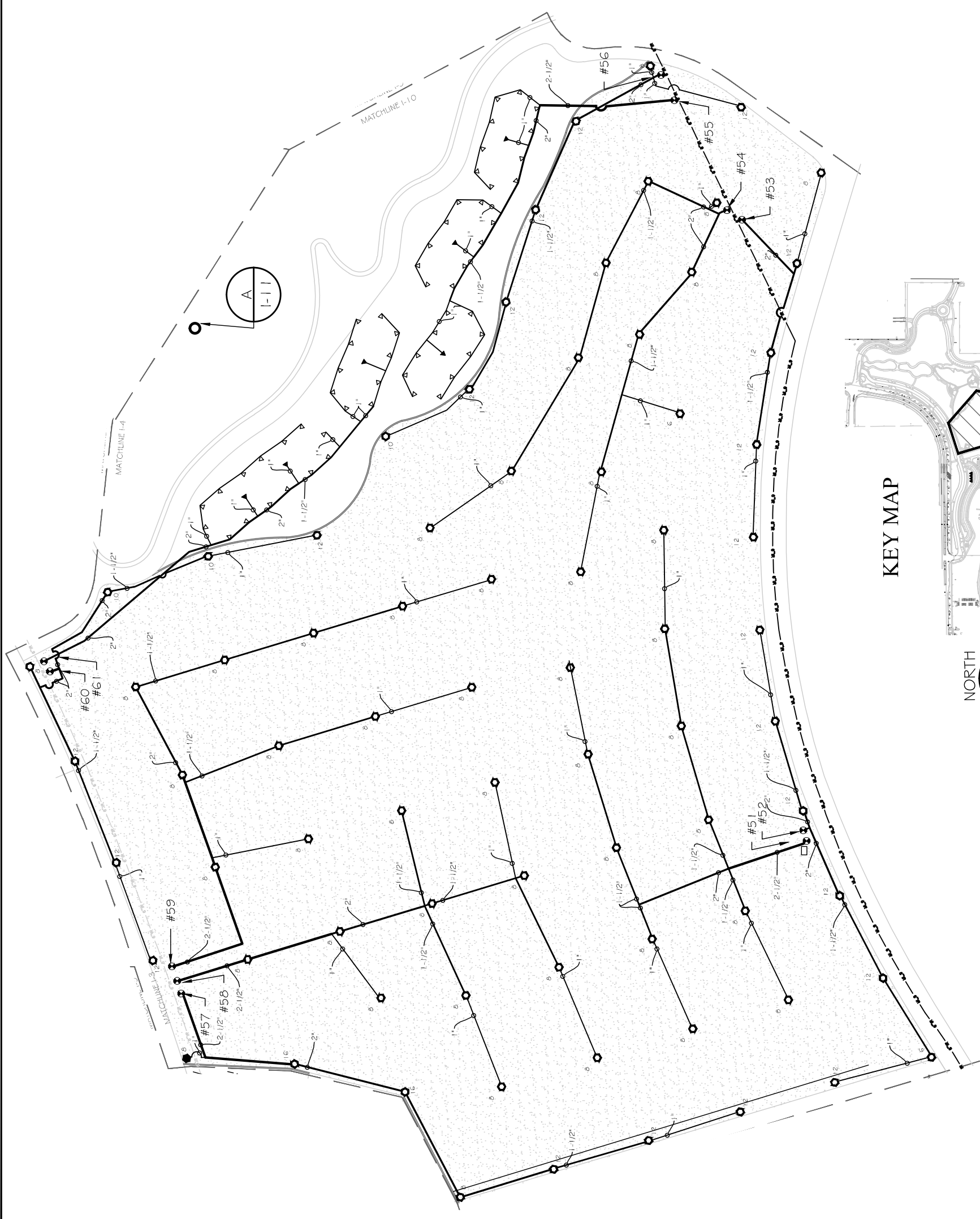
I-8 159

GAYVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND LANDSCAPE ARCHITECTURE

IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#51	2"	6504 FALCON ROTOR	81.5		.35 in/hr
#52	2"	6504 FALCON ROTOR	71.5		.78 in/hr
#53	2"	6504 FALCON ROTOR	51.4		.78 in/hr
#54	2"	6504 FALCON ROTOR	79.5		.35 in/hr
#55	2"	TREE SPRAY	66.6		1.6 in/hr
#56	2"	6504 FALCON ROTOR	60.5		.78 in/hr
#57	2"	6504 FALCON ROTOR	76.4		1.0 in/hr
#58	2"	6504 FALCON ROTOR	81.4		.35 in/hr
#59	2"	6504 FALCON ROTOR	81.4		.35 in/hr
#60	2"	6504 FALCON ROTOR	78.7		.78 in/hr
#61	2"	TREE SPRAY	55.5		1.6 in/hr
#62	2"	R-VAN/5000 MFR	59.3		0.61 in/hr
#63	1-1/2"	R-VAN/5000 MFR	42.8		0.61 in/hr
#64	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#65	2"	1401 BUBBLERS	73.75	295	1.5 in/hr
#66	2"	6504 FALCON ROTOR	91.0		.70 in/hr
#67	2"	6504 FALCON ROTOR	91.0		.70 in/hr

- LEGEND**
- 6" C900 DR. 1.8 PVC MAIN (EXISTING)
 - 6" C900 DR. 1.8 PVC MAIN THIS CONTRACT
 - LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
 - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE, DETAIL BI-6
 - PIPE SIZING
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
 - IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
 - ISOLATION VALVE DETAIL AI-14
 - MANUAL DRAIN VALVE DETAIL AI-13
 - RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE, DETAIL AI-2
 - QUICK COUPLER VALVE DETAIL CH-6
 - RAINBIRD LD1 (LARGE DECODER INTERFACE)
 - LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
 - RAINBIRD 1.804 SERIES SPRAY HEADS, DETAIL BI-2
 - WITH RAINBIRD SPRAY NOZZLE
 - ▲ 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
 - ▲ 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
 - RAINBIRD 6400 SERIES HEAD
 - WITH NOZZLE SIZE AS SHOWN



REVISION Δ REVISION Δ REVISION Δ REVISION Δ	DRAWN BY MH DESIGNED BY XY CHECKED BY YZ APPROVED BY ZZ	DATE DATE DATE DATE	7-7-2018 7-7-2018 7-7-2018 2018	SCALES: PLAN & PROFILE 1" = 100'	CITY OF Grand Junction COLORADO	PUBLIC WORKS ENGINEERING DIVISION	LAS COLONIAS BUSINESS PARK IRRIGATION PLAN	I-9 160
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CAVONNE ROBERTS & ASSOCIATES, INC.
 LAND PLANNING AND
 LANDSCAPE ARCHITECTURE

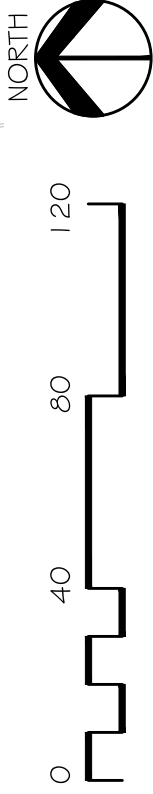
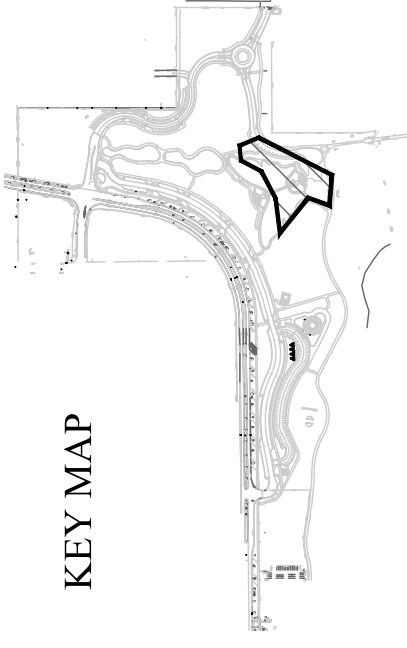
IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#51	2"	6504 FALCON ROTOR	81.5		.35 in/hr
#52	2"	6504 FALCON ROTOR	71.5		.78 in/hr
#53	2"	6504 FALCON ROTOR	51.4		.78 in/hr
#54	2"	6504 FALCON ROTOR	79.5		.35 in/hr
#55	2"	TREE SPRAY	66.6		1.6 in/hr
#56	2"	6504 FALCON ROTOR	60.5		.78 in/hr
#57	2"	6504 FALCON ROTOR	76.4		1.0 in/hr
#58	2"	6504 FALCON ROTOR	81.4		.35 in/hr
#59	2"	6504 FALCON ROTOR	81.4		.35 in/hr
#60	2"	6504 FALCON ROTOR	78.7		.78 in/hr
#61	2"	TREE SPRAY	55.5		1.6 in/hr
#62	2"	R-VAN5000 MFR	59.3		0.61 in/hr
#63	1-1/2"	R-VAN5000 MFR	42.8		0.61 in/hr
#64	1-1/2"	TREE SPRAY	22.2		1.6 in/hr
#65	2"	1401 BUBBLERS	73.75	295	1.5 in/hr
#66	2"	6504 FALCON ROTOR	91.0		.70 in/hr
#67	2"	6504 FALCON ROTOR	91.0		.70 in/hr

LEGEND

- C900 DR. 1.8 PVC MAIN (EXISTING)
- C900 DR. 1.8 PVC MAIN THIS CONTRACT
- LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
- POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BH-6
- PIPE SIZING
- IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
- IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
- ISOLATION VALVE DETAIL AI-14
- MANUAL DRAIN VALVE DETAIL AI-13
- RAINBIRD FIB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
- QUICK COUPLER VALVE DETAIL CH-6
- RAINBIRD LDI (LARGE DECODER INTERFACE)
- LSP-1 MI 008 LINE SURGE PROTECTION WITH GROUND ROD
- BERMAD 2" AIR RELIEF VALVE DETAIL DI-6
- RAINBIRD 5004 SERIES HEAD, DETAIL AI-3 WITH MPR RADIUS AS SHOWN
- RAINBIRD 6400 SERIES HEAD, DETAIL AI-8 WITH NOZZLE SIZE AS SHOWN
- ## QUARTER
- ## THIRD
- ## HALF
- ## FULL
- ## WITH MPR RADIUS AS SHOWN
- ## WITH NOZZLE SIZE AS SHOWN

KEY MAP



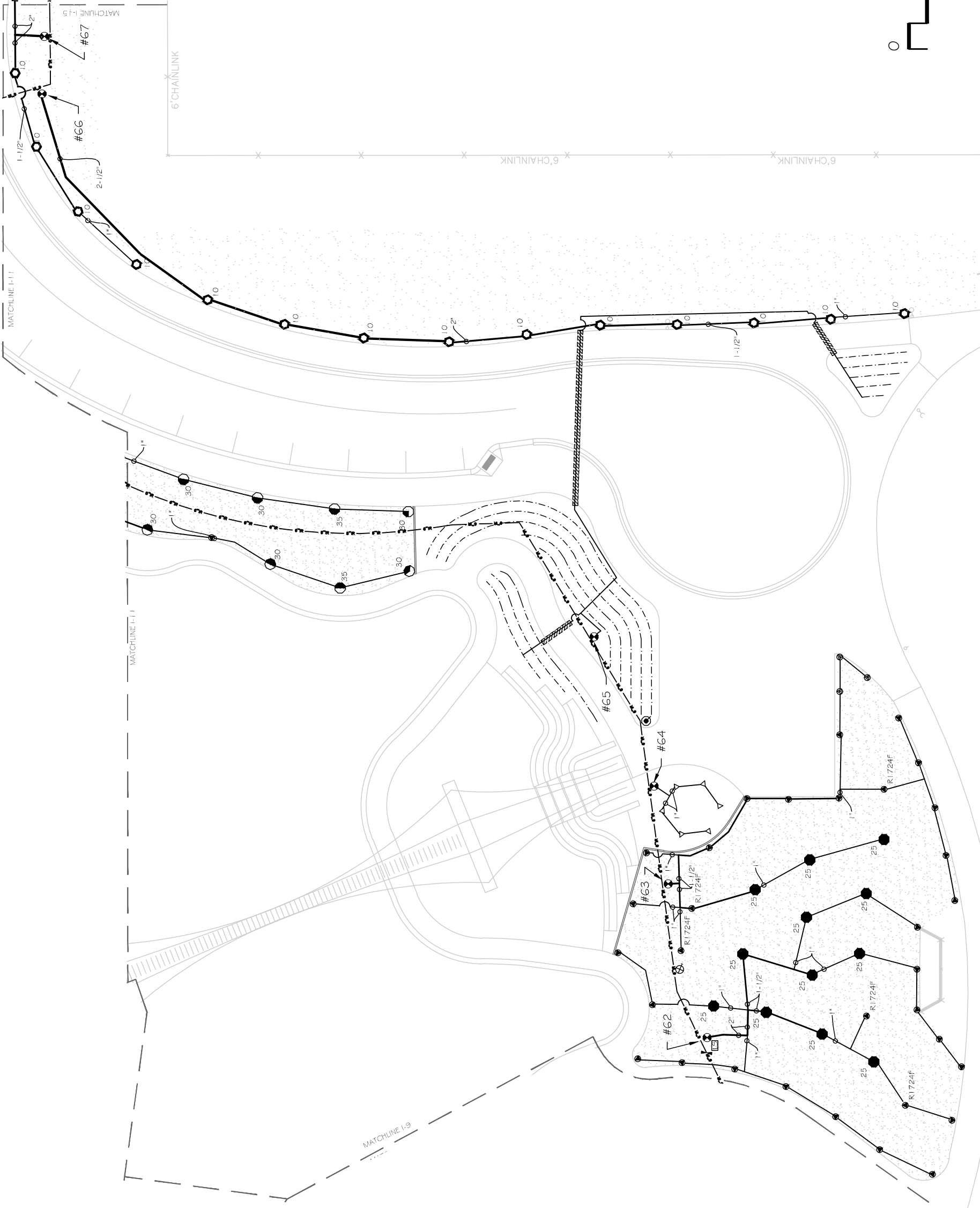
GIANNONE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

PUBLIC WORKS
ENGINEERING DIVISION

CITY OF
Grand Junction
COLORADO

LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN

I-10
161



REVISION	DATE	DESCRIPTION

DRAWN BY	MH	DATE	7-7-2018
DESIGNED BY	XX	DATE	7-7-2018
CHECKED BY	YY	DATE	7-7-2018
APPROVED BY	ZZ	DATE	2018

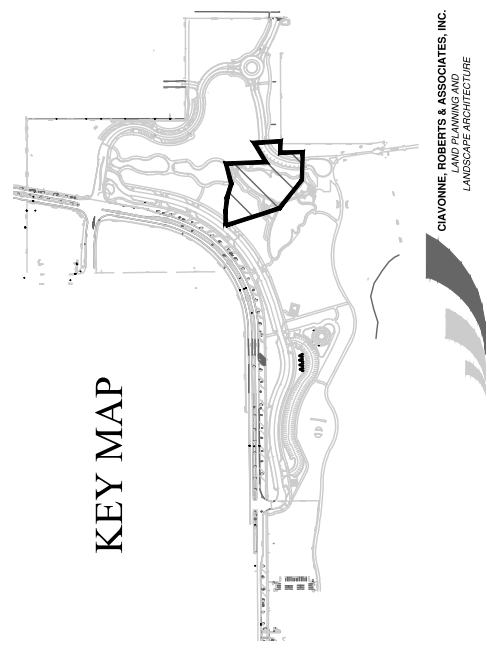
SCALES:	PLAN & PROFILE

IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#66	2"	R-VAN5000 MFR	51.2		0.61 in/hr
#69	1-1/2"	1401 BUBBLERS	33.75	135	1.5 in/hr
#70		FUTURE			
#71		FUTURE			
#72	1-1/2"	6504 FALCON ROTOR	49.7		.31 in/hr
#73	2"	6504 FALCON ROTOR	86.3		.58 in/hr
#74	1-1/2"	6504 FALCON ROTOR	34.9		.33 in/hr
#75	2"	6504 FALCON ROTOR	75.3		.58 in/hr
#76	1-1/2"	1401 BUBBLERS	42.0	168	1.5 in/hr
#77	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#78	2"	TREE SPRAY	65.6		1.6 in/hr
#79	2"	TREE SPRAY	55.5		1.6 in/hr
#80	1-1/2"	R-VAN5000 MFR	25.4		0.61 in/hr
#81	2"	6504 FALCON ROTOR	96.5		.70 in/hr
#82	2"	1401 BUBBLERS	60.75	243	1.5 in/hr
#83	2"	1401 BUBBLERS	66.0	264	1.5 in/hr

LEGEND

- C900 DR 1.8 PVC MAIN (EXISTING)
- C900 DR 1.8 PVC MAIN THIS CONTRACT
- LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
- POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BM-6
- PIPE SIZING
- IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
- IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
- ISOLATION VALVE DETAIL AM-14
- MANUAL DRAIN VALVE DETAIL AM-13
- RAINBIRD FIB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AM-2
- QUICK COUPLER VALVE DETAIL CH-6
- RAINBIRD LDI (LARGE DECODER INTERFACE)
- LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
- BERMAD 2" AIR RELIEF VALVE DETAIL DIH-6
- WITH RAINBIRD R-VAN ROTARY NOZZLE
- R-VAN 14
- R-VAN 18
- R13184
- R-VAN 13-1.8 FULL CIRCLE
- R-VAN 1724
- R17244
- R-VAN 17-24 FULL CIRCLE
- RAINBIRD 5004 SERIES HEAD, DETAIL AH-3 WITH MFR RADIUS AS SHOWN
- QUARTER
- THIRD
- HALF
- FULL



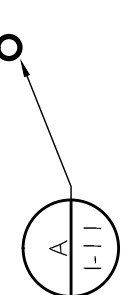
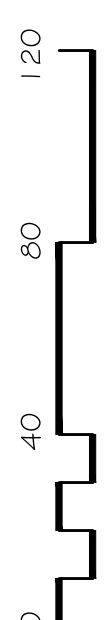
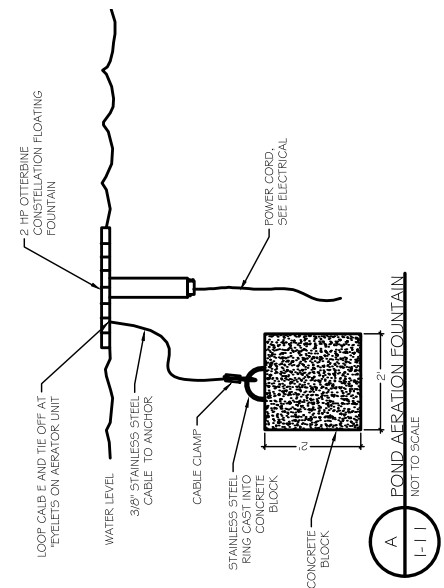
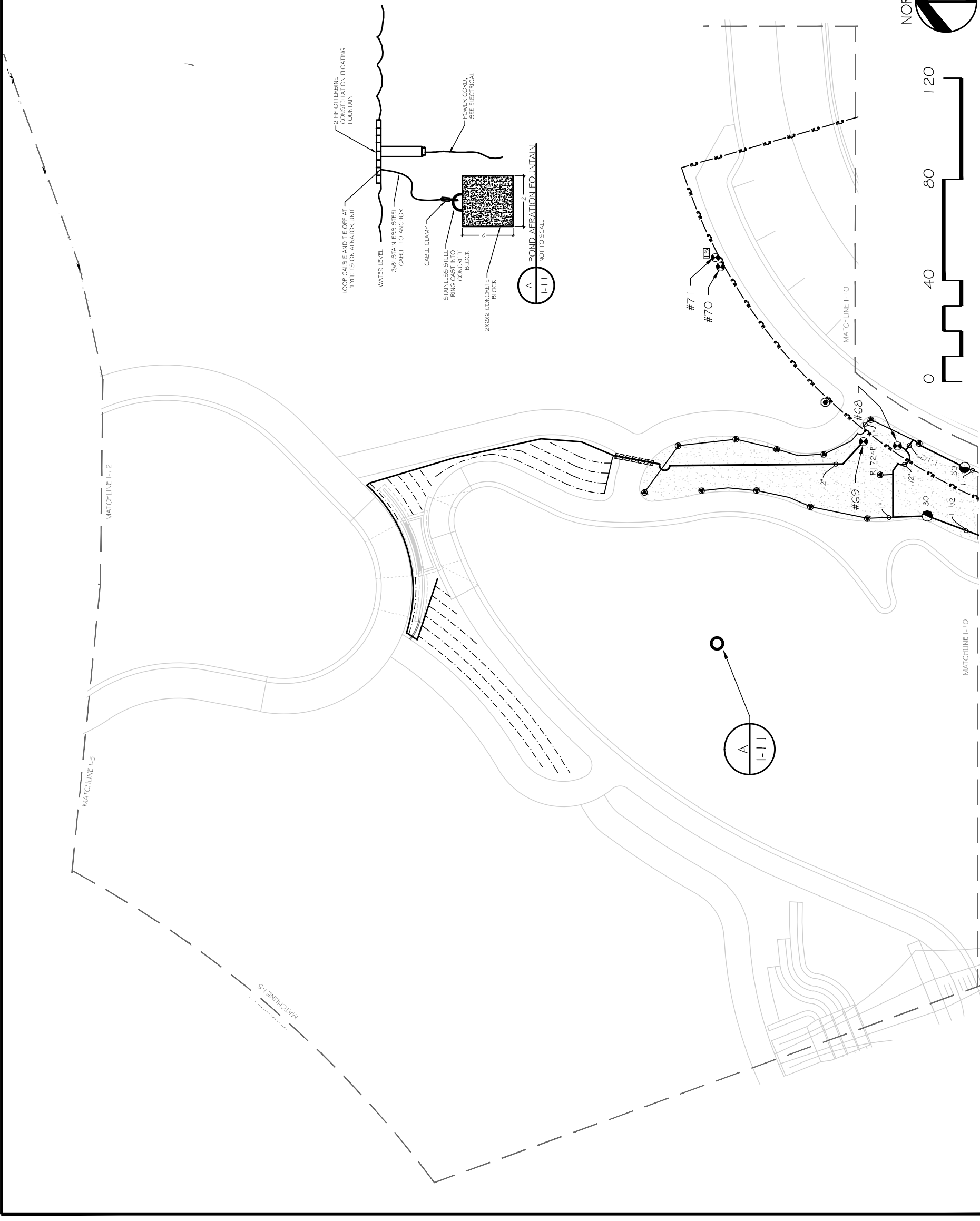
KEY MAP

GIANNONE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION	DATE	DESCRIPTION

DATE	DATE	DATE	DATE
7/7/2018	7/7/2018	7/7/2018	2018

SCALE	SCALE
PLAN & PROFILE HORIZONTAL 1" = 30'	



MATCHLINE I-10

MATCHLINE I-12

MATCHLINE I-5

MATCHLINE I-5

DATE	DATE	DATE	DATE
7/7/2018	7/7/2018	7/7/2018	2018

SCALE	SCALE
PLAN & PROFILE HORIZONTAL 1" = 30'	

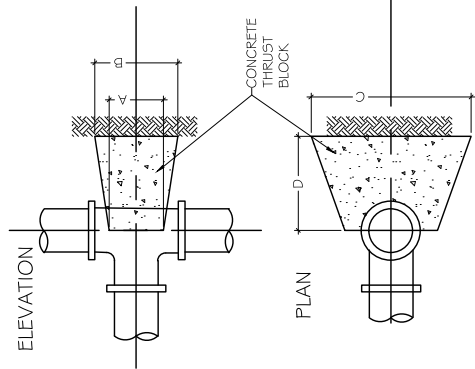
REVISION	DATE	DESCRIPTION

SCALE	SCALE
PLAN & PROFILE HORIZONTAL 1" = 30'	

1. DO NOT POUR CONCRETE THRUST BLOCK OVER PIPE, ONLY OVER FITTINGS
2. BEARING SURFACE OF THRUST BLOCKS TO BEAR ON UNDISTURBED SOIL ONLY. OVER EXCAVATION WILL REQUIRE REINFORCING BARS TO BE SHOWN
3. THRUST BLOCKS SHOWN ARE MINIMUM SIZES.

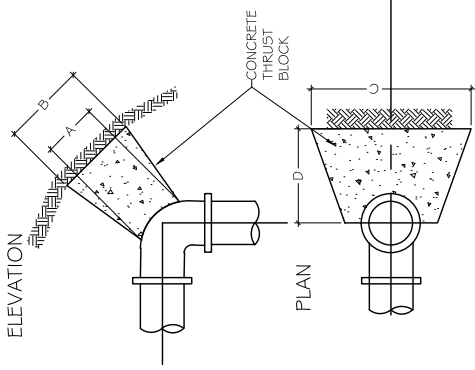
MINIMUM THRUST BLOCK AREA

SIZE	TEE CAP, 90° EL.	60° EL. 11.5° EL.
2"	1.91"	0.5 91"
3"	1.91"	0.5 91"
4"	1.5 91"	1.5 91"
5"	2.5 91"	1.5 91"



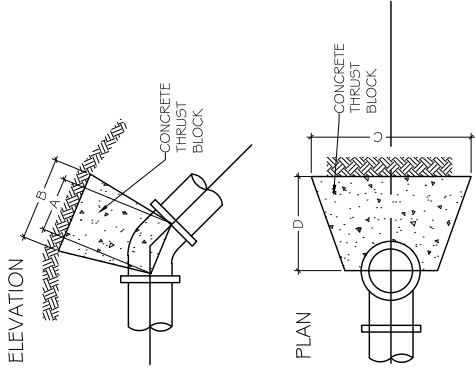
SIZE	2"	3-4"	6"	8"
A	5"	7.5"	12"	12"
B	9"	20"	20"	33"
C	20"	20"	20"	33"
D	13"	13"	13"	21"

A THRUST BLOCK, PVC TEE
1-12 NOT TO SCALE



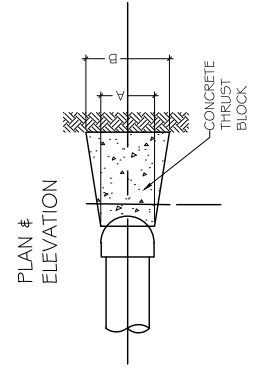
SIZE	2"	3-4"	6"	8"
A	5"	6"	12"	12"
B	9"	10"	24"	32"
C	20"	20"	20"	33"
D	13"	13"	13"	21"

B THRUST BLOCK, PVC 90° ELBOW
1-12 NOT TO SCALE



SIZE	2"	3-4"	6"	8"
A	5"	6"	12"	12"
B	9"	10"	24"	32"
C	20"	20"	20"	33"
D	13"	13"	13"	21"

C THRUST BLOCK, PVC 11.5°-60° ELBOW
1-12 NOT TO SCALE



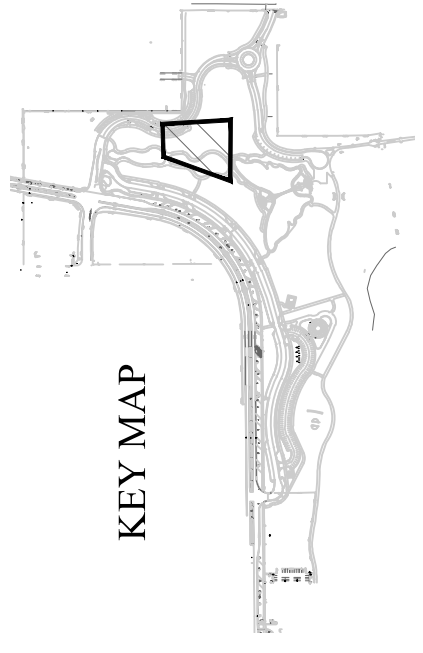
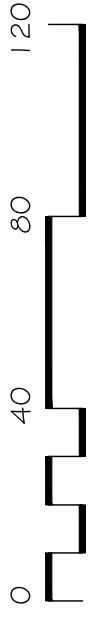
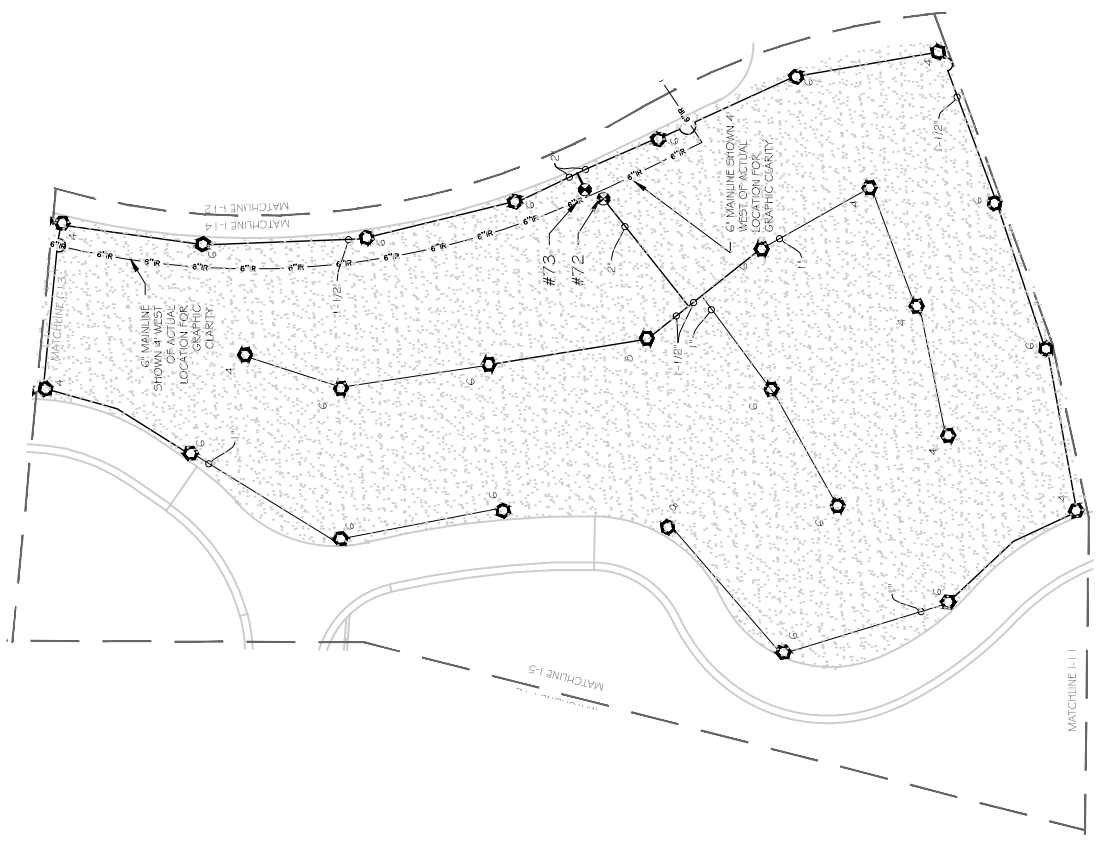
SIZE	2"	3-4"	6"	8"
A	12"	12"	12"	12"
B	12"	14"	20"	27"
C	20"	20"	20"	33"
D	13"	13"	13"	21"

D THRUST BLOCK, PVC CAP
1-12 NOT TO SCALE

IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#68	2"	R-VAN5000 MFR	511.2		0.61 in/hr
#69	1-1/2"	1401 BUBBLERS	33.75	135	1.5 in/hr
#70		FUTURE			
#71		FUTURE			
#72	1-1/2"	6504 FALCON ROTOR	49.7		.31 in/hr
#73	2"	6504 FALCON ROTOR	86.3		.58 in/hr
#74	1-1/2"	6504 FALCON ROTOR	34.9		.33 in/hr
#75	2"	6504 FALCON ROTOR	75.3		.58 in/hr
#76	1-1/2"	1401 BUBBLERS	42.0	168	1.5 in/hr
#77	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#78	2"	TREE SPRAY	65.6		1.6 in/hr
#79	2"	TREE SPRAY	55.5		1.6 in/hr
#80	1-1/2"	R-VAN5000 MFR	25.4		0.61 in/hr
#81	2"	6504 FALCON ROTOR	96.5		.70 in/hr
#82	2"	1401 BUBBLERS	60.75	243	1.5 in/hr
#83	2"	1401 BUBBLERS	66.0	264	1.5 in/hr

- 6"Ø C900 DR 1.8 PVC MAIN (EXISTING)
- 6"Ø DR 1.8 PVC MAIN THIS CONTRACT
- LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
- POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BH-6
- PIPE SIZING
- IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
- ISOLATION VALVE DETAIL AI-14
- MANUAL DRAIN VALVE DETAIL AI-13
- RAINBIRD PEB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
- QUICK COUPLER VALVE DETAIL CH-6
- RAINBIRD LD1 (LARGE DECODER INTERFACE)
- LSP-J M1008 LINE SURGE PROTECTION WITH GROUND ROD
- BERMAD 2" AIR RELIEF VALVE DETAIL DI-6
- RAINBIRD 5004 SERIES HEAD, DETAIL AI-L3
- WITH MFR RADIUS AS SHOWN
- QUARTER
- THIRD
- HALF
- FULL
- RAINBIRD 6400 SERIES HEAD, DETAIL AI-L8
- WITH NOZZLE SIZE AS SHOWN



KEY MAP

GIAVONNE ROBERTS & ASSOCIATES, INC.
LANDSCAPE ARCHITECTURE

REVISION	DATE	DESCRIPTION

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

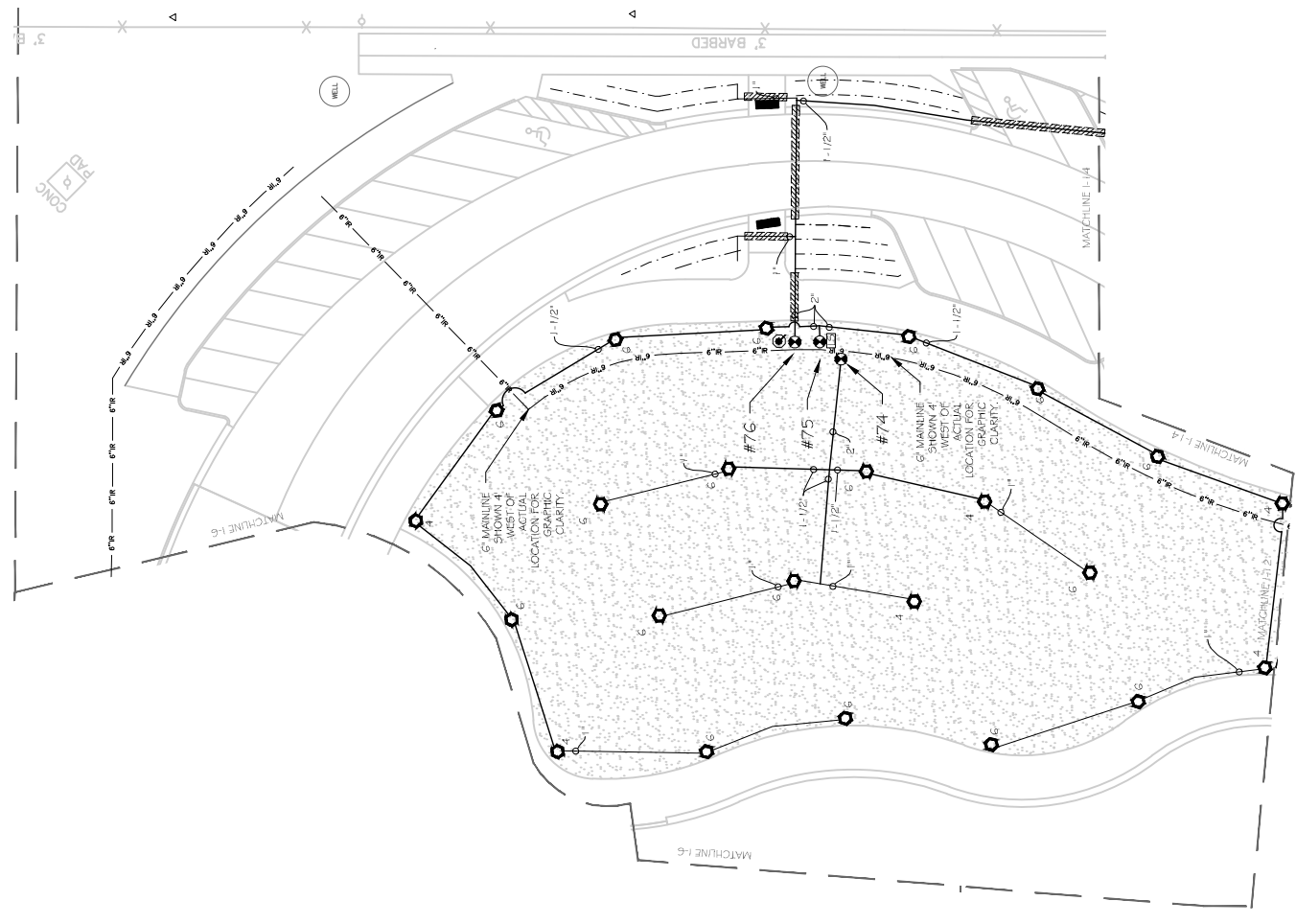
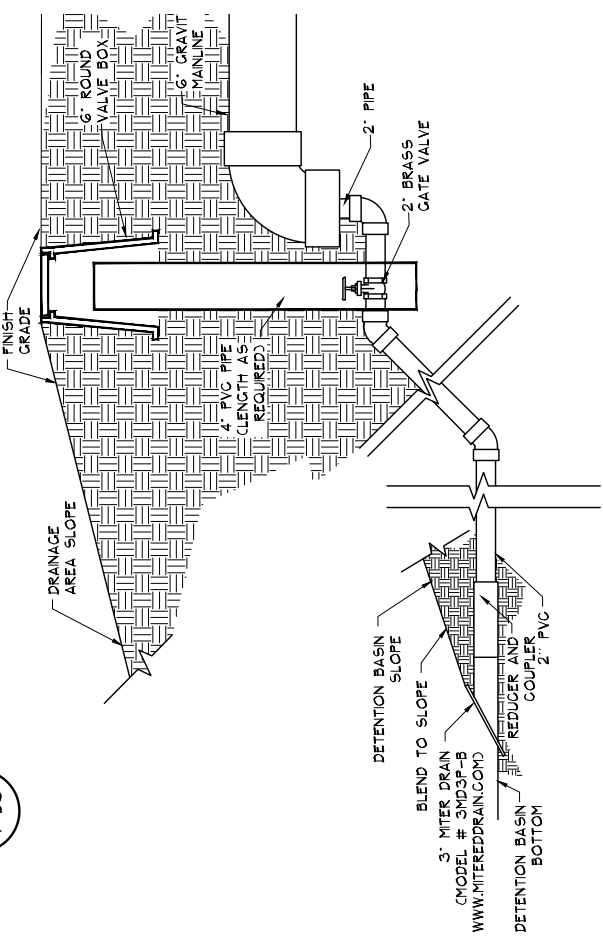
SCALE	DATE



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN

A
I-13
GRAVITY MAINLINE DRAIN
NOT TO SCALE



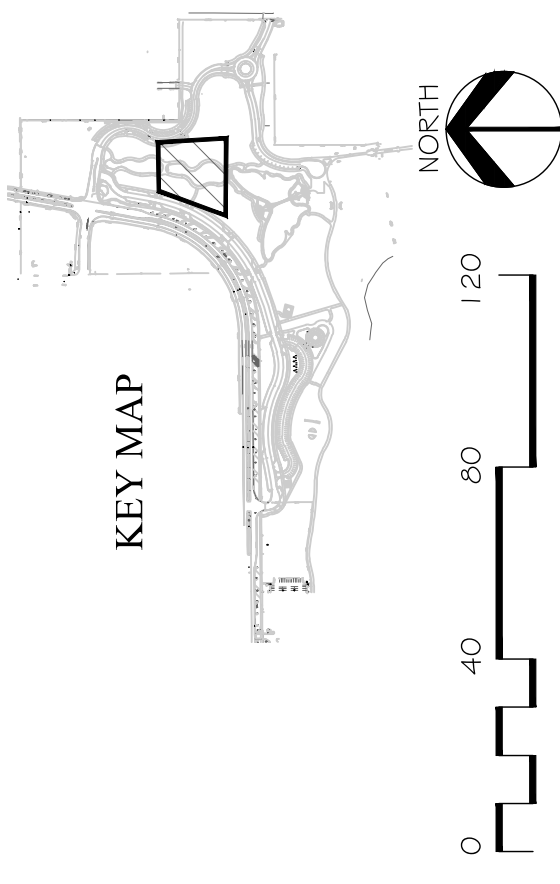
IRRIGATION VALVE SCHEDULE

VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#68	2"	R-VAN5000 MFR	51.2		0.61 in/hr
#69	1-1/2"	1401 BUBBLERS	33.75	135	1.5 in/hr
#70		FUTURE			
#71		FUTURE			
#72	1-1/2"	6504 FALCON ROTOR	49.7		.31 in/hr
#73	2"	6504 FALCON ROTOR	86.3		.58 in/hr
#74	1-1/2"	6504 FALCON ROTOR	34.9		.33 in/hr
#75	2"	6504 FALCON ROTOR	75.3		.58 in/hr
#76	1-1/2"	1401 BUBBLERS	42.0	168	1.5 in/hr
#77	1-1/2"	1401 BUBBLERS	49.75	199	1.5 in/hr
#78	2"	TREE SPRAY	65.6		1.6 in/hr
#79	2"	TREE SPRAY	55.5		1.6 in/hr
#80	1-1/2"	R-VAN5000 MFR	25.4		0.61 in/hr
#81	2"	6504 FALCON ROTOR	96.5		.70 in/hr
#82	2"	1401 BUBBLERS	60.75	243	1.5 in/hr
#83	2"	1401 BUBBLERS	66.0	264	1.5 in/hr

LEGEND

- 6" DR 1.8 PVC MAIN (EXISTING)
- 6" DR 1.8 PVC MAIN THIS CONTRACT
- LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
- FOLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL B/I-6
- PIPE SIZING
- IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
- IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
- ISOLATION VALVE DETAIL A/I-14
- MANUAL DRAIN VALVE DETAIL A/I-13
- RAINBIRD FIB ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL A/I-2
- QUICK COUPLER VALVE DETAIL C/I-6
- RAINBIRD LDI (LARGE DECODER INTERFACE)
- LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
- BERMAD 2" AIR RELIEF VALVE DETAIL D/I-6
- RAINBIRD 6400 SERIES HEAD, DETAIL A/I-8 WITH NOZZLE SIZE AS SHOWN

KEY MAP



CIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	SCALE



PUBLIC WORKS
ENGINEERING DIVISION

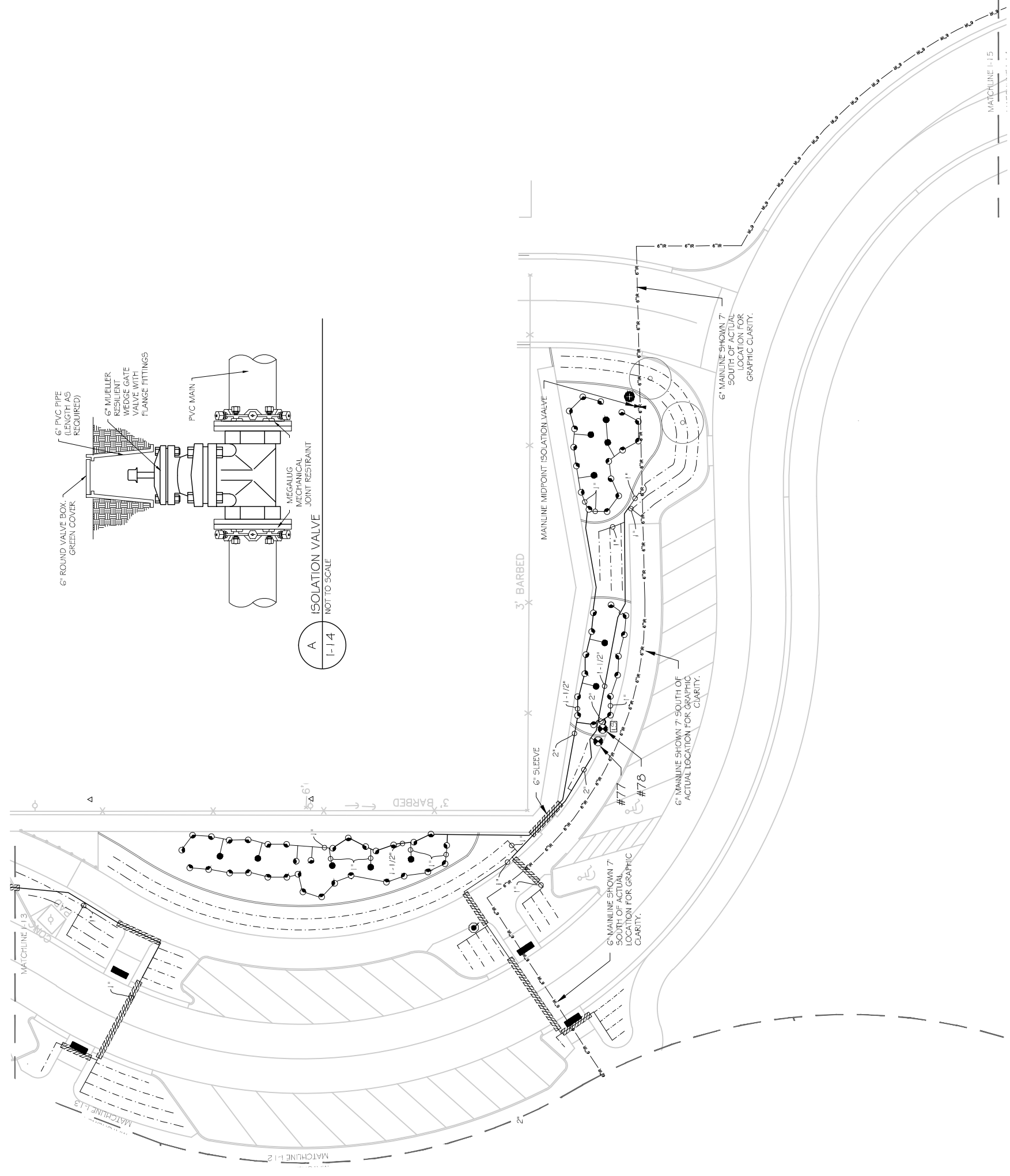
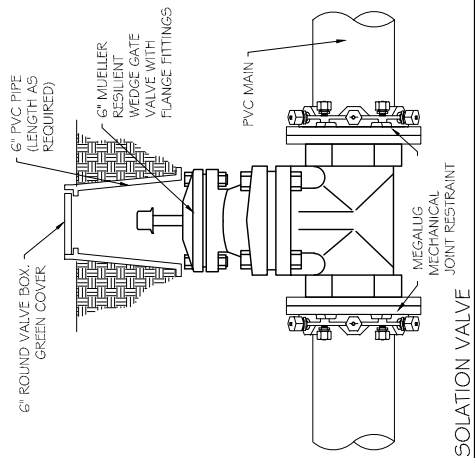
LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN
I-13
164

IRRIGATION VALVE SCHEDULE

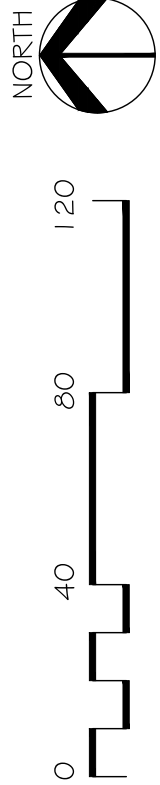
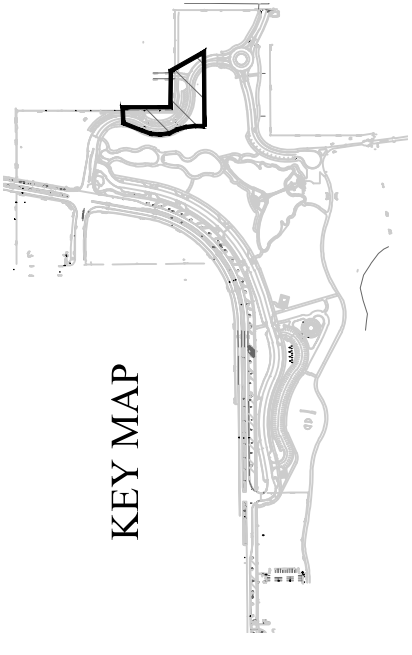
VALVE #	SIZE	TYPE	GPM	BUBBLERS	PRECIP RATE
#68	2"	R-VAN5000 MFR	51.2		0.61 in/hr
#69	1-1/2"	140J BUBBLERS	33.75	135	1.5 in/hr
#70		FUTURE			
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#72	1-1/2"	6504 FALCON ROTOR	49.7		.31 in/hr
#73	2"	6504 FALCON ROTOR	86.3		.58 in/hr
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#76	1-1/2"	140J BUBBLERS	42.0	168	1.5 in/hr
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#78	2"	TREE SPRAY	65.6		1.6 in/hr
#79	2"	TREE SPRAY	55.5		1.6 in/hr
#80	1-1/2"	R-VAN5000 MFR	25.4		0.61 in/hr
#81	2"	6504 FALCON ROTOR	96.5		.70 in/hr
#82	2"	140J BUBBLERS	60.75	243	1.5 in/hr
#83	2"	140J BUBBLERS	66.0	264	1.5 in/hr

LEGEND

- 6" DR 18 PVC MAIN (EXISTING)
- 6" DR 18 PVC MAIN THIS CONTRACT
- LATERAL PVC PIPING 1" UNLESS NOTED OTHERWISE
- - - POLY PIPE FOR BUBBLERS; 1" UNLESS NOTED OTHERWISE DETAIL BI-6
- 2" PIPE SIZING
- IRRIGATION SLEEVE, 4" UNLESS NOTED, THIS CONTRACT
- IRRIGATION SLEEVE, 4" UNLESS NOTED, PREVIOUSLY INSTALLED
- ISOLATION VALVE DETAIL AI-14
- ⊗ MANUAL DRAIN VALVE DETAIL AI-13
- ⊗ RAINBIRD PED ZONE VALVE, SIZE PER VALVE SCHEDULE DETAIL AI-2
- ⊗ QUICK COUPLER VALVE DETAIL CH-6
- ⊗ RAINBIRD LDI (LARGE DECODER INTERFACE)
- ⊗ LSP-1 M1008 LINE SURGE PROTECTION WITH GROUND ROD
- ⊗ BERMAD 2" AIR RELIEF VALVE DETAIL DI-6
- ⊗ RAINBIRD 1604 SERIES SPRAY HEADS, DETAIL BI-2 WITH RAINBIRD SPRAY NOZZLE
- ▲ 15 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
- △ 15 SERIES VAN SPRAY NOZZLE SET TO 120 DEG
- 10 SERIES VAN SPRAY NOZZLE SET TO 360 DEG
- 10 SERIES VAN SPRAY NOZZLE SET TO 120 DEG



KEY MAP



CAYONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION	DATE	DESCRIPTION
△		
△		
△		
△		

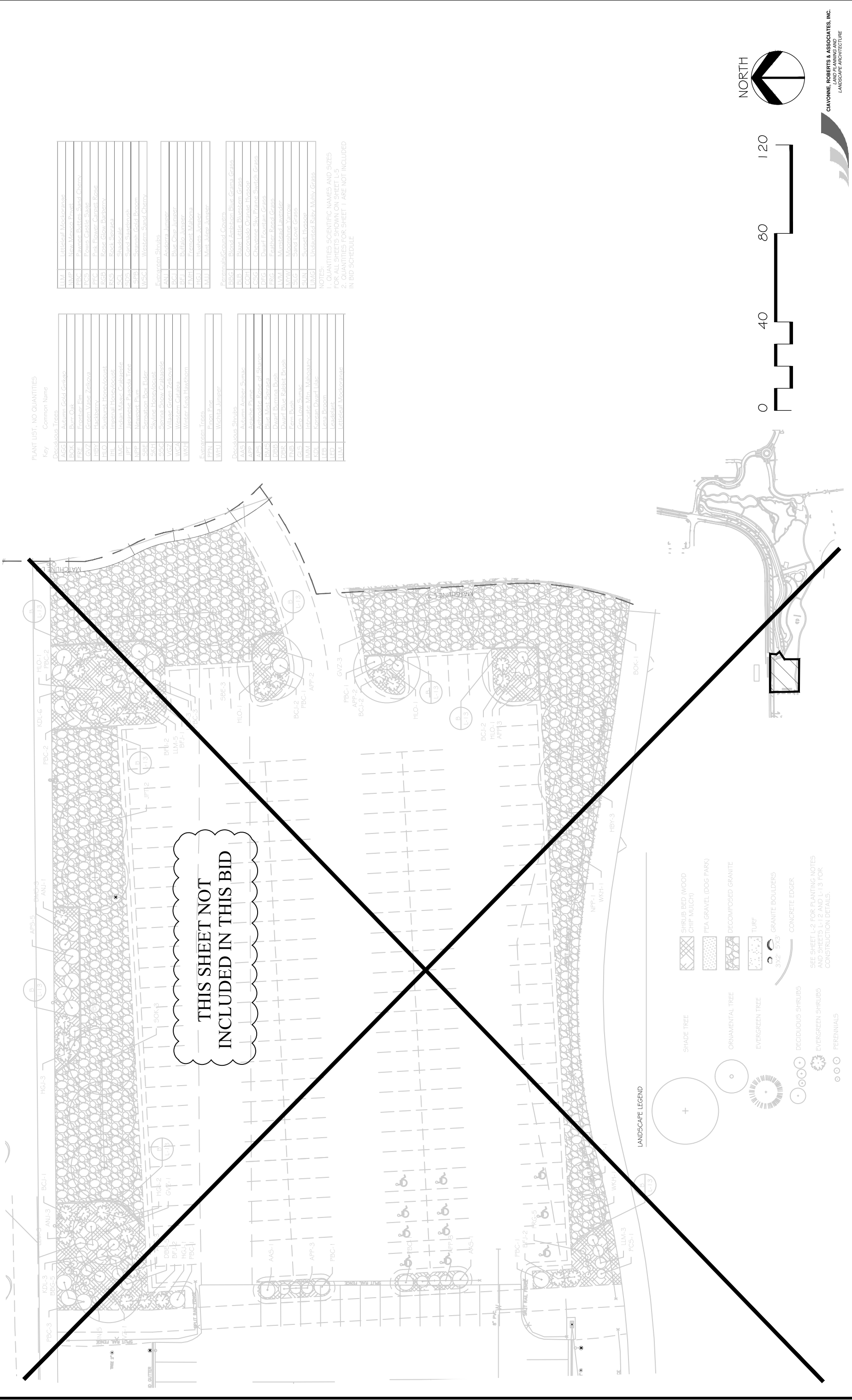
DRAWN BY	MH	DATE	7/7/2018
DESIGNED BY	XX	DATE	7/7/2018
CHECKED BY	YY	DATE	7/7/2018
APPROVED BY	ZZ	DATE	2018

SCALES:	PLAN & PROFILE
	HORIZONTAL



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
IRRIGATION PLAN



THIS SHEET NOT INCLUDED IN THIS BID

PLANT LIST, NO QUANTITIES

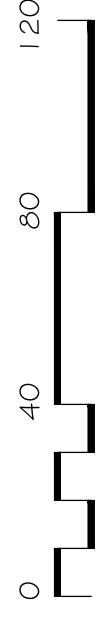
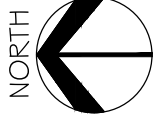
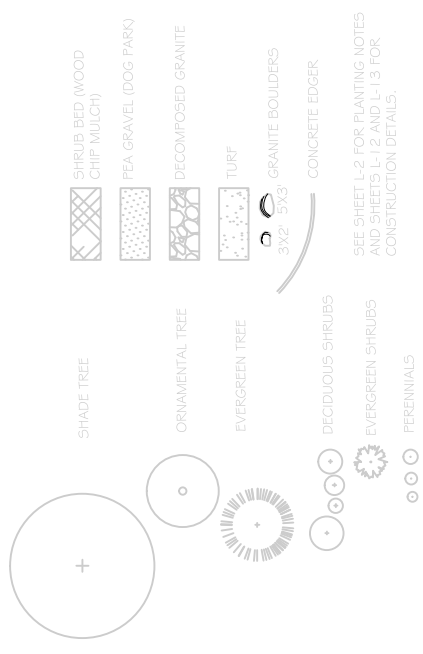
Key Common Name

Deciduous Trees	AAG	Autumn Gold Ginkgo
	BOK	Burr Oak
	FRE	Frontier Elm
	GVZ	Green Vase Zelkova
	HBV	Hackberry
	HLO	Hydrangea
	IKL	Imperial Horsechickadee
	IMC	Indiana Music Crabapple
	JPT	Japonese Palm
	SPR	Spontaneous Elder
	SKT	Spine Flower
	SSC	Spring Snow Crabapple
	VZL	Village Green Zelkova
	WCA	Western Catalpa
	WKA	Winter King Hawthorn
Evergreen Trees	PTN	Pinot Pine
	WTLJ	Wichita Juniper
Deciduous Shrubs	AAS	Autumn Amber Sumac
	ABR	Ashe Rose
	ABR	Ashe Rose
	BMAS	Blue Mist Spirea
	DBS	Dwarf Burning Bush
	DFB	Dwarf Blueberry
	FRB	Forest Blueberry
	GLS	Green Leafy Sumac
	IMM	Intricate Mtn. Milkosahny
	KOL	Korean Dwarf Oak
	LEB	Lena Broom
	LED	Leadplant
	ILM	Intertitle Mooncane

ILM	Intertitle Mooncane	
NMP	New Mexico Privet	
PDC	Pawnee Buttes Sand Cherry	
PCS	Powder Mill Sand Cherry	
FEC	Prickly Pear Cactus	
RGB	Rose Glow Barberry	
RAS	Rock Spirea	
SCI	Shadblow	
SPB	Spirea	
WPC	Western Sand Cherry	
Evergreen Shrubs	ANL	Andromeda
	BCJ	Blue Chip Juniper
	BFJ	Blue Foliage Juniper
	EMH	Emerald Hill Juniper
	HGM	Horizontal Emerald Juniper
	MJJ	Mini Juniper

Perennials/Ground Covers
 BPC: Blazer Anemone Blue Grass
 BBL: Blazer Little Bluestem Grass
 GOH: Grand Orange Thistle
 GSC: Green Sky Prairie Switch Grass
 DFG: Dwarf Fountain Grass
 FRG: Feather Reed Grass
 LVM: Lunatare Lavender
 MVM: Moonshine Yarrow
 SLG: Sand Love Grass
 SUN: Sunset Thistle
 LMG: Lined Anemone Ruby Milk Grass

NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET L-1 ARE NOT INCLUDED IN BID SCHEDULE



REVISION Δ	DATE	DESCRIPTION	DRAWN BY	MH	DATE	7/7/2018	SCALES:	PLAN & PROFILE
REVISION Δ			DESIGNED BY	MH	DATE	7/7/2018	0" = 10'-0"	
REVISION Δ			CHECKED BY	CR	DATE	7/7/2018		
REVISION Δ			APPROVED BY	ZZ	DATE	7/7/2018		

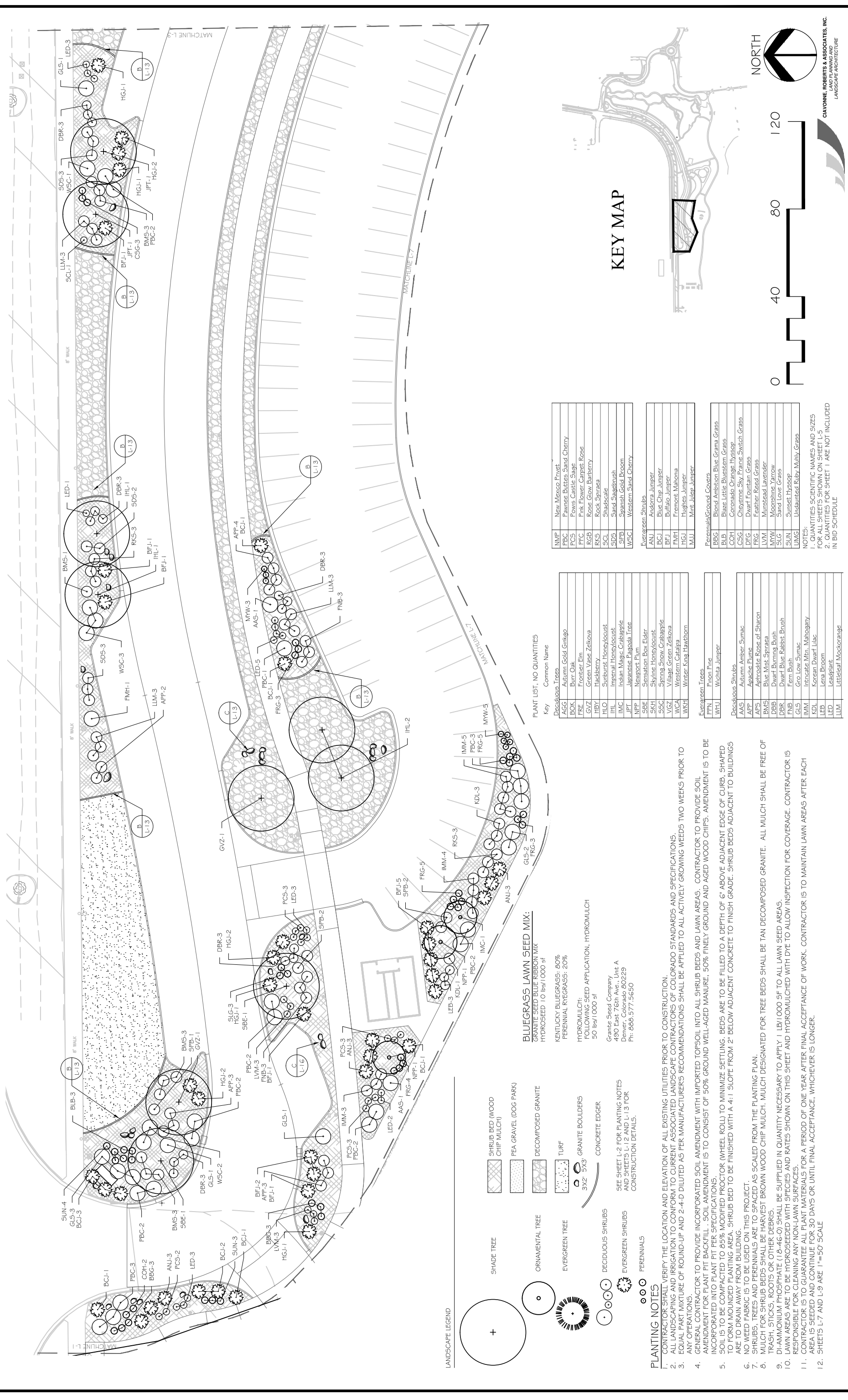
Grand Junction
COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

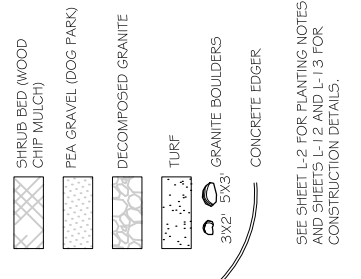
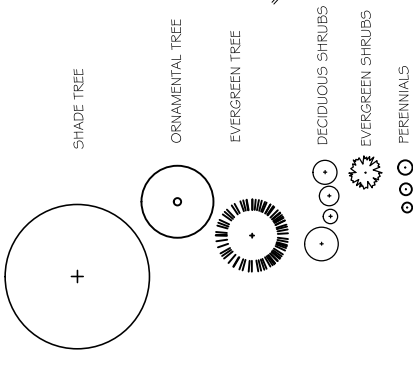
LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

CAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

L-1
166



LANDSCAPE LEGEND



SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

PLANTING NOTES

- CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- ALL LANDSCAPING AND IRRIGATION TO CONFORM TO CURRENT ASSOCIATED LANDSCAPE CONTRACTORS OF COLORADO STANDARDS AND SPECIFICATIONS.
- EQUAL PART MIXTURE OF ROUND-UP AND 2-4-D DILUTED AS PER MANUFACTURER'S RECOMMENDATIONS SHALL BE APPLIED TO ALL ACTIVELY GROWING WEEDS TWO WEEKS PRIOR TO ANY OPERATIONS.
- GENERAL CONTRACTOR TO PROVIDE INCORPORATED SOIL AMENDMENT WITH IMPORTED TOPSOIL INTO ALL SHRUB BEDS AND LAWN AREAS. CONTRACTOR TO PROVIDE SOIL AMENDMENT FOR PLANT FIT BACKFILL. SOIL AMENDMENT IS TO CONSIST OF 50% GROUND WELL-AGED MANURE, 30% FINELY GROUND AND AGED WOOD CHIPS. AMENDMENT IS TO BE INCORPORATED INTO PLANT FIT PER SPECIFICATIONS.
- SOIL IS TO BE COMPACTED TO 85% MODIFIED PROCTOR (WHEEL ROLL) TO MINIMIZE SETTLING. BEDS ARE TO BE FILLED TO A DEPTH OF 6" ABOVE ADJACENT EDGE OF CURB. SHAPED TO FORM MOUND PLANTING AREA. SHRUB BED TO BE FINISHED WITH A 4:1 SLOPE FROM 2" BELOW ADJACENT CONCRETE TO FINISH GRADE. SHRUB BEDS ADJACENT TO BUILDINGS ARE TO DRAIN AWAY FROM BUILDING.
- NO WEED FABRIC IS TO BE USED ON THIS PROJECT.
- SHRUBS, TREES AND PERENNIALS ARE TO BE SPACED AS SCALED ON THIS PLAN.
- MULCH FOR SHRUB BEDS SHALL BE HARVEST BROWN WOOD CHIP MULCH. MULCH DESIGNATED FOR TREE BEDS SHALL BE TAN DECOMPOSED GRANITE. ALL MULCH SHALL BE FREE OF TRASH, STICKS, ROOTS OR OTHER DEBRIS.
- DI-AMMONIUM PHOSPHATE (18-46-0) SHALL BE SUPPLIED IN QUANTITY NECESSARY TO APPLY 1 LB/1000 SF TO ALL LAWN SEED AREAS.
- LAWN AREAS ARE TO BE HYDROSEED WITH SPECIES AND RATES SHOWN ON THIS SHEET AND HYDROMULCHED WITH DYE TO ALLOW INSPECTION FOR COVERAGE. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL NON-LAWN SURFACES.
- CONTRACTOR IS TO GUARANTEE ALL PLANT MATERIALS FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF WORK. CONTRACTOR IS TO MAINTAIN LAWN AREAS AFTER EACH AREA IS SEEDING AND CONTINUE FOR 30 DAYS OR UNTIL FINAL ACCEPTANCE, WHICHEVER IS LONGER.
- SHEETS L-7 AND L-9 ARE 1"=50' SCALE

BLUEGRASS LAWN SEED MIX:

GRANITE SEED BLUE RIBBON MIX
HYDROSEED 10 lbs/1000 sf

KENTUCKY BLUEGRASS: 80%
PERENNIAL RYEGRASS: 20%

HYDROMULCH:
FOLLOWING SEED APPLICATION, HYDROMULCH
50 lbs/1000 sf

Grante Seed Company
490 East 76th Ave., Unit A
Denver, Colorado 80229
Ph: 866-577-5650

PLANT LIST, NO QUANTITIES

Key Common Name

Code	Common Name
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GBY	Green Vase Zelkova
HBY	Hackberry
HLO	Sturboist Honeylocust
IHL	Internal Honeylocust
IMC	Indian Masc Crabapple
JPT	Japanese Pagoda Tree
NFP	Newport Elm
SBE	Sensation Box Elder
SKH	Shyne Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

Code	Common Name
ANU	Andorra Juniper
BCJ	Blue Chip Juniper
BJJ	Butalo Juniper
FMI	Fremont Mahonia
HIG	Hughes Juniper
MJJ	Mini-Julep Juniper

Code	Common Name
ANU	Andorra Juniper
BCJ	Blue Chip Juniper
BJJ	Butalo Juniper
FMI	Fremont Mahonia
HIG	Hughes Juniper
MJJ	Mini-Julep Juniper

Code	Common Name
AGG	Autumn Gold Ginkgo
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IMC	Indian Masc Crabapple
JPT	Japanese Pagoda Tree
NFP	Newport Elm
SBE	Sensation Box Elder
SKH	Shyne Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

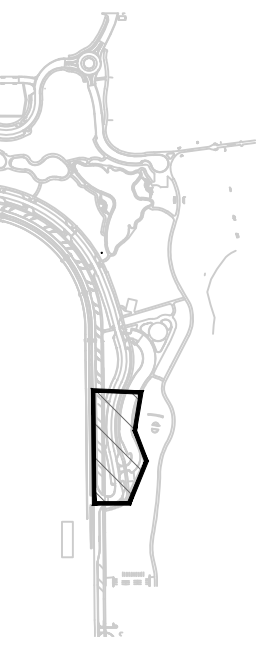
Code	Common Name
NMF	New Mexico Privet
PBC	Pawnee Buttes Sand Cherry
PCS	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spirea
SCL	Shadefade
SDS	Sand Sagebrush
SFD	Spanish Gold Broom
WSC	Western Sand Cherry

Code	Common Name
ANU	Andorra Juniper
BCJ	Blue Chip Juniper
BJJ	Butalo Juniper
FMI	Fremont Mahonia
HIG	Hughes Juniper
MJJ	Mini-Julep Juniper

Code	Common Name
BEG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
CSG	Cheyenne Sky Frame Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Munstead Lavender
MYW	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMJ	Undaunted Ruby Mully Grass

NOTES:
1. QUANTITIES, SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
2. QUANTITIES FOR SHEET L-1 ARE NOT INCLUDED IN BID SCHEDULE

KEY MAP



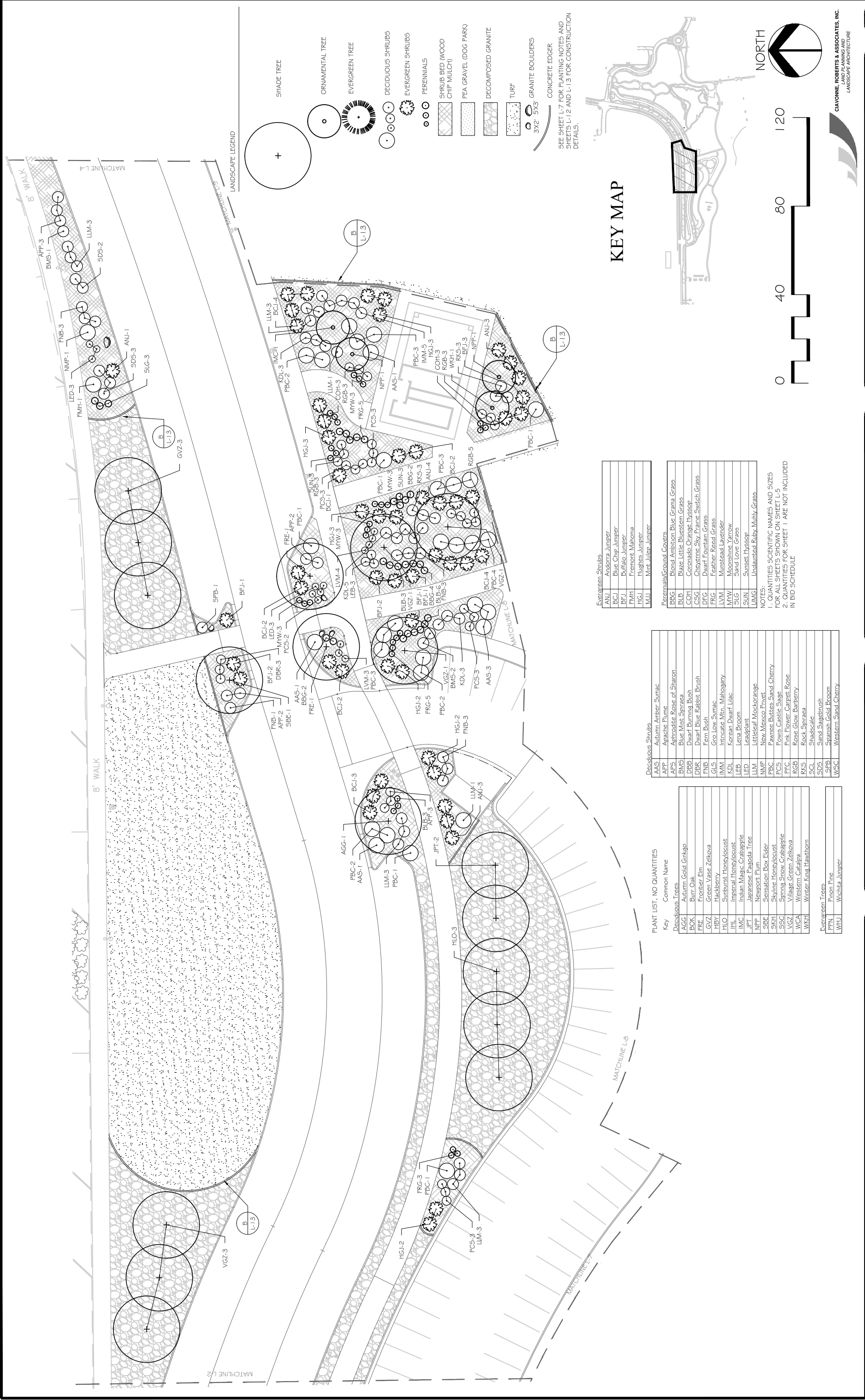
CAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	SCALE
REVISION 1		7/7/2018	MH	7/7/2018	PLAN & PROFILE
REVISION 2		7/7/2018	MH	7/7/2018	0" = 10'-0"
REVISION 3		7/7/2018	CR	7/7/2018	
REVISION 4		7/7/2018	ZZ	7/7/2018	

CITY OF
Grand Junction
COLORADO

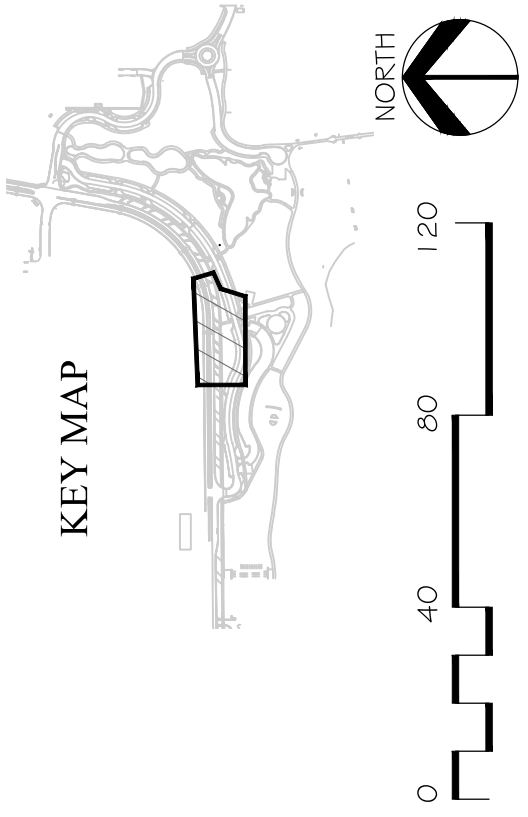
PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN



- LANDSCAPE LEGEND**
- SHADE TREE
 - ORNAMENTAL TREE
 - EVERGREEN TREE
 - DECIDUOUS SHRUBS
 - EVERGREEN SHRUBS
 - PERENNIALS
 - SHRUB BED (WOOD CHIP MULCH)
 - PEA GRAVEL (DOG PARK)
 - DECOMPOSED GRANITE
 - TURF
 - 3x2' 5x3' GRANITE BOULDERS
 - CONCRETE EDGER

SEE SHEET L-7 FOR PLANTING NOTES AND SHEETS L-1, 2 AND L-1, 3 FOR CONSTRUCTION DETAILS.



CIANNONE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

Evergreen Shrubs

ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFI	Buffalo Juniper
FMH	Fremont Mahonia
HGJ	Hughes Juniper
MJL	Mint Julep Juniper

Perennials/Ground Covers

BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
C5G	Cheyenne Sky Frame Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Moonshine Yarrow
MYW	Sand Love Grass
SLG	Sunset Hyssop
SUN	Undaunted Ruby Mully Grass

NOTES:
1. QUANTITIES, SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
2. QUANTITIES FOR SHEET 1 ARE NOT INCLUDED IN BID SCHEDULE

Deciduous Shrubs

AAS	Autumn Amber Sumac
APP	Apache Plume
APF	Aphrodite Rose of Sharon
BMS	Blue Mist Spriraea
DBB	Dwarf Burning Bush
DBK	Dwarf Blue Rabbit Brush
FNB	Fern Bush
GL5	Gro Low Sumac
IMM	Intricate Mtn. Mahogany
KDI	Korean Dwarf Lilac
LEB	Lea Broom
LEF	Leadplant
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Pawnee Buttes Sand Cherry
PCS	Powis Castle Sage
PCF	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spiraea
SCL	Shadscale
SD5	Sand Sagebrush
SPB	Spanish Gold Broom
W5C	Western Sand Cherry

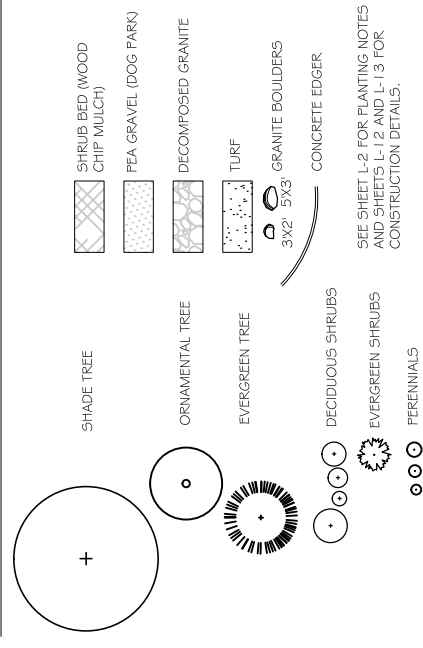
PLANT LIST, NO QUANTITIES

Key	Common Name
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBT	Hickberry
HLO	Humboldt Honeylocust
IMC	Imperial Honeylocust
IND	Indian Magic Crabapple
JFT	Japanese Pagoda Tree
NPP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WST	Winter King Hawthorn
FPN	Pinon Pine
WHJ	Weichta Juniper

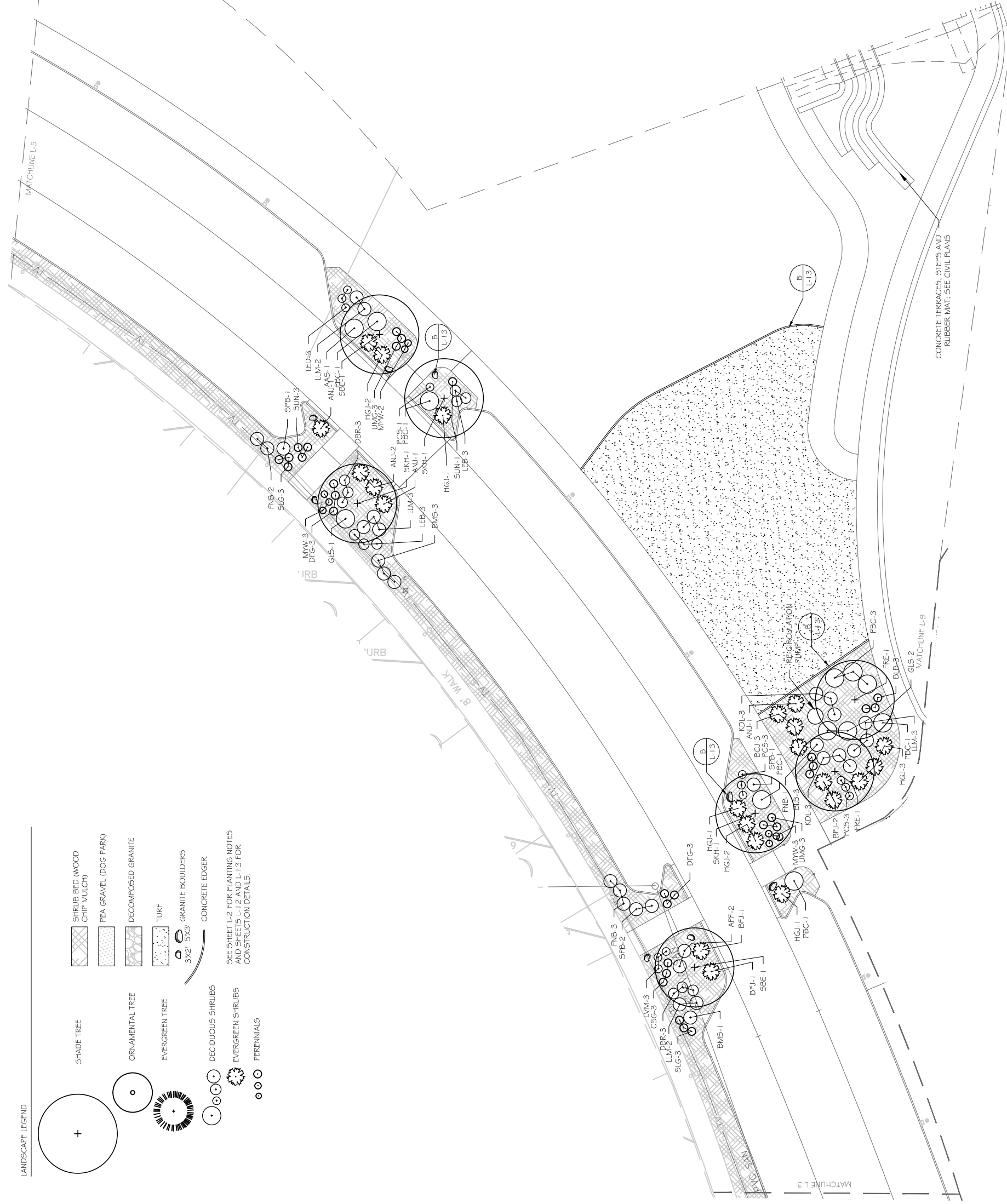
REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	DATE	DATE	DATE

SCALES: PLAN & PROFILE 1" = 30'

LANDSCAPE LEGEND



SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-2 AND L-3 FOR CONSTRUCTION DETAILS.



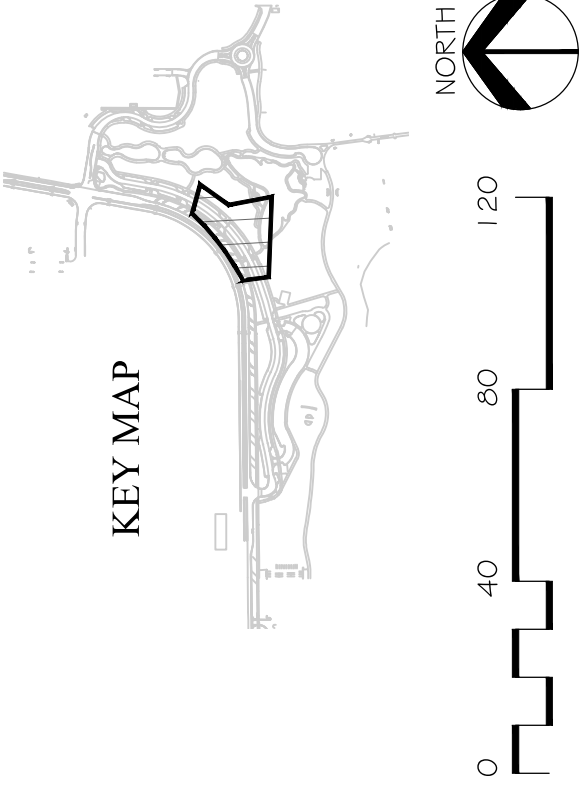
PLANT LIST, NO QUANTITIES

Key Common Name

Key	Common Name
Deciduous Trees	
AGG	Autum Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBV	Hickberry
HLO	Subarise Honeylocust
IMC	Imperial Honeylocust
JFI	Indian Magic Crabapple
JPP	Japanese Paulownia Tree
NFP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKS	Winter King Hawthorn
Evergreen Trees	
PFN	Pinon Pine
WHL	Wichita Juniper
Deciduous Shrubs	
AAS	Autum Antier Sumac
APP	Apache Pine
APS	Apricot Rose of Sharon
BMS	Blue Mist Spruce
DBK	Dwarf Burning Bush
FNB	Fern Bush
GLS	Gro Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant
Perennials/Grass Covers	
BEG	Blond Ambition Blue Grama Grass
BIB	Blaze Little Bluestem Grass
COH	Coronado Orange Hyssop
C5G	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Munstead Lavender
MWV	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Muhly Grass

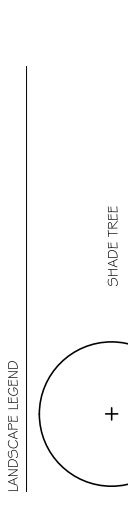
NOTES:
1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
2. QUANTITIES FOR SHEET L ARE NOT INCLUDED IN BID SCHEDULE

KEY MAP



	PUBLIC WORKS ENGINEERING DIVISION	LAS COLONIAS BUSINESS PARK LANDSCAPE PLAN	L-4 169
	SCALES: PLAN & PROFILE 0 10 20 30 40 0 10 20 30 40 0 10 20 30 40		
	DRAWN BY MH DATE 7/7/2018 DESIGNED BY MH DATE 7/7/2018 CHECKED BY CR DATE 7/7/2018 APPROVED BY ZZ DATE 7/7/2018		
	REVISION Δ REVISION Δ REVISION Δ REVISION Δ		

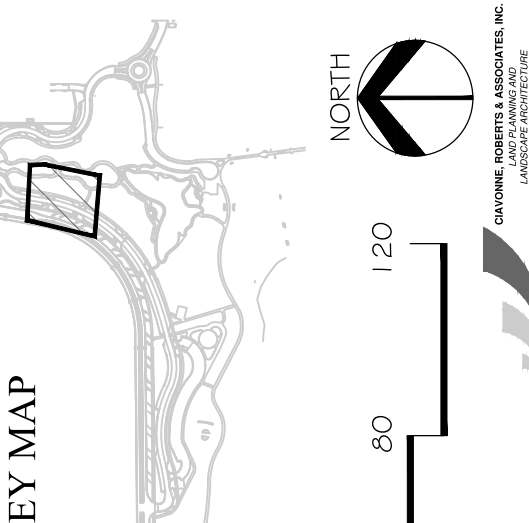
CIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE



SEE SHEET L-7 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

PLANT LIST

City Key	Common Name	Scientific Name	Size	Mature Height
Deciduous Trees				
1	AGG Autumn Gold Ginkgo	Ginkgo biloba 'Autumn Gold'	2"	40-50'
2	BOK Burr Oak	Quercus macrocarpa	2"	50-60'
7	FRE Frontier Elm	Ulmus x Frontier	2"	25-35'
10	GVZ Green Vease Zelkova	Zelkova serrata 'Green Vease'	2"	40-60'
3	HBY Hackberry	Celtis occidentalis	2"	35-60'
8	HL0 Honeylocust	Gleditsia triacanthos var. 'Inermis Impregnal'	2"	45-70'
4	ITL Imperial Honeylocust	Gleditsia triacanthos var. 'Inermis Impregnal'	2"	30-40'
3	IMC Indian Magic Crabapple	Malus sp. 'Indian Magic'	2"	12-17'
6	JPT Japanese Pagoda Tree	Sophora japonica	2"	50-75'
9	NPP Newport Plum	Prunus cerasifera 'Newport'	2"	15-20'
15	SBE Sensation Box Elder	Acer negundo 'Sensation'	2"	25-40'
5	SKH Skyline Honeylocust	Gleditsia triacanthos var. 'Inermis Skyline'	2"	40-50'
3	SSC Spring Snow Crabapple	Malus 'Spring Snow'	2"	15-20'
7	VGZ Village Green Zelkova	Zelkova serrata 'Village Green'	2"	40-50'
1	WCA Western Catalpa	Catalpa speciosa	2"	45-55'
2	WKH Winter King Hawthorn	Crataegus virens 'Winter King'	2"	15-20'
Evergreen Trees				
1/8	PFN Pinon Pine	Pinus cembroides edulis	6'	10-15'
3	WTH Wichita Juniper	Juniperus sabina 'Wichita'	6'	10-15'
Deciduous Shrubs				
2/8	AAS Autumn Amber Sumac	Rhus typhina 'Autumn Amber'	5 gal	1-2'
5/4	APP Apricot Rose of Sharon	Falugia parviflora	5 gal	3-6'
5	AFS Apricot Rose of Sharon	Falugia parviflora	5 gal	3-6'
44	BWS Blue Mist Spirea	Spirea japonica	3 gal	2-12'
6	DBB Dwarf Burning Bush	Euonymus alata 'Compacta'	5 gal	4-6'
67	DBR Dwarf Blue Rabbit Brush	Chrysothamnus nauseosus	5 gal	3-5'
57	FNB Fern Bush	Chamaelirium millefolium	5 gal	2-5'
37	GL5 Gro Low Sumac	Rhus aromatica 'Gro-Low'	5 gal	4-7'
43	IMM Intricate Mtn. Mahogany	Cercocarpus intricatus	5 gal	1.5-3'
66	KDL Korean Dwarf Lilac	Syringa meyeri 'Palmer'	5 gal	3-4'
32	LEB Lena Bloom	Cytisus x 'Lena'	5 gal	3-4'
67	LEB Leadplant	Amaranthus canescens	5 gal	2-3'
59	LLM Littleleaf Mockorange	Philadelphus microphyllus	5 gal	4-5'
10	LMV New Mexico Fernet	Forestiera neo-mexicana	5 gal	5-7'
121	PBC Pawnee Buttes Sand Cherry	Prunus besseyi 'Pawnee Buttes'	5 gal	1-2'
112	PCS Powis Castle Sage	Artemisia 'Powis Castle'	1 gal	2-3'
8	PTC Pink Flower Carpet Rose	Rosa x Flower Carpet 'Nostraum'	5 gal	1-2'
20	RGB Rose Glow Barberry	Berberis thunbergii 'Rose Glow'	5 gal	3-5'
30	RK5 Rock Spirea	Holidaysium dumosum	5 gal	3-4'
11	SCI Shadscale	Atriplex confertifolia	5 gal	1-2'
17	SBS Sand Sagebrush	Artemisia filifolia	5 gal	2-3'
1/8	SFB Spanish Gold Bloom	Cytisus purgans 'Spanish Gold'	5 gal	3-4'
12	WPC Western Sand Cherry	Prunus besseyi	5 gal	3-5'
Evergreen Shrubs				
4/8	ANJ Andorra Juniper	Juniperus horizontalis 'Andorra'	5 gal	1-1.5'
63	BCJ Blue Chip Juniper	Juniperus horizontalis 'Blue Chip'	5 gal	5-11'
49	BFJ Buffalo Juniper	Juniperus sabina 'Buffalo'	5 gal	1-2'
3	FMH Fremont Mahonia	Mahonia fremontii	5 gal	3-6'
62	HGJ Hughes Juniper	Juniperus horizontalis 'Hughes'	5 gal	5-11'
3	MUJ Mint Jubilee Juniper	Juniperus chinensis 'Mint Jubilee'	5 gal	5-11'
Perennials/Ground Covers				
69	BBG Blond Ambition Blue Grama Grass	Bouteloua gracilis 'Blond Ambition'	1 gal	2-3'
47	BIB Blaze Little Bluestem Grass	Schizanthus scoparium 'Blaze'	1 gal	1-2.5'
3/8	COH Colorado Orange Hyssop	Agastache aurantiaca	1 gal	2-3'
35	CSG Cheyenne Sky Prairie Switch Grass	Panicum virgatum 'Cheyenne Sky'	1 gal	2-3'
43	DFG Dwarf Fountain Grass	Pennisetum alopecuroides 'Hemel'	1 gal	1.5-3'
54	FRG Feather Reed Grass	Pennisetum alopecuroides 'Hemel'	1 gal	2-4'
81	LWJ Munstead Lavender	Calamagrostis x acutiflora 'Neri Foerster'	1 gal	1-2.5'
43	MWJ Moonshine Yarrow	Arnica montana 'Moonshine'	1 gal	1-2'
31	SLG Sand Love Grass	Amelica millefolium 'Moonshine'	1 gal	2-4'
69	SUN Sunset Hyssop	Eragrostis trichodes	1 gal	1.5-3'
35	UMG Undaunted Ruby Mully Grass	Agastache rupestris	1 gal	1.5-3'



CIYONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

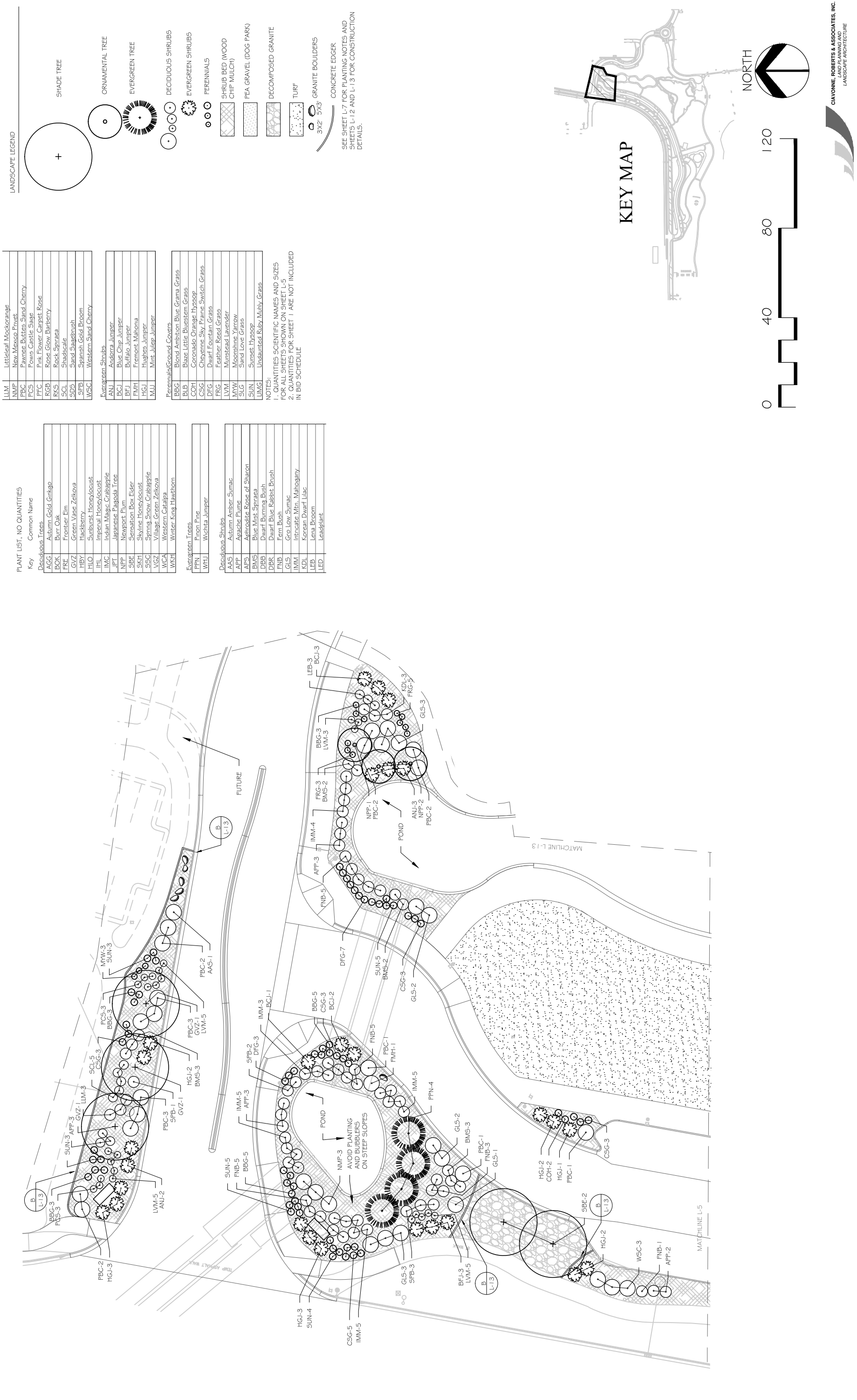
PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

REVISION Δ
REVISION Δ
REVISION Δ
REVISION Δ

DESCRIPTION	DATE	DRAWN BY	MH	DATE	7/7/2018
PLAN & PROFILE	0' = 10'-0"	DESIGNED BY	MH	DATE	7/7/2018
		CHECKED BY	CR	DATE	7/7/2018
		APPROVED BY	ZZ	DATE	7/7/2018

Grand Junction
COLORADO



PLANT LIST, NO QUANTITIES

Key	Common Name
Deciduous Trees	
AGG	Autumn Gold Ginkgo
BOX	Blair Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBY	Hackberry
HLO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JPT	Japanese Pagoda Tree
NPP	Newport Plum
SPF	Sensation Box Elder
SKH	Shylite Honeylocust
S5C	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WTK	Winter King Tiptonhorn
Evergreen Trees	
PFN	Pinon Pine
WHT	Wichita Juniper
Deciduous Shrubs	
AAS	Autumn Amber Sumac
APP	Apache Plume
APS	Aproditte Rose of Sharon
BMS	Blue Mist Spriraea
DBR	Dwarf Burning Bush
FNB	Fern Bush
GLS	Gro Low Sumac
IMM	Intricate Mtn. Mahogany
KDI	Korean Dwarf Lilac
LEB	Lea Broom
LED	Leadplant

LIM	Littleleaf Mockorange
NMP	New Mexico Priest
PBC	Pauciflora Spindle Cherry
PCS	Pavus Castle Stage
PGC	Pink Flower Carpet Rose
RGD	Rose Glow Barberry
RGS	Rock Spirea
SCL	Shadscale
SDS	Sand Scaebush
SFB	Spanish Gold Broom
WSC	Western Sand Cherry
Evergreen Shrubs	
ANJ	Audorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Maltonia
HGJ	Hughes Juniper
MJJ	Mint Juniper Juniper
Perennials/Ground Covers	
BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Coronado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Mumstead Lavender
MMW	Moonslime Yarrow
SIG	Sand Lone Grass
SUN	Sunset Thyssop
LUMG	Undaunted Ruby Mully Grass

+	SHADE TREE
○	ORNAMENTAL TREE
●	EVERGREEN TREE
○	DECIDUOUS SHRUBS
○	EVERGREEN SHRUBS
○	PERENNIALS
▨	SHRUB BED (WOOD CHIP MULCH)
▨	PEA GRAVEL (DOG PARK)
▨	DECOMPOSED GRANITE
▨	TURF
○	3/2' 5x3' GRANITE BOULDERS
—	CONCRETE EDGER

SEE SHEET L7 FOR PLANTING NOTES AND SHEETS L-1.2 AND L-1.3 FOR CONSTRUCTION DETAILS.

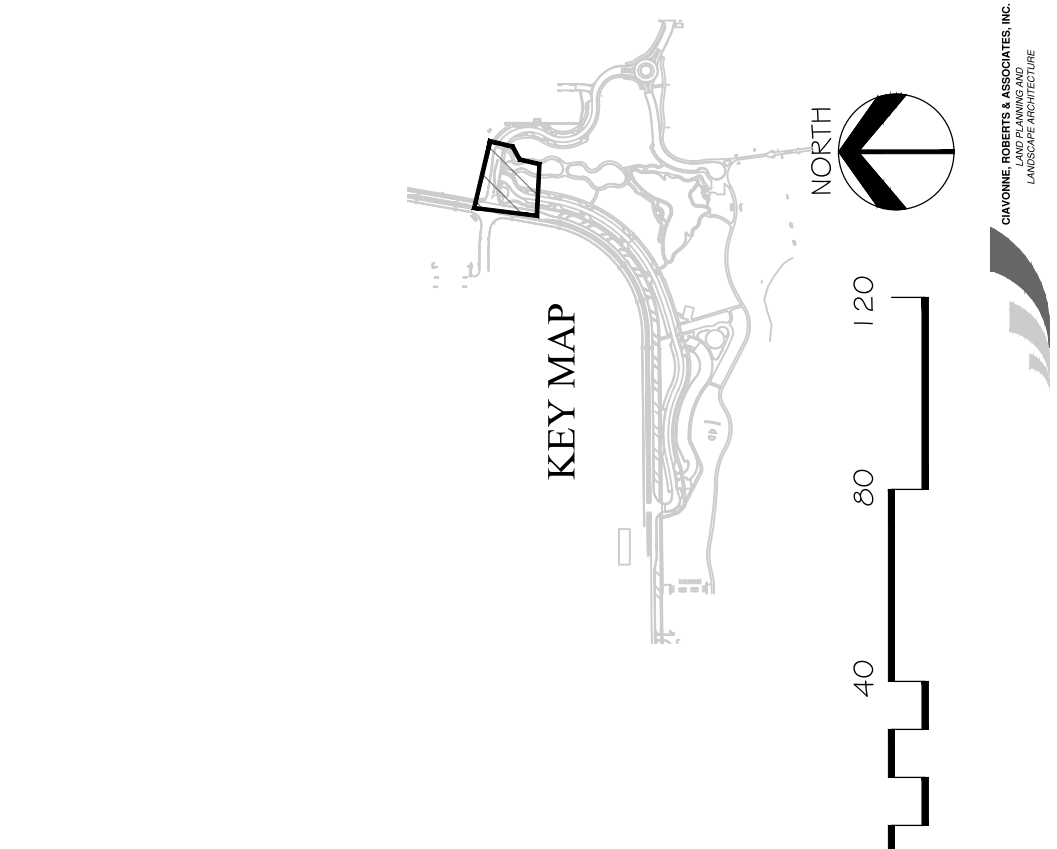
NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET 1 ARE NOT INCLUDED IN BID SCHEDULE

LANDSCAPE LEGEND

LANDSCAPE LEGEND

SEE SHEET L7 FOR PLANTING NOTES AND SHEETS L-1.2 AND L-1.3 FOR CONSTRUCTION DETAILS.

SEE SHEET L7 FOR PLANTING NOTES AND SHEETS L-1.2 AND L-1.3 FOR CONSTRUCTION DETAILS.



REVISION Δ	DATE	DRAWN BY	MH	DATE	7/7/2018	SCALES:	PLAN & PROFILE
REVISION Δ		DESIGNED BY	MH	DATE	7/7/2018	0	1" = 30'
REVISION Δ		CHECKED BY	CR	DATE	7/7/2018		
REVISION Δ		APPROVED BY	ZZ	DATE	7/7/2018		

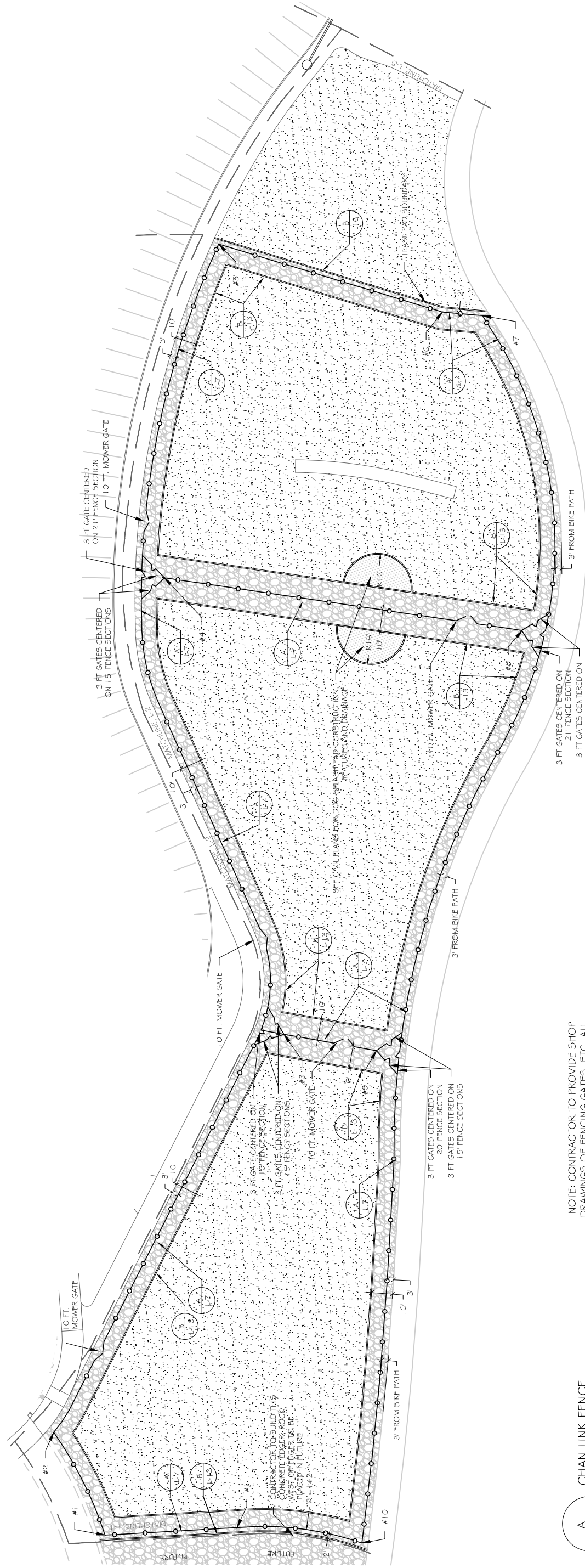
CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

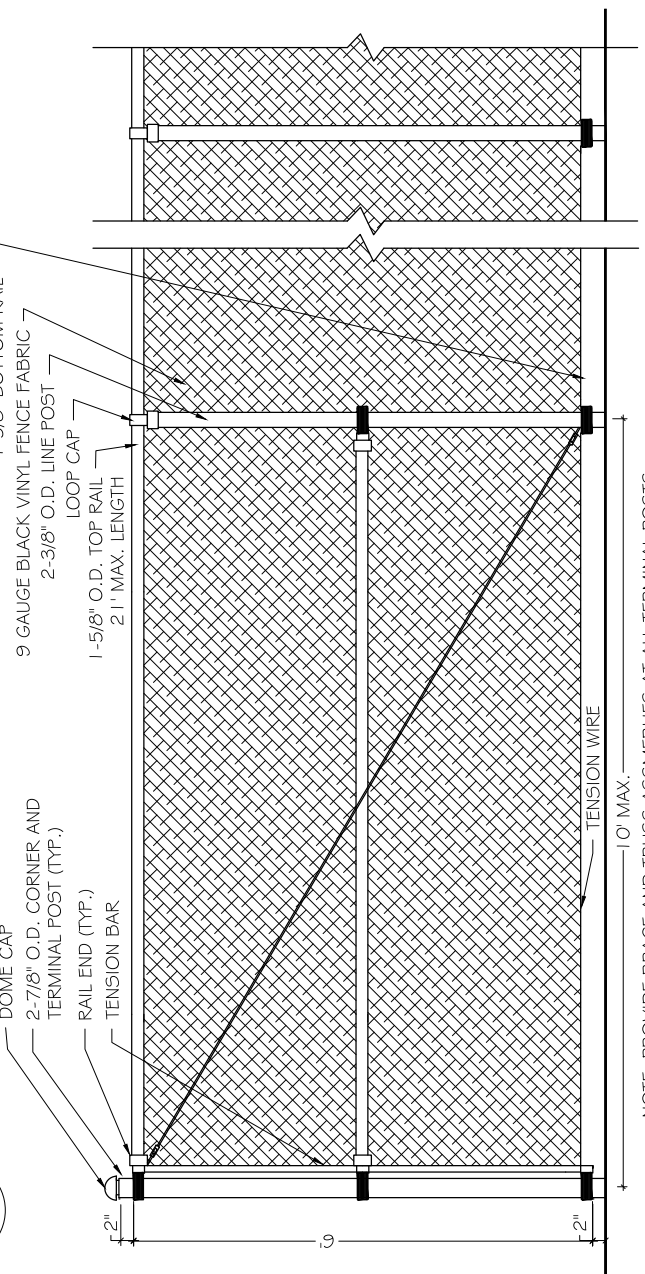
LAS COLONIAS BUSINESS PARK
 LANDSCAPE PLAN

L-6
 171

CIAVONNE ROBERTS & ASSOCIATES, INC.
 LAND PLANNING AND
 LANDSCAPE ARCHITECTURE



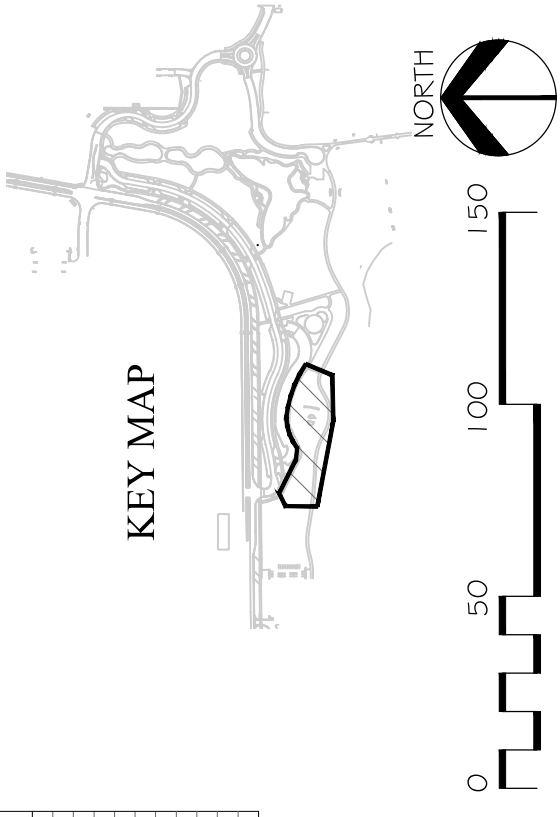
NOTE: CONTRACTOR TO PROVIDE SHOP DRAWINGS OF FENCING GATES, ETC. ALL COMPONENTS TO BE BLACK VINYL COATED



- LANDSCAPE LEGEND
- PEA GRAVEL (DOG PARK) - FULL DEPTH @ TOP OF EDGER TO FILL BASIN
 - DECOMPOSED GRANITE
 - TURF
 - CONCRETE EDGER
 - BLACK VINYL-COATED FENCING. SEE DETAIL, THIS SHEET
- CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR FENCING, 3' GATES AND MOWER GATE DETAILS. SEE SHEET L-13 FOR MORE CONSTRUCTION DETAILS.

FENCE CORNERS POINT TABLE

POINT #	NORTHING	EASTING
1	31480.9	94754.9
2	31505.3	94603.6
3	31395.9	94992.6
4	31452.6	95209.3
5	31426.9	95367.7
6	31320.7	95335.4
7	31301.6	95333.7
8	31283.0	95184.3
9	31352.0	94984.8
10	31359.0	94751.1
11	31418.3	94758.4



REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	DATE	DATE	DATE	DATE	DATE
△			MH	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018
△			MH	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018
△			CR	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018
△			ZZ	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018	7/17/2018



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

L-7
172



PLANT LIST, NO QUANTITIES

Key Common Name

Key	Common Name
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRF	Frontier Elm
CVZ	Green Vease Zelkova
ITBY	Hackberry
TILO	Sunburst Honeylocust
ITIL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JFT	Japanese Pagoda Tree
NFP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

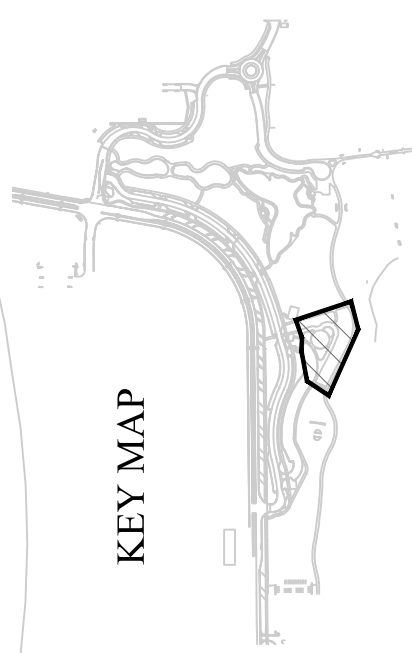
Key	Common Name
EPN	Pinon Pine
WHL	Wichita Juniper

Key	Common Name
AAS	Autumn Amber Sumac
APF	Apache Plum
APR	Apricot Rose of Sharon
BMS	Blue Mist Spruce
DBB	Dwarf Burning Bush
DBR	Dwarf Blue Rabbit Bush
FNB	Fern Bush
GLS	Gre Low Sumac
IMM	Intricate Min. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Pawnee Brittes Sand Cherry
PFC	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spruce
SCL	Shadesale
SDB	Santa Diego Bush
SFB	Spanish Gold Broom
WSC	Western Sand Cherry

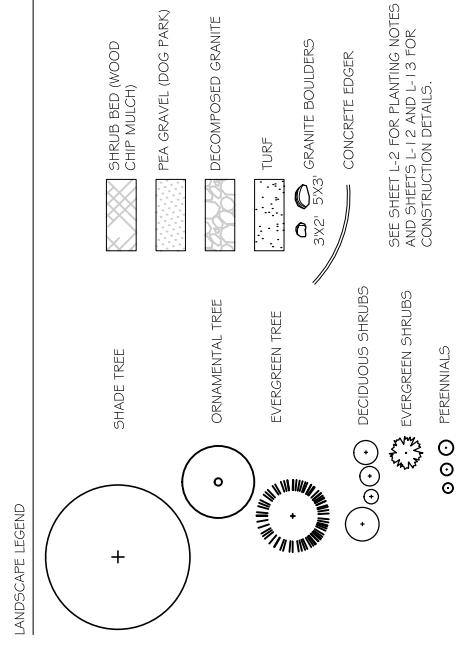
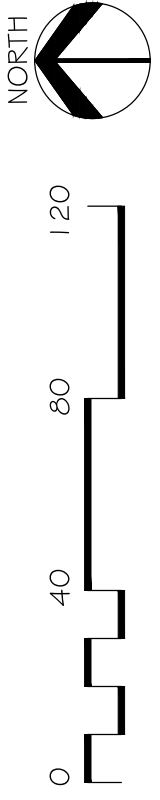
Key	Common Name
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Malonia
HGJ	Hughes Juniper
MJJ	Mint Juniper Juniper

Key	Common Name
BBG	Blond Ambition Blue Grama Grass
BIB	Blaze Little Bluestem Grass
COH	Coronado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Munstead Lavender
MYW	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UNG	Undaunted Ruby Mully Grass

NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES
 2. FOR ALL SHEETS SHOWN ON SHEET L-5
 3. QUANTITIES FOR SHEET L-1 ARE NOT INCLUDED
 IN BID SCHEDULE



KEY MAP



SEE SHEET L-2 FOR PLANTING NOTES
 AND SHEETS L-1, L-2 AND L-1, L-3 FOR
 CONSTRUCTION DETAILS.

REVISION	DESCRIPTION	DATE

DRAWN BY	MH	DATE	7/7/2018
DESIGNED BY	MH	DATE	7/7/2018
CHECKED BY	CR	DATE	7/7/2018
APPROVED BY	ZZ	DATE	7/7/2018

SCALES:	PLAN & PROFILE
0	0
10	10
20	20
40	40



PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 LANDSCAPE PLAN

CLAVONNE ROBERTS & ASSOCIATES, INC.
 LAND PLANNING AND
 LANDSCAPE ARCHITECTURE

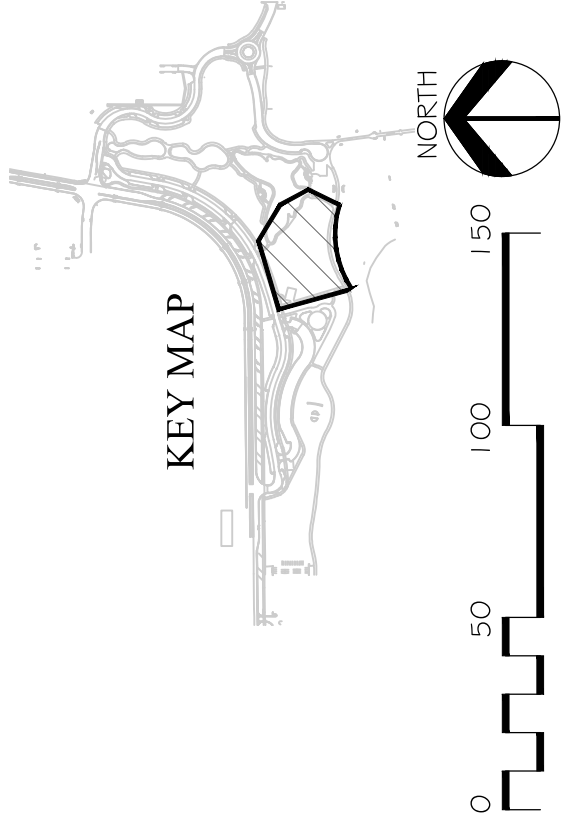
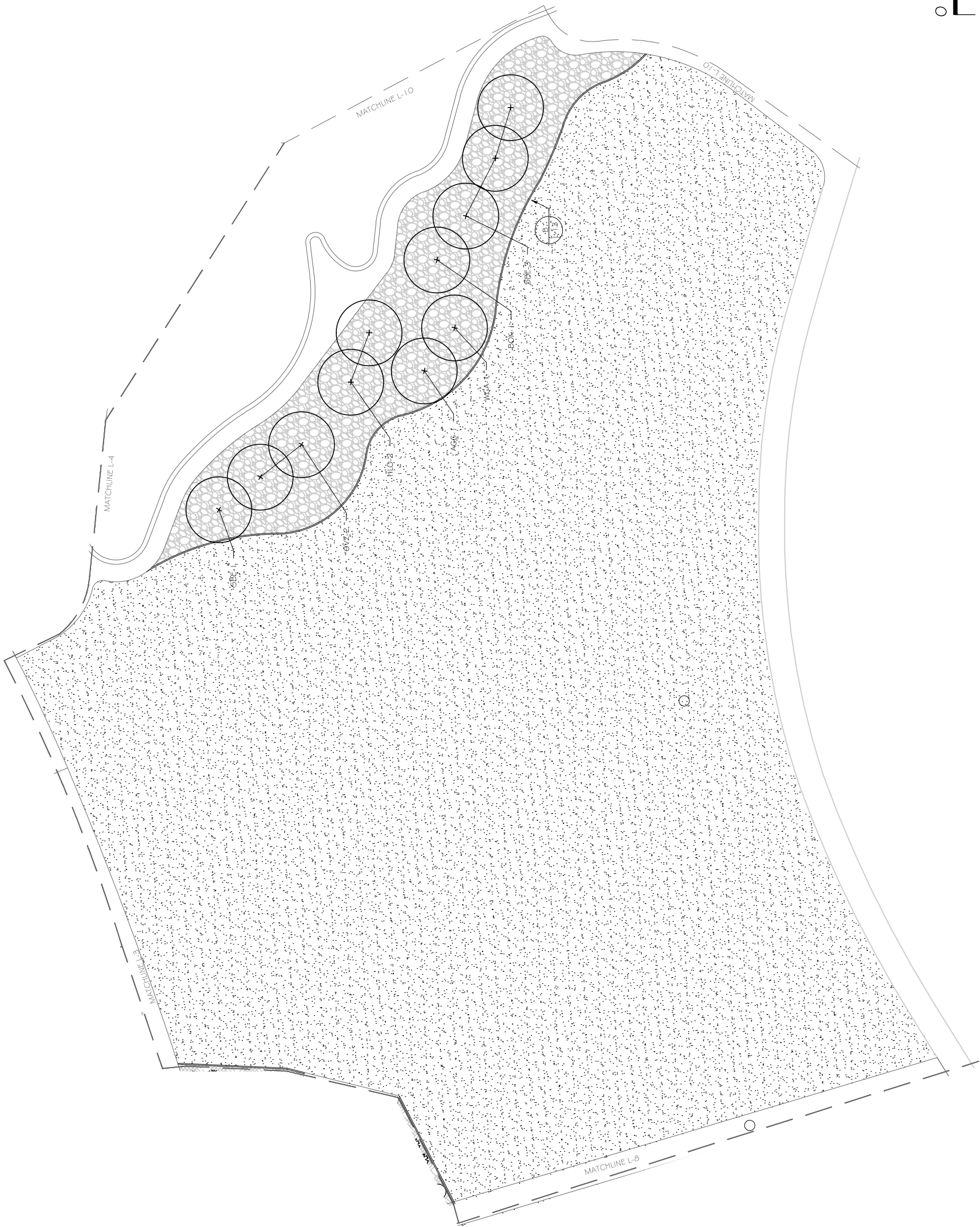
PLANT LIST - NO QUANTITIES

Key	Common Name
Deciduous Trees	
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
PRE	Frontier Elm
GVZ	Green Vase Zelkova
HBV	Hackberry
HLO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JPT	Japanese Pagoda Tree
NPP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SNC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

LANDSCAPE LEGEND

- SHADE TREE
- ORNAMENTAL TREE
- EVERGREEN TREE
- DECIDUOUS SHRUBS
- EVERGREEN SHRUBS
- PERENNIALS
- SHRUB BED (WOOD CHIP MULCH)
- PEA GRAVEL (DOG PARK)
- DECOMPOSED GRANITE
- TURF
- 3X2X3 GRANITE BOULDERS
- CONCRETE EDGER

SEE SHEET L-7 FOR PLANTING NOTES AND SHEETS L-1, 2 AND L-3 FOR CONSTRUCTION DETAILS.



REVISION	DESCRIPTION	DATE

DRAWN BY	MH	DATE	7/7/2018
DESIGNED BY	MH	DATE	7/7/2018
CHECKED BY	CR	DATE	7/7/2018
APPROVED BY	ZZ	DATE	7/7/2018

SCALES:	PLAN & PROFILE

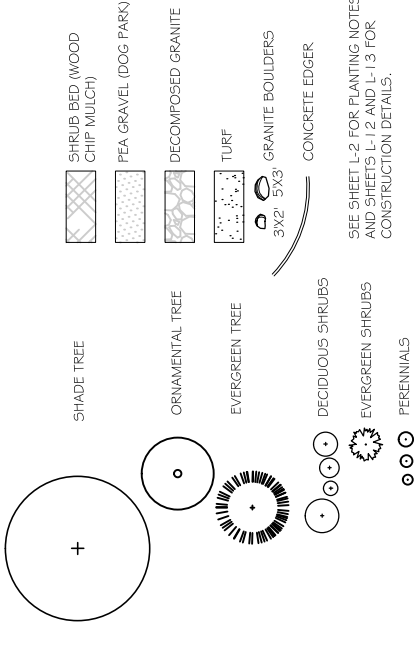


PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN



LANDSCAPE LEGEND



SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

PLANT LIST, NO QUANTITIES

Key	Common Name
Deciduous Trees	
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBV	Hackberry
HLO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JPT	Japanese Prunella Tree
NFP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn
Evergreen Trees	
FPN	Finon Pine
WJU	Wichita Juniper
Deciduous Shrubs	
AAS	Autumn Amber Sumac
APF	Apache Plum
APR	Aproditte Rose of Sharon
BMS	Blue Mist Spruce
DBB	Dwarf Burmia Bush
DBR	Dwarf Blue Rabbit Ebnah
FNB	Fern Bush
GLS	Green Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Bloom
LED	Leadplant
Evergreen Shrubs	
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Pawnee Buttes Sand Cherry
FCS	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RS	Rock Spruce
SCI	Shadeleaf
SDS	Sand Sagebrush
SFB	Spiral Gold Bloom
WSC	Western Sand Cherry
Evergreen Shrubs	
ANJ	Ancient Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Mahonia
HGJ	Hughes Juniper
MJJ	Mint Juniper

Common Name	Scientific Name	% of Mix by Qty
Blond Ambition Blue Grama Grass	BBG	20%
Blaze Little Bluestem Grass	BLB	20%
Colorado Orange Hyssop	COH	10%
Cheyenne Sky Frame Switch Grass	C5G	10%
Dwarf Fountain Grass	DFG	10%
Feather Reed Grass	FRG	10%
Munstead Lavender	LVM	10%
Moonline Yarrow	MYW	10%
Sand Love Grass	SLG	10%
Sunset Huesop	SUN	10%
Undaunted Baby Mully Grass	UMG	30%

NOTES:
1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
2. QUANTITIES FOR SHEET 1 ARE NOT INCLUDED IN BID SCHEDULE

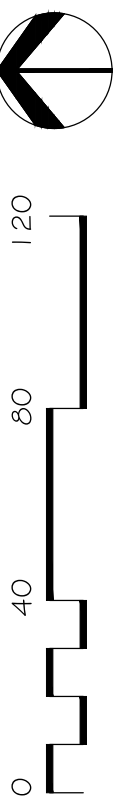
NATIVE SEED MIX

COMMON NAME	SCIENTIFIC NAME	% OF MIX BY QTY
GALLET GRASS	HILARIA JAMESII	20%
SAND DROPSIED	SPOROBOLUS CRYPTANDRUS	20%
SANDBERG BLUEGRASS	POA SECUNDA	10%
NEEDLE & THREAD GRASS	STIPA COMATA	10%
SHEEP FESCUE	FESTUCA OVINA 'COVAR'	10%
WESTERN WHEATGRASS	AGROPYRON SMITHII 'ARRIBA'	30%

SEED AT 10 LB/ACRE IN IRRIGATED AREAS



KEY MAP



REVISION Δ REVISION Δ REVISION Δ REVISION Δ	DESCRIPTION	DATE	DRAWN BY	MH	DATE	7/7/2018	SCALES:	PLAN & PROFILE
			DESIGNED BY	CR	DATE	7/7/2018	0' = 10'-0" (HORIZONTAL)	
			CHECKED BY	CR	DATE	7/7/2018		
			APPROVED BY	ZZ	DATE	7/7/2018		
PUBLIC WORKS ENGINEERING DIVISION			LAS COLONIAS BUSINESS PARK LANDSCAPE PLAN			GRAND JUNCTION COLORADO		
			CAVONNE ROBERTS & ASSOCIATES, INC. LAND PLANNING AND LANDSCAPE ARCHITECTURE			L-10 175		

LLM	Littleleaf Mockorange
NMP	New Mexico Eriogonum
FBC	Fawnite Buttes Sand Cherry
FC3	Forns Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spruce
SCL	Shadscale
SOS	Sand Sagebrush
SPB	Spanish Gold Broom
W5C	Western Sand Cherry

AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GAZ	Green Vase Zelkova
HBV	Hackberry
HLO	Honeylocust
HLI	Imperial Honeylocust
IMC	Indian Magic Crabapple
JFT	Japanese Fatsia Tree
NFF	Newport Flum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

Evergreen Trees	
PFN	Pinon Pine
WJU	Wichita Juniper

Deciduous Shrubs	
AAS	Autumn Amber Sumac
APP	Aspen Pine
APR	Arctic Rose of Sharon
BLM	Blue Mist Spruce
DBB	Dwarf Blowing Bush
FNB	Fern Bush
GL5	Gre Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant

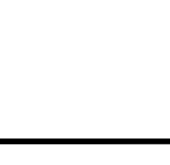
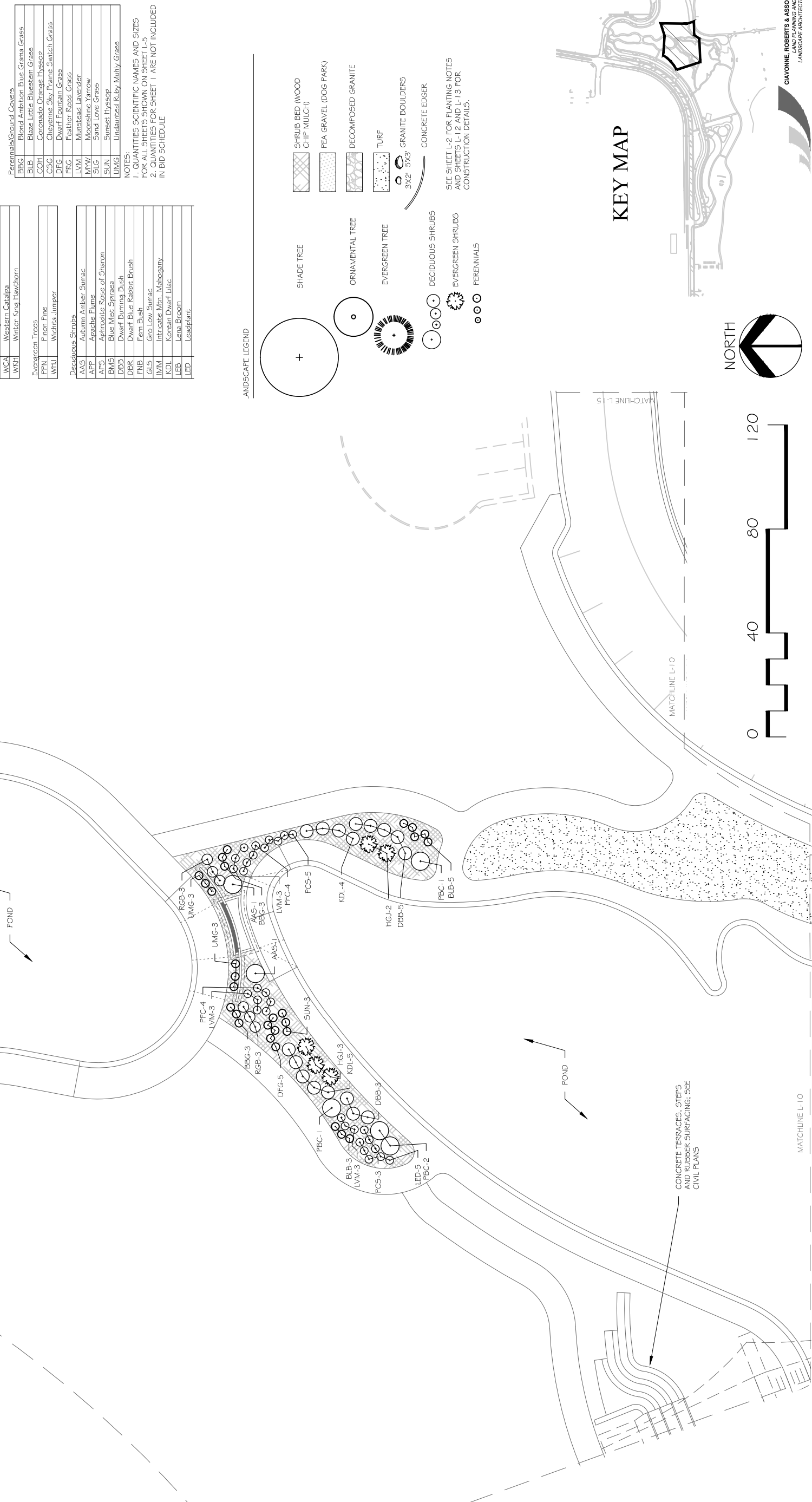
Perennials/Grass Covers	
BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Moonside Yarrow
MWV	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Muhly Grass

Evergreen Shrubs	
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Mahonia
HGJ	Hughes Juniper
MJJ	Mont Julep Juniper

Deciduous Trees	
SHD	Shade Tree
ORN	Ornamental Tree
EVG	Evergreen Tree
DCS	Deciduous Shrubs
EVG	Evergreen Shrubs
PER	Perennials

Shrub Bed (Wood Chip Mulch)	
FEA	Fea Gravel (Dog Park)
DGR	Decomposed Granite
TUR	Turf
GBL	3x2' 5x3' Granite Boulders
CEG	Concrete Edger

NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET 1 ARE NOT INCLUDED IN BID SCHEDULE



CONCRETE TERRACES, STEPS AND RUBBER SURFACING; SEE CIVIL PLANS

LLM	Littleleaf Mockorange
NMP	New Mexico Eriogonum
FBC	Fawnite Buttes Sand Cherry
FC3	Forns Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spruce
SCL	Shadscale
SOS	Sand Sagebrush
SPB	Spanish Gold Broom
W5C	Western Sand Cherry
Evergreen Shrubs	
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Mahonia
HGJ	Hughes Juniper
MJJ	Mont Julep Juniper
Perennials/Grass Covers	
BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Moonside Yarrow
MWV	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Muhly Grass

Deciduous Trees	
PFN	Pinon Pine
WJU	Wichita Juniper

Deciduous Shrubs	
AAS	Autumn Amber Sumac
APP	Aspen Pine
APR	Arctic Rose of Sharon
BLM	Blue Mist Spruce
DBB	Dwarf Blowing Bush
FNB	Fern Bush
GL5	Gre Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant

Shrub Bed (Wood Chip Mulch)	
FEA	Fea Gravel (Dog Park)
DGR	Decomposed Granite
TUR	Turf
GBL	3'x2' 5'x3' Granite Boulders
CEG	Concrete Edger

NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET 1 ARE NOT INCLUDED IN BID SCHEDULE

REVISION DATE _____ DESCRIPTION _____

REVISION DATE _____ DESCRIPTION _____

REVISION DATE _____ DESCRIPTION _____

REVISION DATE _____ DESCRIPTION _____

DRAWN BY _____ DATE 7/7/2018

DESIGNED BY _____ DATE 7/7/2018

CHECKED BY _____ DATE 7/7/2018

APPROVED BY _____ DATE 7/7/2018

SCALES: PLAN & PROFILE 1"=30'

CITY OF GRAND JUNCTION, COLORADO

Grand Junction

PUBLIC WORKS ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK LANDSCAPE PLAN

CIIVONNE ROBERTS & ASSOCIATES, INC. LAND PLANNING AND LANDSCAPE ARCHITECTURE

L-176

PLANT LIST - NO QUANTITIES

Key	Common Name
Deciduous Trees	
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GZV	Green Vase Zelkova
HBY	Hackberry
HLO	Sunburst Honeylocust
JHL	Imperial Honeylocust
JMC	Indian Magic Crabapple
JPT	Japanese Pagoda Tree
NPT	Newport Plum
SBE	Sensation Box Elder
SKH	Skylark Honeylocust
SEC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

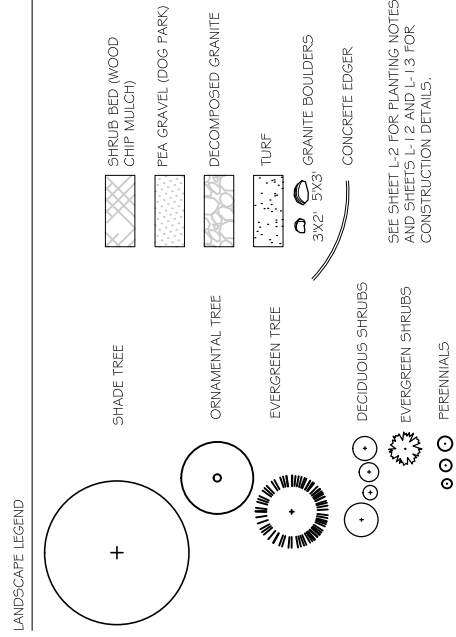
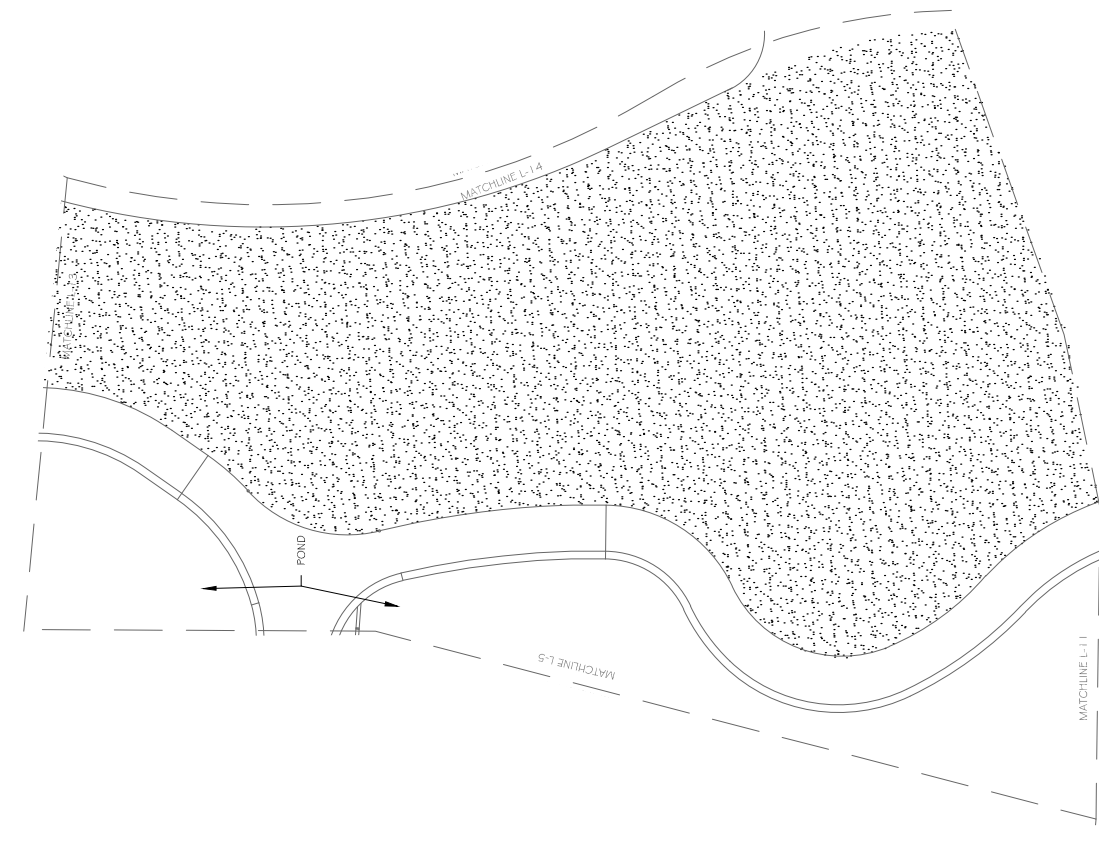
Evergreen Trees	
PPN	Pinon Pine
WTH	Wichita Juniper

Deciduous Shrubs	
AA5	Autumn Amber Sumac
APP	Apache Plume
AP5	Aprochite Rose of Sharon
BM5	Blue Mist Spiraea
DBB	Dwarf Burmese Bush
DB8	Dwarf Blue Rabbit Bush
FNB	Fern Bush
GL5	Grass Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LEB	Lesaplant
LIM	Littleleaf Mockorange
NMP	New Mexico Fruit
PBC	Pawnee Buffels Sand Cherry
PCS	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spiraea
SCL	Shadscale
SD5	Sand Sagebrush
SFB	Spanish Gold Broom
WSC	Western Sand Cherry

Evergreen Shrubs	
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Malonia
HGJ	Hughes Juniper
MJJ	Mint Julep Juniper

Perennials/Ground Covers	
BBG	Blond Ambition Blue Grama Grass
BLD	Blaze Little Bluestem Grass
COH	Coronado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Munstead Lavender
MTW	Moonshine Yarrow
SIG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Mully Grass

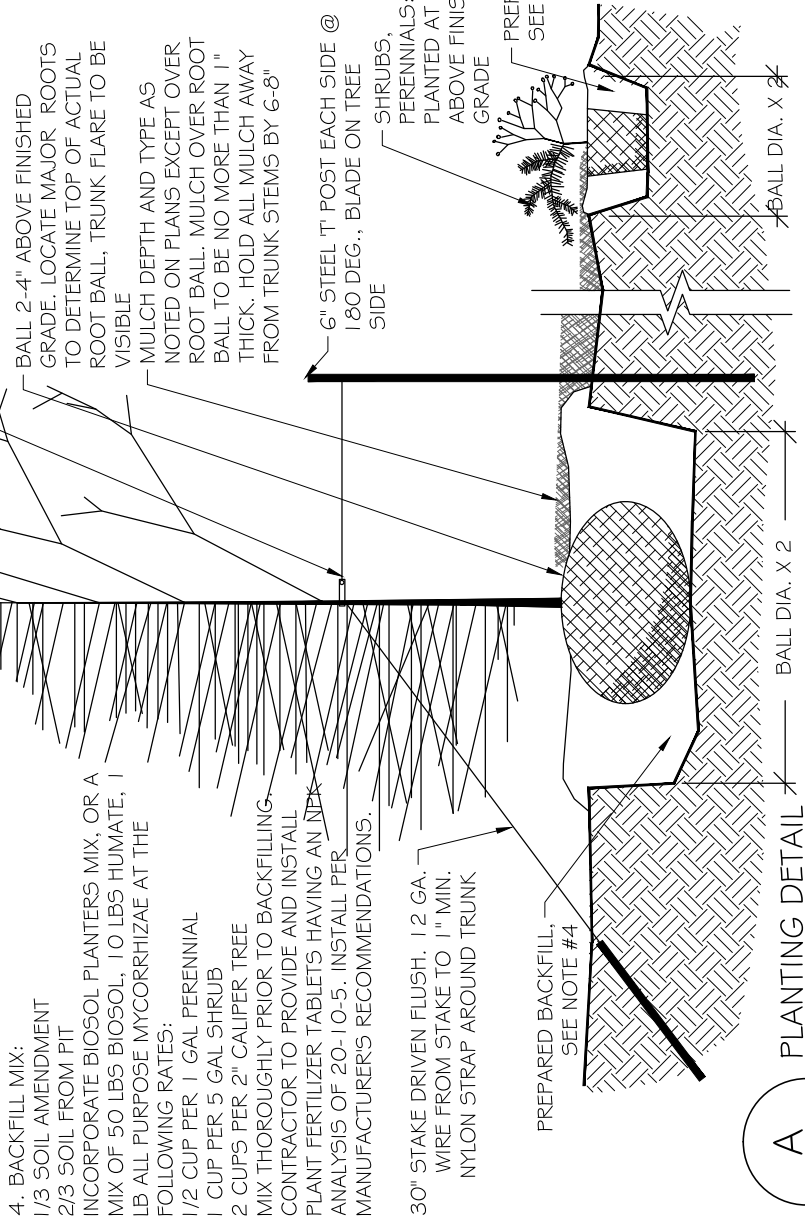
NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET L ARE NOT INCLUDED IN BID SCHEDULE



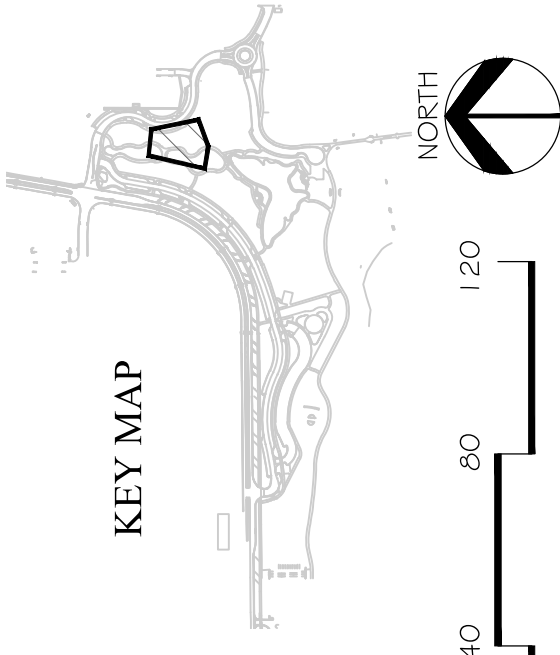
SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

EVERGREEN (OPPOSITE SIDE SAME) DECIDUOUS (OPPOSITE SIDE SAME)

NOTES:
 1. ALL BEDS SHALL BE PITCHED TO DRAIN AT 3% MIN.
 2. ALL BEDS TO RECEIVE WEED CONTROL FABRIC ON FINISHED GRADE UNDER MULCH UNLESS OTHERWISE NOTED.
 3. SPRAY DECIDUOUS TREE TRUNK WITH INSECTICIDE. WRAP WITH 4" TREE WRAP FROM BOTTOM UP TO SECOND BRANCH. TAPE IN MIN. 3 PLACES.
 4. BACKFILL MIX:
 1/3 SOIL AMENDMENT
 2/3 SOIL FROM PIT
 INCORPORATE BIOSOL PLANTERS MIX, OR A MIX OF 50 LBS BIOSOL, 10 LBS HUMATE, 1 LB ALL PURPOSE MYCORRHIZAE AT THE FOLLOWING RATES:
 1/2 CUP PER 1 GAL PERENNIAL
 1 CUP PER 5 GAL SHRUB
 2 CUPS PER 2" CALIFPER TREE
 MIX THOROUGHLY PRIOR TO BACKFILLING. CONTRACTOR TO PROVIDE AND INSTALL PLANT FERTILIZER TABLETS HAVING AN NPK ANALYSIS OF 20-10-5. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
 30" STAKE DRIVEN FLUSH. 12 GA. WIRE FROM STAKE TO 1" MIN. NYLON STRAP AROUND TRUNK



A PLANTING DETAIL
 L-12 NOT TO SCALE



KEY MAP

CAVONNE ROBERTS & ASSOCIATES, INC.
 LAND PLANNING AND
 LANDSCAPE ARCHITECTURE

REVISION	DATE	DESCRIPTION

DRAWN BY	DATE	SCALE	PLAN & PROFILE
MH	7/17/2018	1" = 30'	
DESIGNED BY	DATE		
MH	7/17/2018		
CHECKED BY	DATE		
CR	7/17/2018		
APPROVED BY	DATE		
ZZ	7/17/2018		

CITY OF
Grand Junction
 COLORADO

PUBLIC WORKS
 ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
 LANDSCAPE PLAN

PLANT LIST, NO QUANTITIES

Key	Common Name
Deciduous Trees	
AGG	Auburn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBV	Hickberry
HLO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JFT	Japanese Pagoda Tree
NFP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
S9C	Spring Snow Crabapple
V6Z	Village Green Zelkova
WCA	Western Catalpa
WKT	Winter King Hardhorn

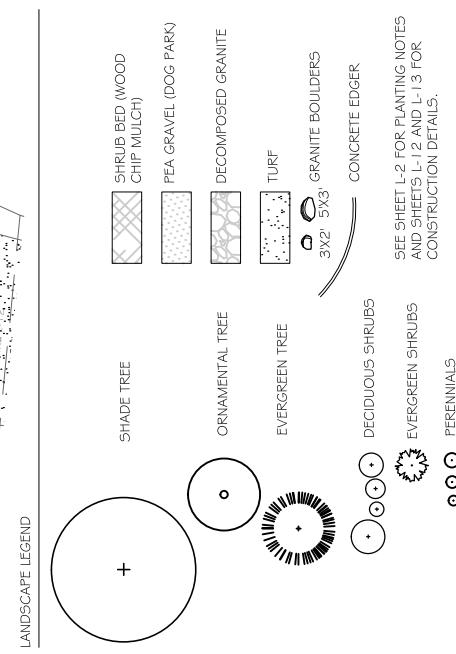
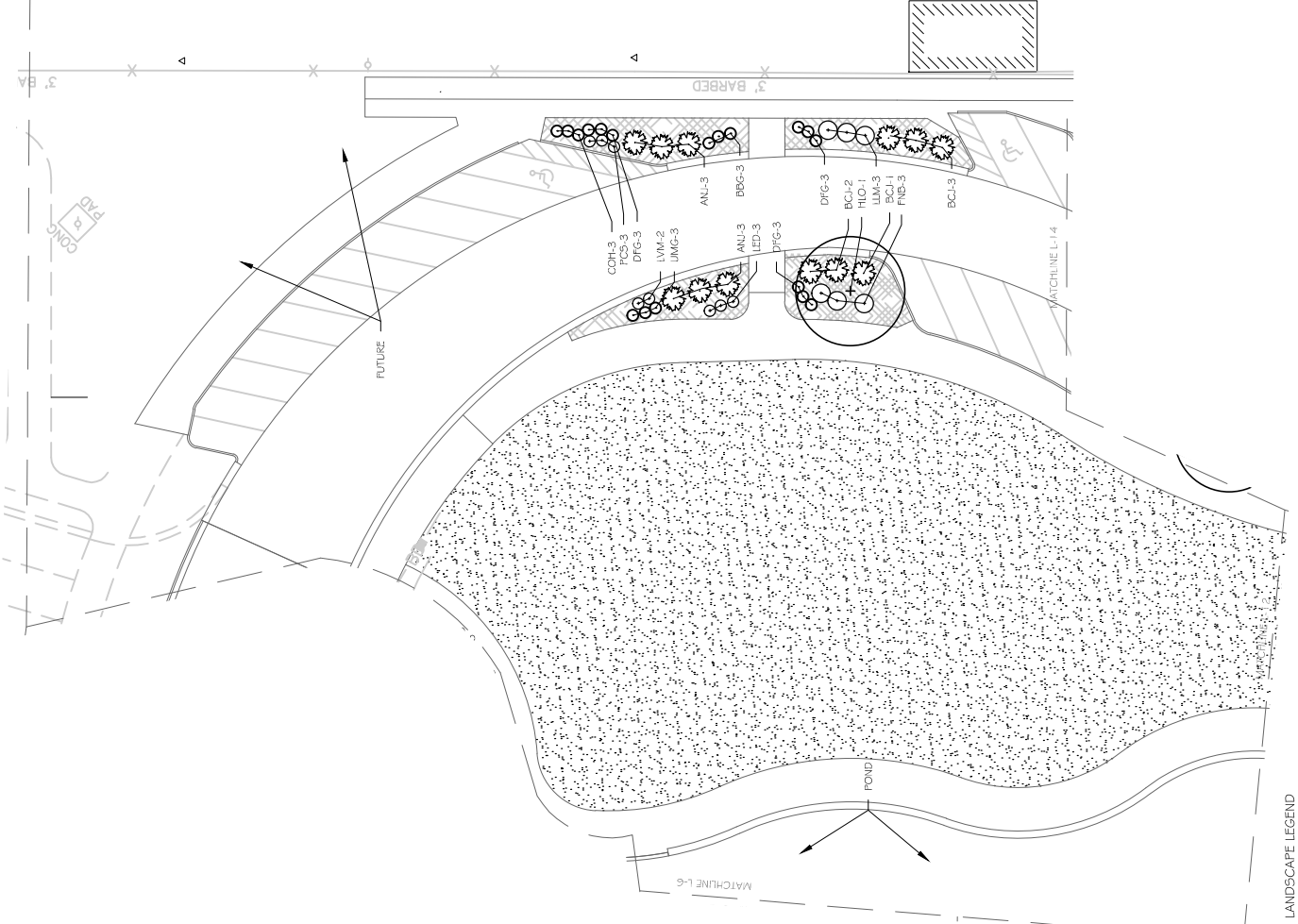
Evergreen Trees	
PPN	Pinon Pine
WTJ	Witchita Juniper

Deciduous Shrubs	
AAS	Autumn Amber Sumac
APP	Apache Plum
AFS	Apricotlike Rose of Sharon
BW5	Blue Mist Spiraea
DBB	Dwarf Burning Bush
DBR	Dwarf Blue Rabbit Brush
FNB	Fern Bush
GL5	Gr. Low Sumac
IMM	Intricate Mtn. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Panicle Bluetop Sand Cherry
PCS	Powis Castle Sage
FTC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spiraea
SCL	Shadscale
SD5	Sand Sagebrush
SFB	Spanish Gold Broom
WSC	Western Sand Cherry

Evergreen Shrubs	
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Mahonia
HGJ	Hughes Juniper
MJJ	Mint Jubilee Juniper

Perennials/Ground Covers	
BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
CSG	Cheyenne Sky Prairie Switchgrass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Muskeget Lavender
MTW	Moonshime Tarragon
SUG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Mully Grass

NOTES:
 1. QUANTITIES, SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET L ARE NOT INCLUDED IN BID SCHEDULE



SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-1, 4 AND L-13 FOR CONSTRUCTION DETAILS.

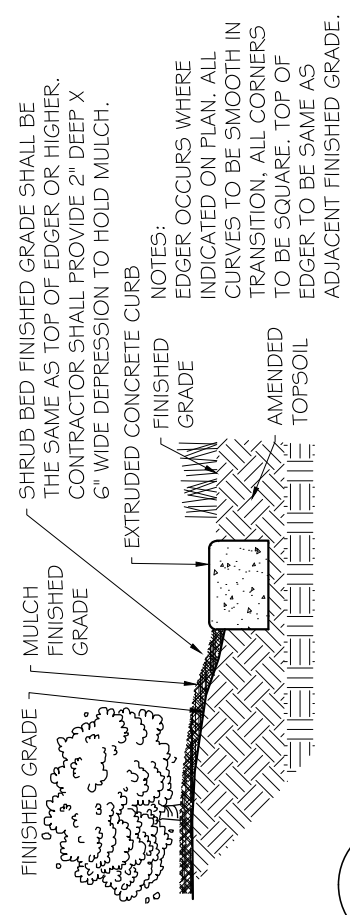
REVISION	DATE	DESCRIPTION

SCALE	DATE	DATE	DATE	DATE
PLAN & PROFILE	7/7/2018	7/7/2018	7/7/2018	7/7/2018
DESIGNED BY	MH	DATE	DATE	DATE
CHECKED BY	CR	DATE	DATE	DATE
APPROVED BY	ZZ	DATE	DATE	DATE

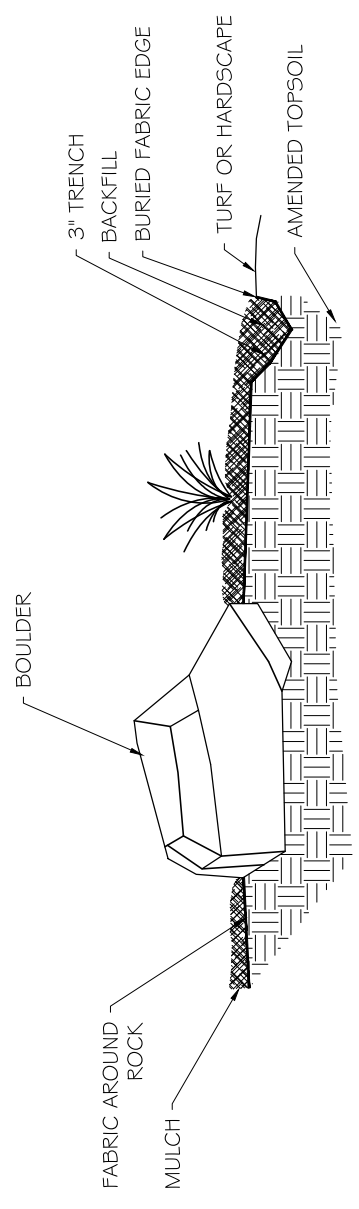


PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

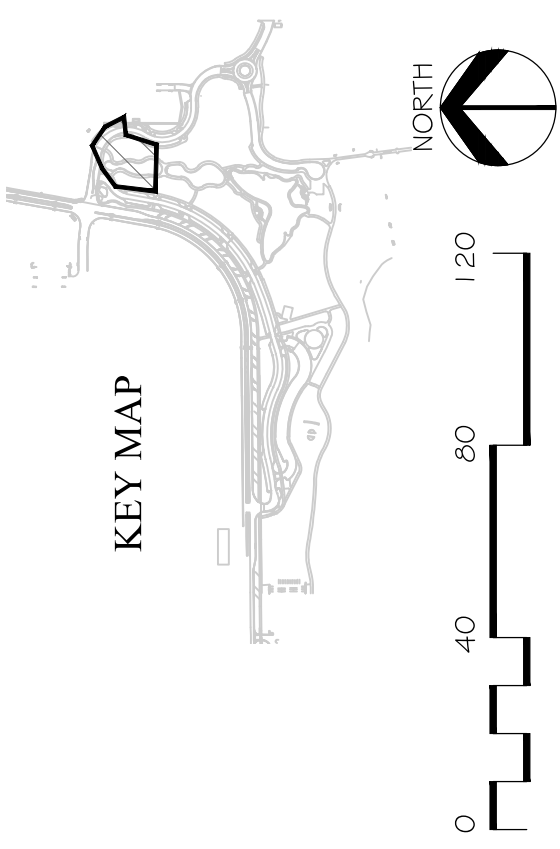


B CONCRETE MOWSTRIP
L-13
NOT TO SCALE

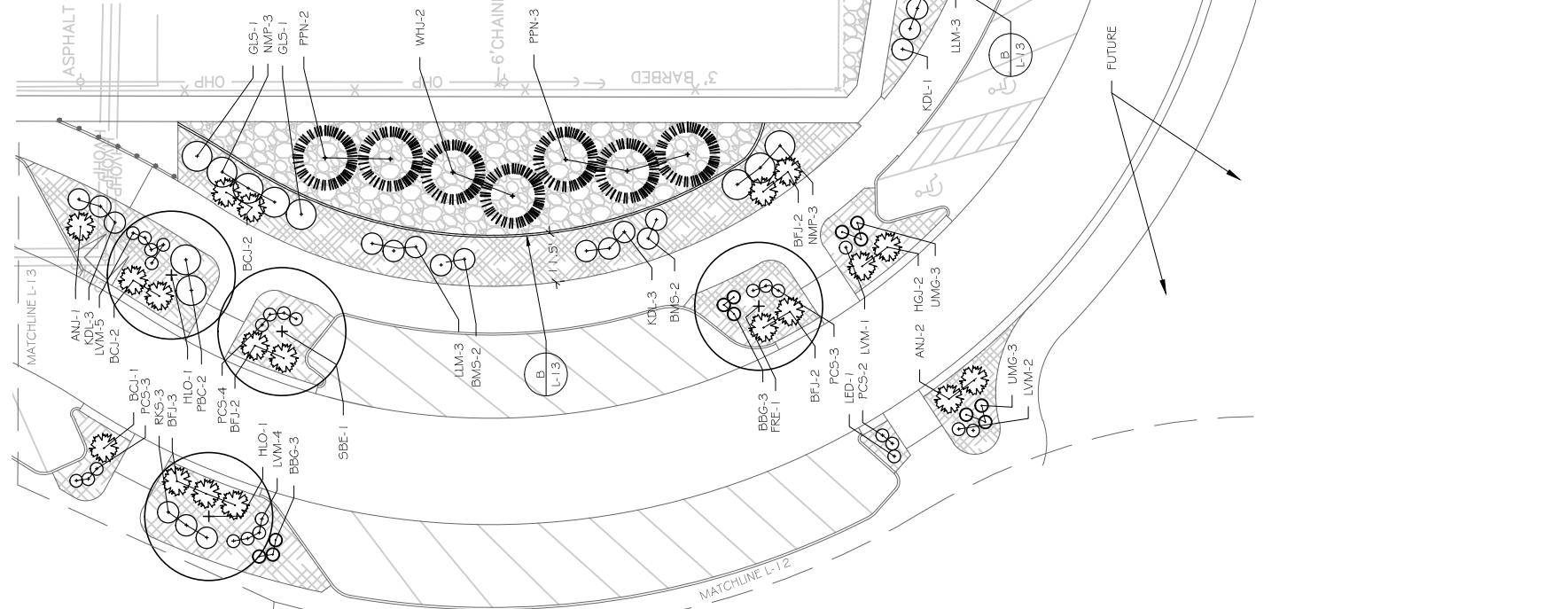


C DECORATIVE BOULDER PLACEMENT
L-13
NOT TO SCALE

KEY MAP



CIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE



PLANT LIST, NO QUANTITIES

Key	Common Name
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Pawnee Buttes Sand Cherry
FCS	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spirea
SCL	Shadscale
SDS	Sand Sagebrush
SFB	Spanish Gold Broom
WSC	Western Sand Cherry

Key	Common Name
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
CVZ	Green Vase Zelkova
TBT	Hickberry
HTO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JPT	Japanese Pagoda Tree
NFP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
SSC	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

Key	Common Name
PPN	Pinon Pine
WCH	Wichita Juniper

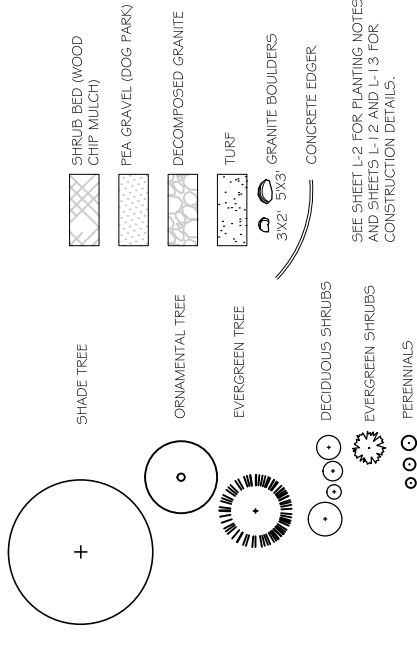
Key	Common Name
AAS	Autumn Amber Sumac
APP	Apache Plume
APS	Aprostadia Rose of Sharon
BMS	Blue Mist Spirea
DBB	Dwarf Burning Bush
DNB	Dwarf Blue Rabbit Bush
FNB	Fern Bush
GLS	Gro Low Sumac
IMM	Intricate Min. Mahogany
KDL	Korean Dwarf Lilac
LEB	Lena Broom
LED	Leadplant

Key	Common Name
ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Manilla
HGI	Higgins Juniper
MJJ	Mt. Julep Juniper

Key	Common Name
BBG	Blond Ambition Blue Grama Grass
BLB	Blaze Little Bluestem Grass
COH	Coronado Orange Hyssop
CSG	Cheyenne Sky Prairie Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Moonshead Lavender
MYW	Moopahine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMG	Undaunted Ruby Mully Grass

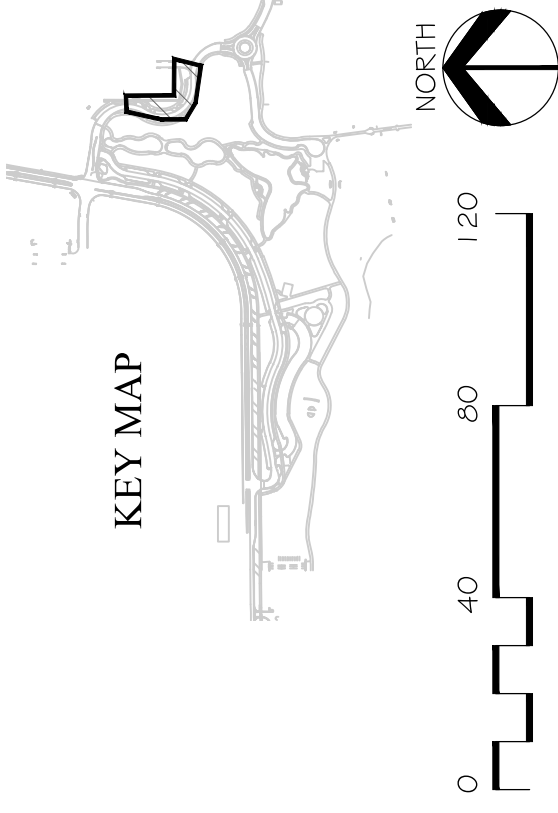
NOTES:
 1. QUANTITIES SCIENTIFIC NAMES AND SIZES FOR ALL SHEETS SHOWN ON SHEET L-5
 2. QUANTITIES FOR SHEET L-1 ARE NOT INCLUDED IN BID SCHEDULE

LANDSCAPE LEGEND



SEE SHEET L-2 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

KEY MAP



REVISION	DESCRIPTION	DATE	DRAWN BY	DATE	DATE	DATE	DATE
△				7/7/2018	7/7/2018	7/7/2018	7/7/2018
△							
△							
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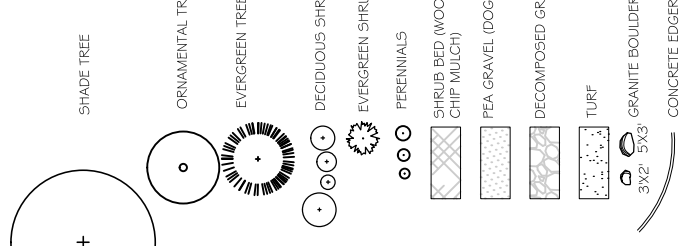


PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

CIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

LANDSCAPE LEGEND



SEE SHEET L-7 FOR PLANTING NOTES AND SHEETS L-12 AND L-13 FOR CONSTRUCTION DETAILS.

NATIVE SEED MIX

COMMON NAME	SCIENTIFIC NAME	% OF MIX BY QTY
GALLETTA GRASS	HILARIA JAMESII	20%
SAND DROPSIED	SFORBOLUS CRYPTANDRUS	20%
SANDBERG BULLGRASS	POA SECUNDA	10%
NEEDLE & THREAD GRASS	STIPA COMATA	10%
SHEEP FESCUE	FESTUCA OVINA 'COVAR'	10%
WESTERN WHEATGRASS	AGROPYRON SMITHII 'ARRIBA'	30%

SEED AT 1.0 LB/ACRE IN IRRIGATED AREAS

PLANT LIST, NO QUANTITIES

Key	Common Name
AGG	Autumn Gold Ginkgo
BOK	Burr Oak
FRE	Frontier Elm
GVZ	Green Vase Zelkova
HBV	Hackberry
HLO	Sunburst Honeylocust
IHL	Imperial Honeylocust
IMC	Indian Magic Crabapple
JFT	Japanese Pagoda Tree
NPP	Newport Plum
SBE	Sensation Box Elder
SKH	Skyline Honeylocust
S5C	Spring Snow Crabapple
VGZ	Village Green Zelkova
WCA	Western Catalpa
WKH	Winter King Hawthorn

Key	Common Name
LLM	Littleleaf Mockorange
NMP	New Mexico Privet
PBC	Palmee Buttes Sand Cherry
FCS	Powis Castle Sage
PFC	Pink Flower Carpet Rose
RGB	Rose Glow Barberry
RKS	Rock Spiraea
SCL	Shadscale
SDS	Sand Sagebrush
SFB	Spanish Gold Bloom
WSC	Western Sand Cherry

Evergreen Shrubs

ANJ	Andorra Juniper
BCJ	Blue Chip Juniper
BFJ	Buffalo Juniper
FMH	Fremont Maloinia
HGJ	Hughes Juniper
MJJ	Mint Julep Juniper

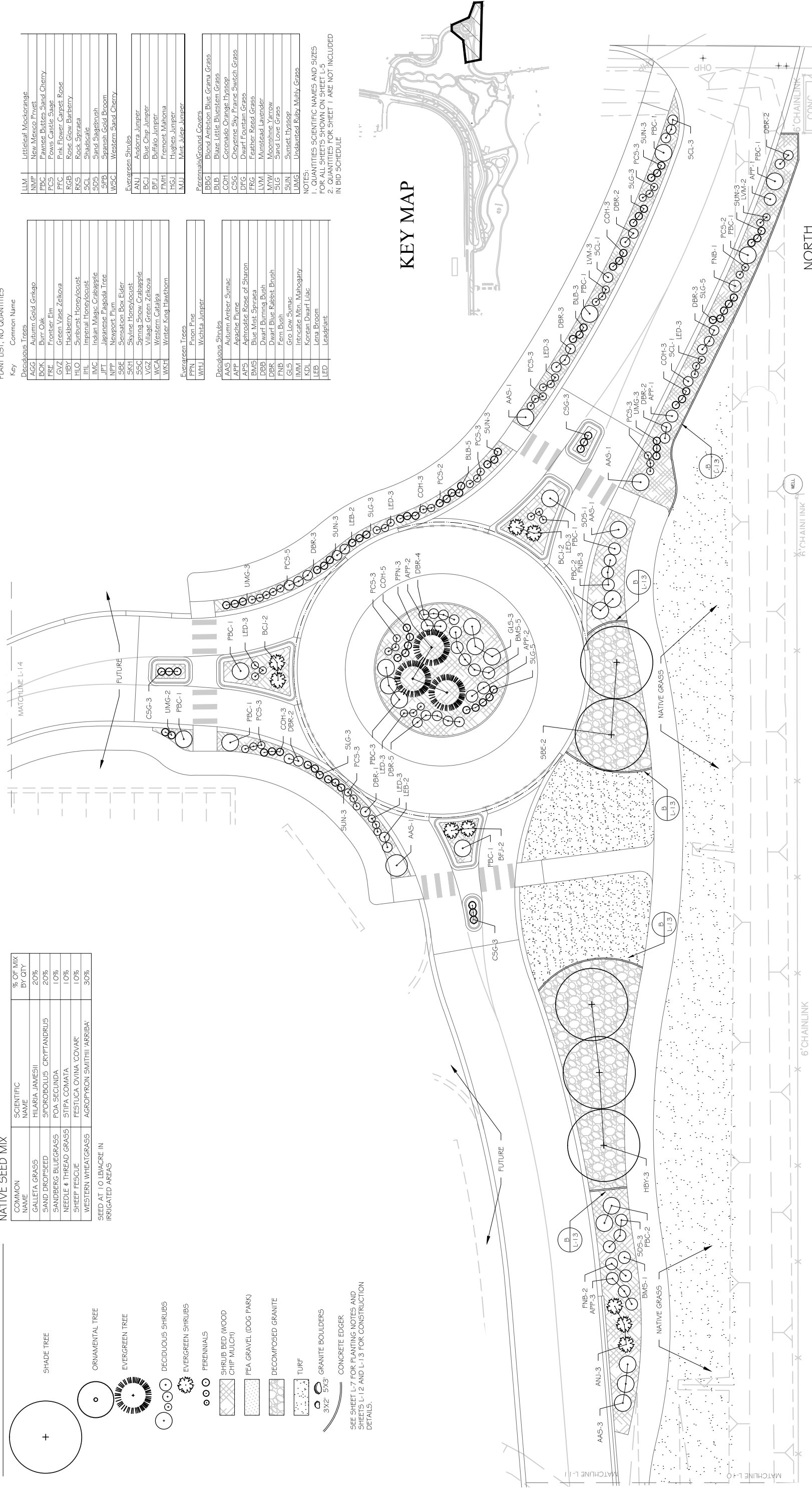
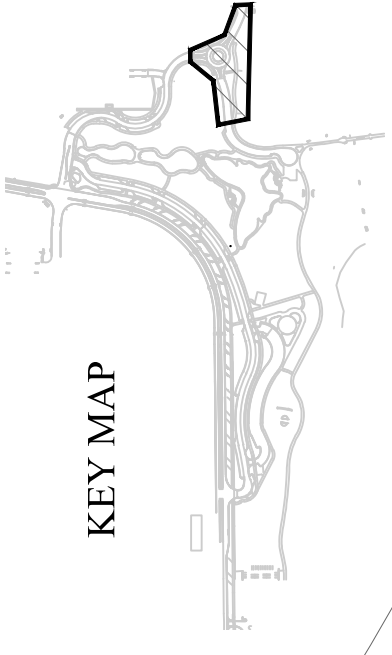
Perennials/Ground Covers

BBS	Blood Ambrosia Blue Grama Grass
BLD	Blaze Little Bluestem Grass
COH	Colorado Orange Hyssop
CSG	Cheyenne Sky Frame Switch Grass
DFG	Dwarf Fountain Grass
FRG	Feather Reed Grass
LVM	Munkehead Lavender
MYW	Moonshine Yarrow
SLG	Sand Love Grass
SUN	Sunset Hyssop
UMJG	Undaunted Ruby Mullly Grass

Deciduous Shrubs

AA5	Autumn Amber Sumac
APP	Apache Plume
APS	Aphrodite Rose of Sharon
BMS	Blue Mist Spirea
DBB	Dwarf Burning Bush
DBR	Dwarf Blue Rabbit Bush
FNB	Fern Bush
GL5	Gro Low Sumac
IMM	Intricate Mtn. Mahogany
KDI	Korean Dwarf Lilac
LEB	Lena Bloom
LED	Leadplant

KEY MAP



REVISION	DESCRIPTION	DATE

DRAWN BY	DATE
MH	7/7/2018

DESIGNED BY	DATE
MH	7/7/2018

CHECKED BY	DATE
CR	7/7/2018

APPROVED BY	DATE
CR	7/7/2018



PUBLIC WORKS
ENGINEERING DIVISION

LAS COLONIAS BUSINESS PARK
LANDSCAPE PLAN

CIAVONNE ROBERTS & ASSOCIATES, INC.
LAND PLANNING AND
LANDSCAPE ARCHITECTURE

Appendix C

Las Colonias Park Shoreline Amenities

- River Construction Specifications
- Bid Schedule Descriptions

LAS COLONIAS PARK SHORELINE AMENITIES PROJECT COLORADO RIVER GRAND JUNCTION, CO JULY 8, 2018

General Notes:

1. The Contractor shall conform to the Technical Specifications dated July 8, 2018. In the case of any discrepancy between the Drawings and Technical Specifications, the Technical Specifications shall prevail.
2. The Contractor shall conform to all City of Grand Junction rules, regulations and stipulations while accessing through or working within the site.
3. Utilities marked on Plans are approximate. The Contractor is wholly responsible for field locating any and all utilities and their protection. The Contractor is made aware that conflicts with existing utility services may exist. Prior to beginning any construction, the Contractor shall contact all appropriate utility companies for line locations, and Contractor shall then locate all utilities (including depth). Utilities that are damaged by the Contractor shall be repaired by the Contractor at no expense to the Owner or Engineer.
4. The Contractor shall obtain at their expense all permits and inspections which are necessary to perform the proposed work.
5. Contractor shall not scale drawings for construction purposes. Any missing dimensions or discrepancies in plans, field staking or physical features shall be brought to the attention of the Engineer. If the Contractor proceeds with the work without notifying the Engineer, he does so at his own risk.
6. Observations of the work in progress and on-site visits are not to be construed as a guarantee or warranty by the Engineer of the Contractor's contractual responsibilities.
7. The Contractor is responsible for all coordination of stockpiling of materials. The Contractor shall coordinate with the Owner and the material supplier.
8. Initial Construction Staking shall be provided by the Owner. The Contractor is responsible for maintaining or restaking.
9. Safety is the responsibility of the Contractor. The Engineer is not responsible for safety in, on, or around the project site, nor for compliance by the appropriate party with any regulations relating thereto.
10. All fill material to be compacted and tested per Technical Specifications.
11. The Contractor shall take all appropriate precautions to significantly reduce any potential pollution caused by his activities, including vehicle fueling, storage of fertilizers or chemicals, etc. The Contractor shall have identified procedures for handling potential pollutants and have identified spill prevention and response procedures prior to any activities at the project site.
12. The Contractor shall keep 2 sets of contract drawings marked to fully indicate as-built conditions. The drawings shall be provided to the Owner and RiverRestoration upon completion of this work. The drawings, fittings, valves and instructions to physical manufacturers are to be provided by the Contractor.
13. The construction of all roads, sidewalks, curbs, earthwork and other infrastructure development not specifically specified by separate utility companies, shall be constructed to the latest editions and latest revisions of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction and CDOT Traffic Standard Project Plans. The Contractor shall obtain copies of these specifications and plans. The Contractor shall have one copy of the plans and one copy of the specifications at the job site at all times.
14. All site development will be constructed to the above mentioned Colorado Department of Transportation Standard Specifications for Road and Bridge Construction and CDOT Traffic Standard Project Plans. Use Regulations as may be applicable. When standards conflict, the standard judged most appropriate by the Engineer shall prevail. The Contractor shall obtain copies of the Mesa County Land Use Regulations in its most current edition and have that copy on the site at all times.
15. All utility construction shall be in compliance with respective utility company standards specifications and details. When standards conflict, the standard judged most appropriate by the Engineer shall prevail.
16. Road subgrade and finished aggregate base course shall be proof rolled and free of deflection meeting a required specifications or to the satisfaction of the Owner. Any failing areas shall be repaired and proof rolled again until accepted by Engineer, with no additional cost to Owner.
17. Topsoil shall be stripped and stockpiled.
18. Contractor is responsible for daily cleaning of public streets and paths necessitated by his activities on the site.
19. Contractor is responsible for dust control of the construction site at all times.
20. Contractor shall employ "Best Management Practices" at all times.
21. All temporary discharges are subject to the provisions of the Colorado Water Quality Act and the Colorado Discharge Permit Regulations. The Owner shall obtain at their expense any and all discharge permits necessary to perform the proposed work.

CONTACTS

Traci Wieland
 Recreation Superintendent
 Grand Junction Parks and Recreation
 (970) 254-3846

Scott Prins, P.E.
 Project Engineer
 RiverRestoration.org, LLC.
 (970)-947-9568

SHEET INDEX

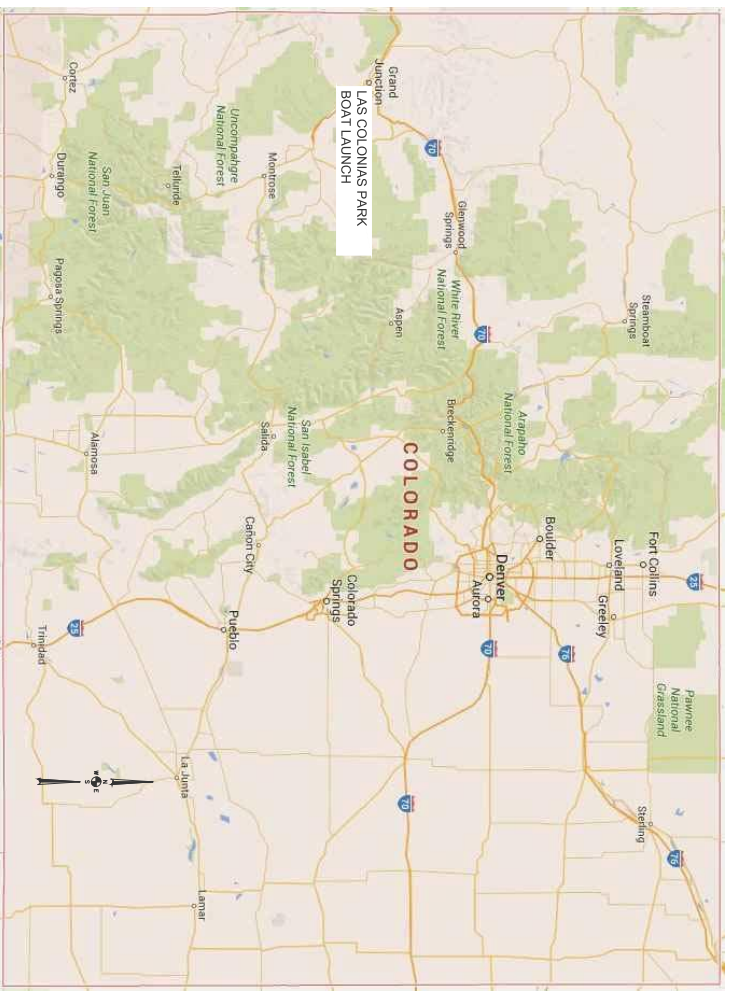
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G01	COVER SHEET
EC01	E.C. AND C.O.W. PLAN
EC02	E.C. AND C.O.W. DETAILS
EC03	E.C. AND C.O.W. DETAILS
R01	CONSTRUCTION SITE PLAN
R02	BOAT RAMP PLAN AND PROFILE
R03	BOAT RAMP DESIGN SECTION
R04	TERRACED LANDING PLAN AND PROFILE
R05	PARKING LOT AND TURNAROUND PLAN AND PROFILE
R06	PARKING LOT AND TURNAROUND GRADING PLAN
D01	BOAT RAMP DETAILS 1
D02	BOAT RAMP DETAILS 2
D03	PARKING STALL DETAIL
D04	EROSION CONTROL BLANKET INSTALLATION DETAIL I
D05	EROSION CONTROL BLANKET INSTALLATION DETAIL II

LOCATION MAP



VICINITY MAP

State of Colorado



LAS COLONIAS PARK SHORELINE AMENITIES PROJECT COVER SHEET

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

**City of Grand Junction
 Parks and Recreation
 250 North 5th Street
 Grand Junction, CO 81501
 970.245.3866**

DESIGN FIRM NAME AND ADDRESS

**RIVER
 Restoration
 P.O. Box 248
 Carbonade, CO 81623
 www.RiverRestoration.org**

PROJECT NAME AND ADDRESS

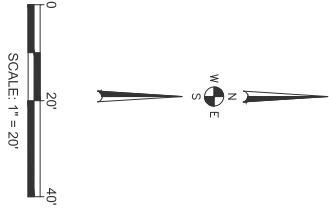
**Las Colonias Park Slough
 Restoration Project
 Las Colonias Park
 Grand Junction, CO 81501**

Project No.	11.0024.003	Sheet	G01
Date	JULY 2018		
Scale	NTS		



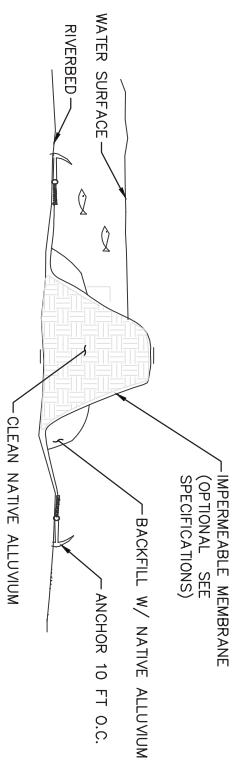
CONSTRUCTION NOTES:

1. ALL CONCRETE LADEN WATER MUST BE CONTAINED OR EVAPORATED ONSITE AND NOT RETURNED TO THE COLORADO RIVER OR CONNECTING DRAINAGES
2. CONTRACTOR SHALL UPDATE CARE OF WATER PLANS PER ACTUAL IMPLEMENTATION
3. CONFORM TO ALL SPECIAL CONDITIONS AND ENCLOSURES OF PERMIT NUMBER SPK 2017-01049 PER LETTER DATED 6/27/2018
4. ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR
 THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA



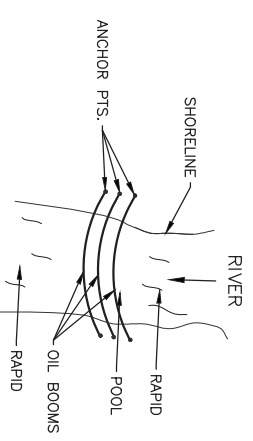
LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL AND CARE OF
WATER PLAN

No.	REVISION/UPDATE	Date
CLIENT NAME AND ADDRESS		
City of Grand Junction Parks and Recreation 250 North 5th Street Grand Junction, CO 81501 970.245.3866		
DESIGN FIRM NAME AND ADDRESS		
 RiverRestoration P.O. Box 248 Carbondale, CO 81623 www.RiverRestoration.org		
PROJECT NAME AND ADDRESS		
Las Colonias Park Slough Restoration Project Las Colonias Park Grand Junction, CO 81501		
Project	11.CO24.003	Sheet
Date	JULY 2016	ECO1
Scale		



ALLUVIAL COFFER (TYP.)
SECTION VIEW-NTS

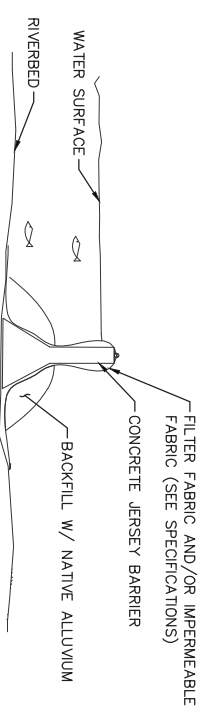
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PLAN VIEW
TYPICAL LAYOUT FOR STREAMS AND RIVERS
TO BE PLACED DOWNSTREAM OF
ANY EQUIPMENT WORKING IN THE WET

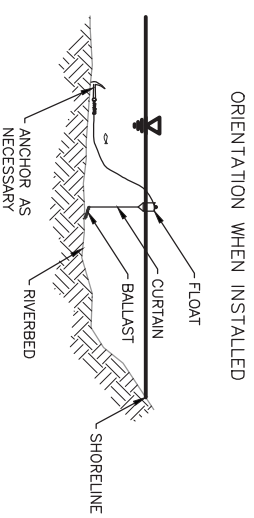
OIL BOOM (TYP.)
PLAN VIEW-NTS

2
ECO2

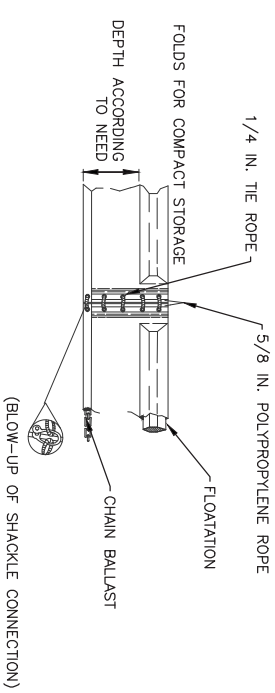


CONCRETE BARRIER COFFER DAM (TYP.)
SECTION VIEW-NTS

3
ECO2

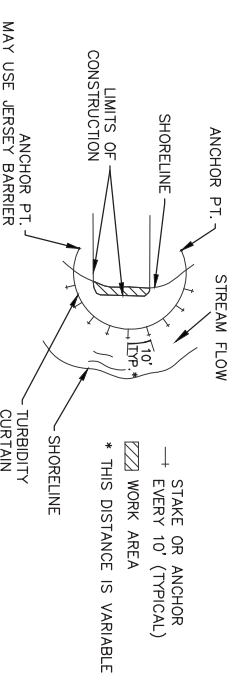


TURBIDITY CURTAIN (TYP.)
SECTION VIEW-NTS



SILMASTER II PERMEABLE GEOTEXTILE
DREDGE BARRIER NON-WOVEN DBNW
BY PARKERSYSTEMS OR EQUIVALENT

TURBIDITY CURTAIN (TYP.)
PROFILE VIEW-NTS

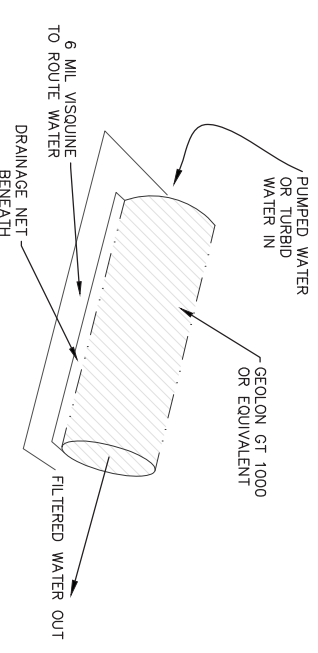


TYPICAL LAYOUTS
STREAMS, PONDS, AND LAKES (PROTECTED AND NON-TIDAL)

STAKE OR ANCHOR EVERY 10' (TYPICAL)
WORK AREA
* THIS DISTANCE IS VARIABLE

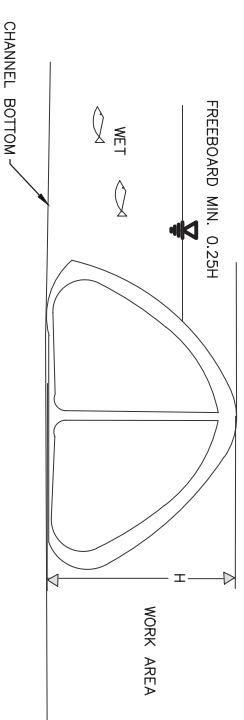
TURBIDITY CURTAIN (TYP.)
PLAN VIEW-NTS

4
ECO2

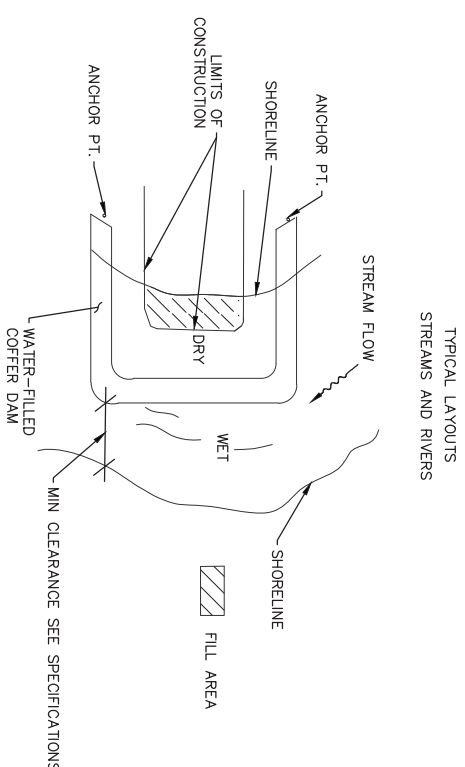


GEO-TUBEFILTER (TYPICAL)
NTS

5
ECO2



WATER FILLED COFFER DAM (TYP.)
SECTION VIEW-NTS



TYPICAL LAYOUTS
STREAMS AND RIVERS

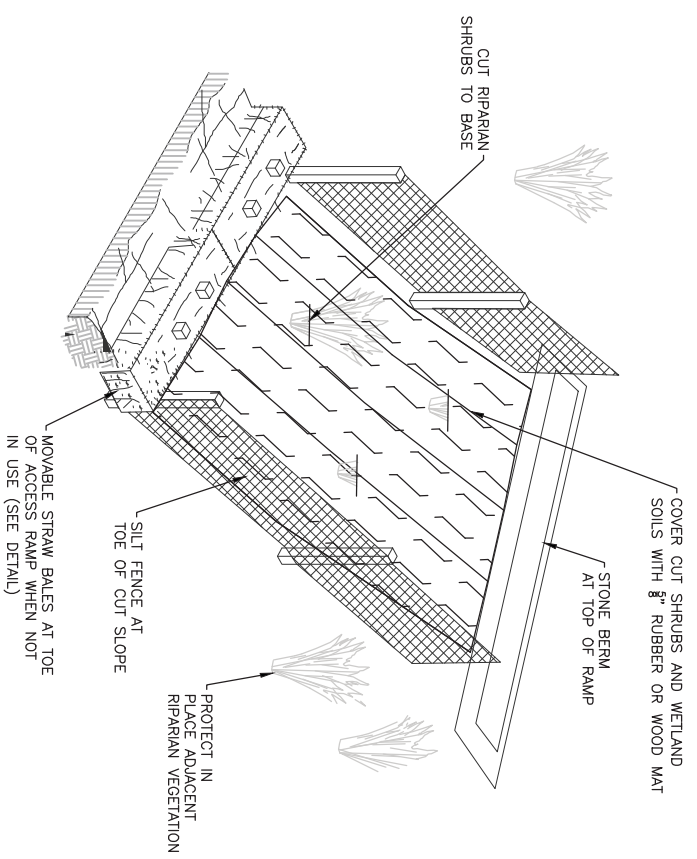
WATER FILLED COFFER DAM (TYP.)
PLAN VIEW-NTS

6
ECO2



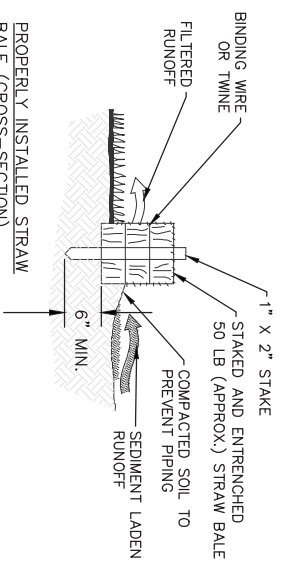
LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL AND
CARE OF WATER DETAILS

<p>City of Grand Junction Parks and Recreation 250 North 5th Street Grand Junction, CO 81501 970.245.3866</p>		<p>RiverRestoration P.O. Box 246 Carbondale, CO 81623 www.RiverRestoration.org</p>	
<p>DESIGN FIRM NAME AND ADDRESS PROJECT NAME AND ADDRESS PROJECT: Las Colonias Park Slough Restoration Project ADDRESS: Las Colonias Park, Grand Junction, CO 81501</p>			
<p>PROJECT NO. 11.CO24.003 DATE: JULY 2018 SCALE:</p>		<p>SHEET: ECO2</p>	



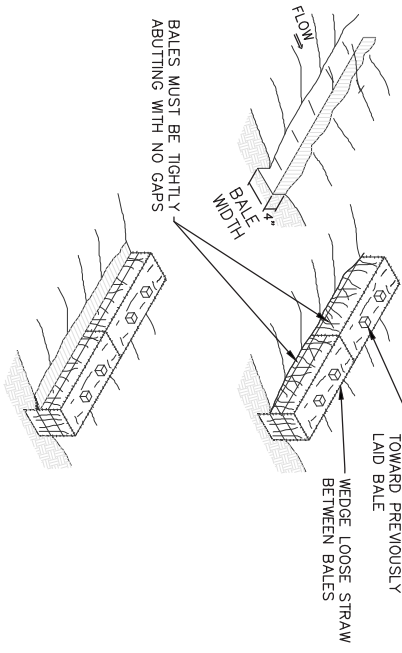
TEMPORARY EQUIPMENT ACCESS (TYP.)
NTS

1
EC03



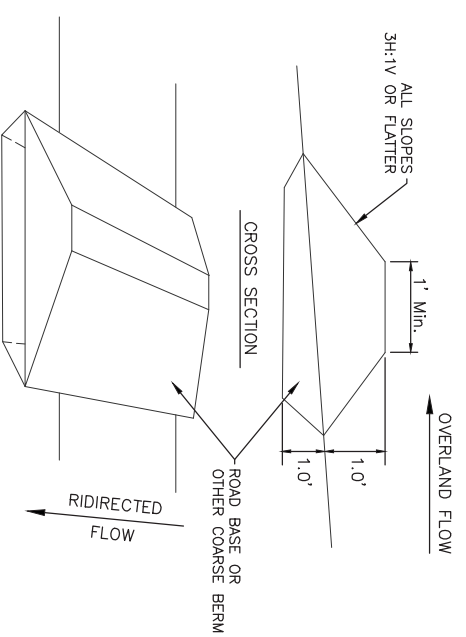
PROPERLY INSTALLED STRAW BALE (CROSS-SECTION)

INSTALLATION STEPS:
1. EXCAVATE THE TRENCH 2. PLACE AND STAKE STRAW BALES



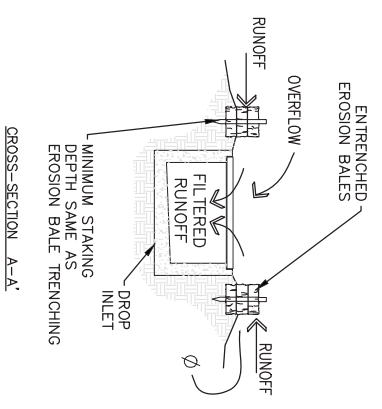
STRAW BALE (TYP.)
NTS

2
EC03

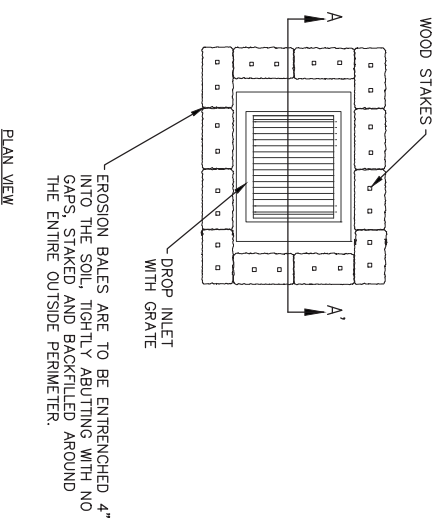


STONE BERM (TYP.)
NTS

3
EC03

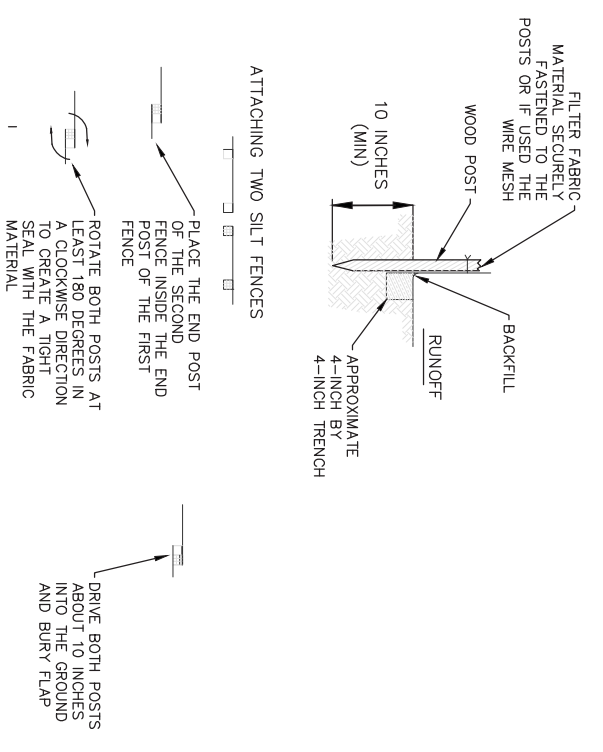


DROP INLET EROSION BALE FILTER
CROSS SECTION VIEW-NTS



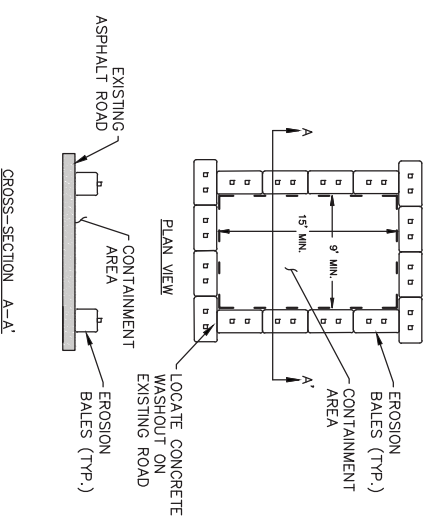
DROP INLET EROSION BALE FILTER
PLAN VIEW-NTS

4
EC03



SILT FENCE (TYP.)
NTS

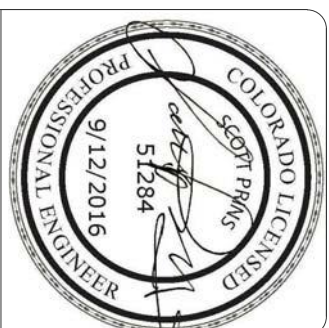
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EC03



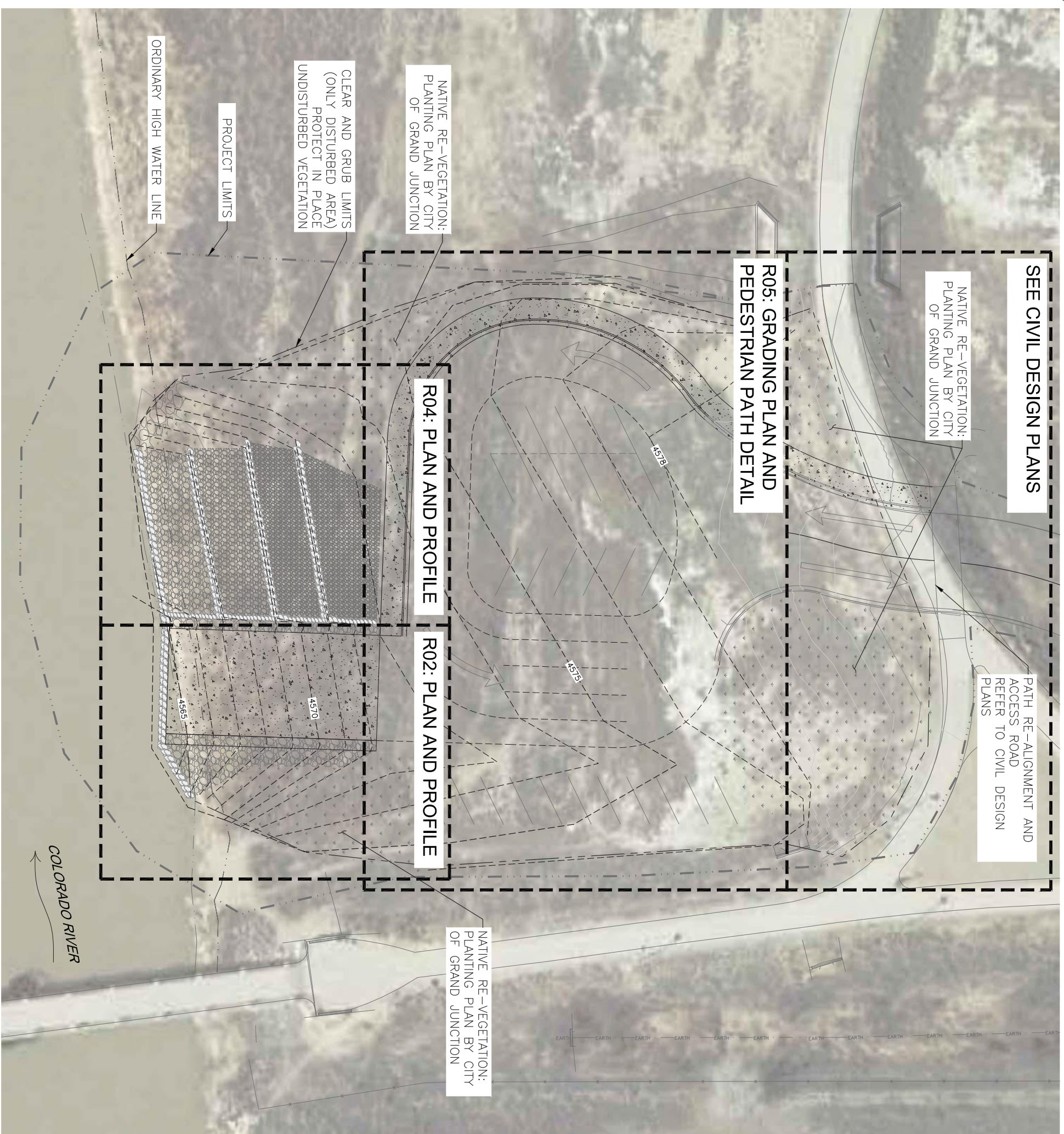
CONCRETE WASHOUT (TYP.)
NTS

6
EC03

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL AND
CARE OF WATER DETAILS

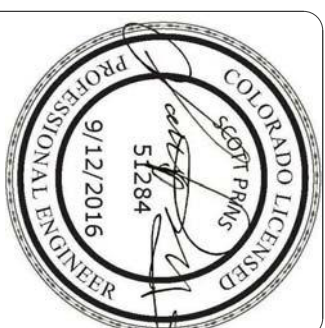


<p>RiverRestoration P.O. Box 248 Carbondale, CO 81623 www.RiverRestoration.org</p>	<p>DESIGN FIRM NAME AND ADDRESS</p> <p>City of Grand Junction Parks and Recreation 250 North 5th Street Grand Junction, CO 81501 970.245.3866</p>
<p>PROJECT NAME AND ADDRESS</p> <p>Las Colonias Park Slough Restoration Project Las Colonias Park Grand Junction, CO 81501</p>	<p>CLIENT NAME AND ADDRESS</p>
<p>PROJECT NO. 11.C024.003</p> <p>DATE JULY 2018</p> <p>SCALE</p>	<p>NO. REVISION/UPDATE DATE</p>
<p>Sheet</p> <p>EC03</p>	



CONSTRUCTION NOTES:

1. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
2. ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR
 THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA



LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
CONSTRUCTION SITE PLAN

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS
 City of Grand Junction
 Parks and Recreation
 250 North 5th Street
 Grand Junction, CO 81501
 970.245.3866

DESIGN FIRM NAME AND ADDRESS

 RiverRestoration
 P.O. Box 248
 Carbondale, CO 81623
 www.RiverRestoration.org

PROJECT NAME AND ADDRESS
 Las Colonias Park Slough
 Restoration Project
 Las Colonias Park
 Grand Junction, CO 81501

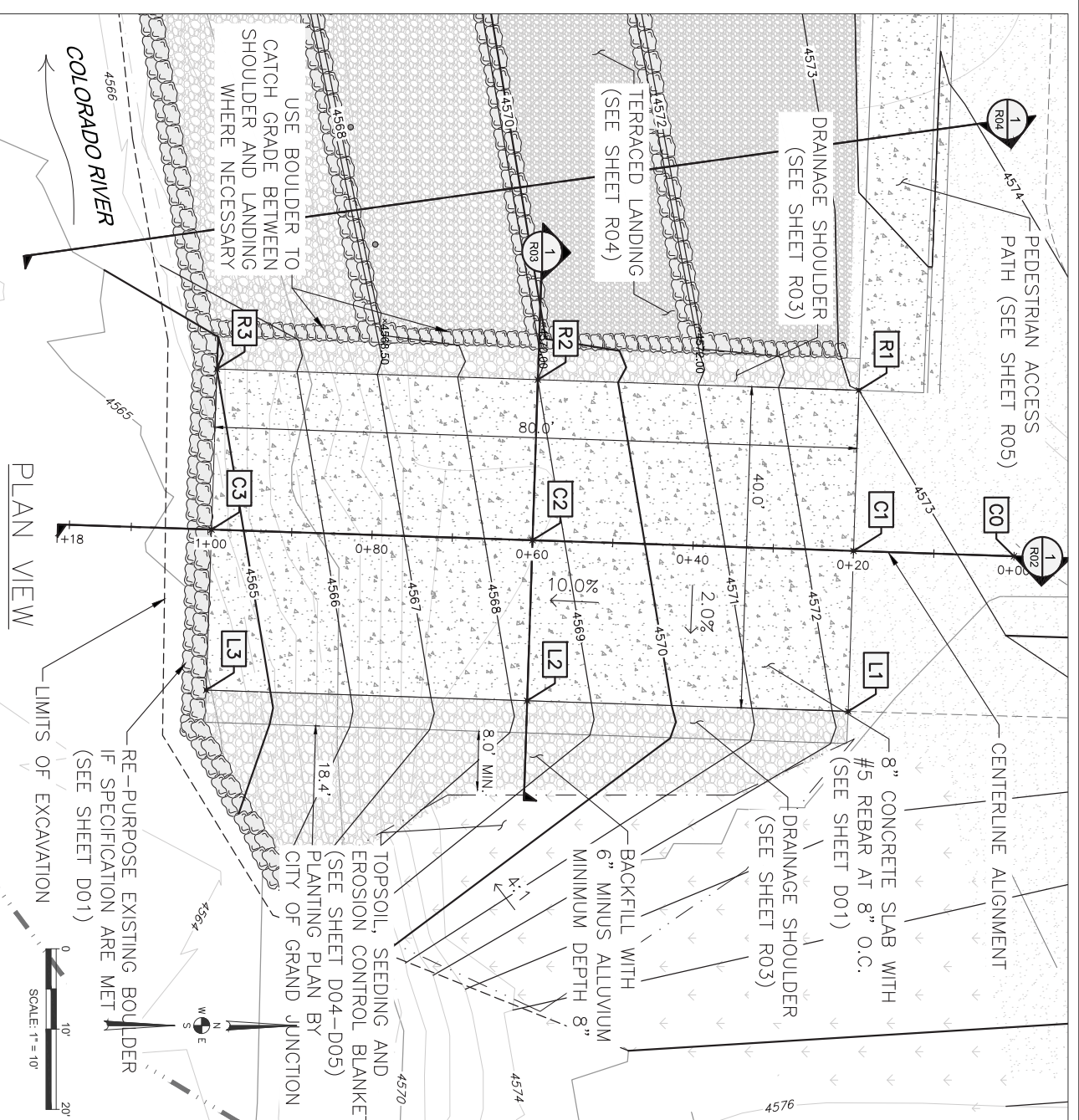
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 Date: JULY 2016
 Scale: 1" = 20'

Sheet: R01

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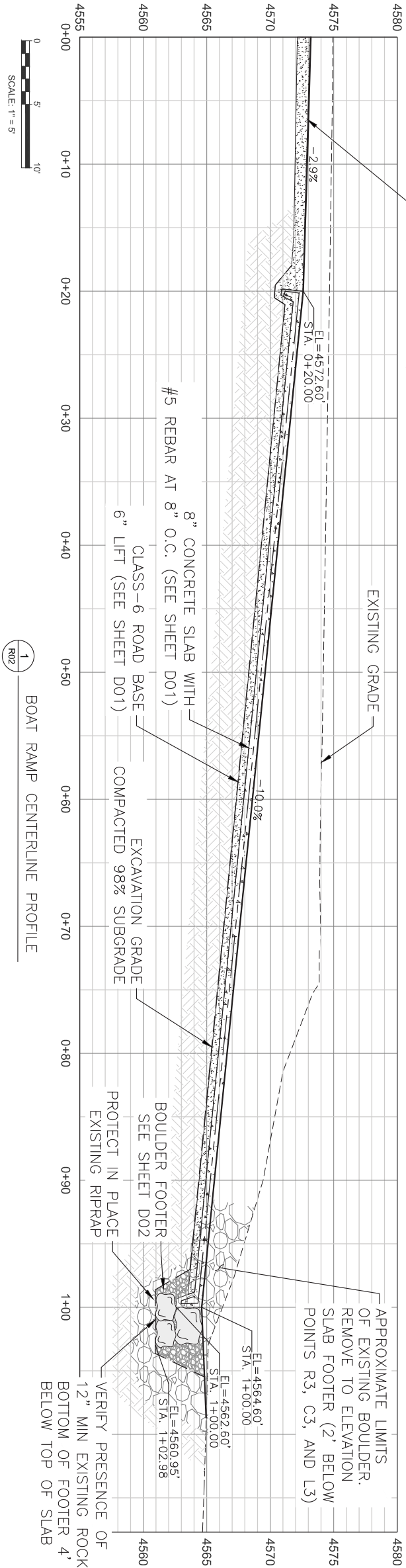
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- CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
- ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - CONCRETE AND REBAR
 THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA

POINT	STATION OFFSET	FINISHED GRADE ELEVATION	LOCATION
C0	STA. 0+00.00 (0.00',)	4573.20	N=31,079.00 E=96,546.76
C1	STA. 0+20.00 (0.00',)	4572.60	N=31,059.01 E=96,546.10
C2	STA. 0+60.00 (0.00',)	4568.60	N=31,019.04 E=96,534.77
C3	STA. 1+00.00 (0.00',)	4564.60	N=30,979.06 E=96,534.44
R1	STA. 0+20.00 (20.00', R)	4573.00	N=31,059.68 E=96,528.11
R2	STA. 0+60.00 (20.00', R)	4569.00	N=31,019.70 E=96,524.78
R3	STA. 1+00.00 (20.00', R)	4565.00	N=30,979.72 E=96,523.45
L1	STA. 0+20.00 (20.00', L)	4572.20	N=31,058.35 E=96,566.09
L2	STA. 0+60.00 (20.00', L)	4568.20	N=31,018.37 E=96,564.76
L3	STA. 1+00.00 (20.00', L)	4564.20	N=30,978.39 E=96,563.73



PARKING LOT AND TURNAROUND GRADE
(SEE SHEET R05)

1 BOAT RAMP CENTERLINE PROFILE



NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP
PENDING STRUCTURAL REVIEW

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP PLAN AND PROFILE

No.	REVISION/UPDATE	Date

Grand Junction
City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866



RIVER
RiverRestoration
P.O. Box 248
Carbondale, CO 81623
www.RiverRestoration.org

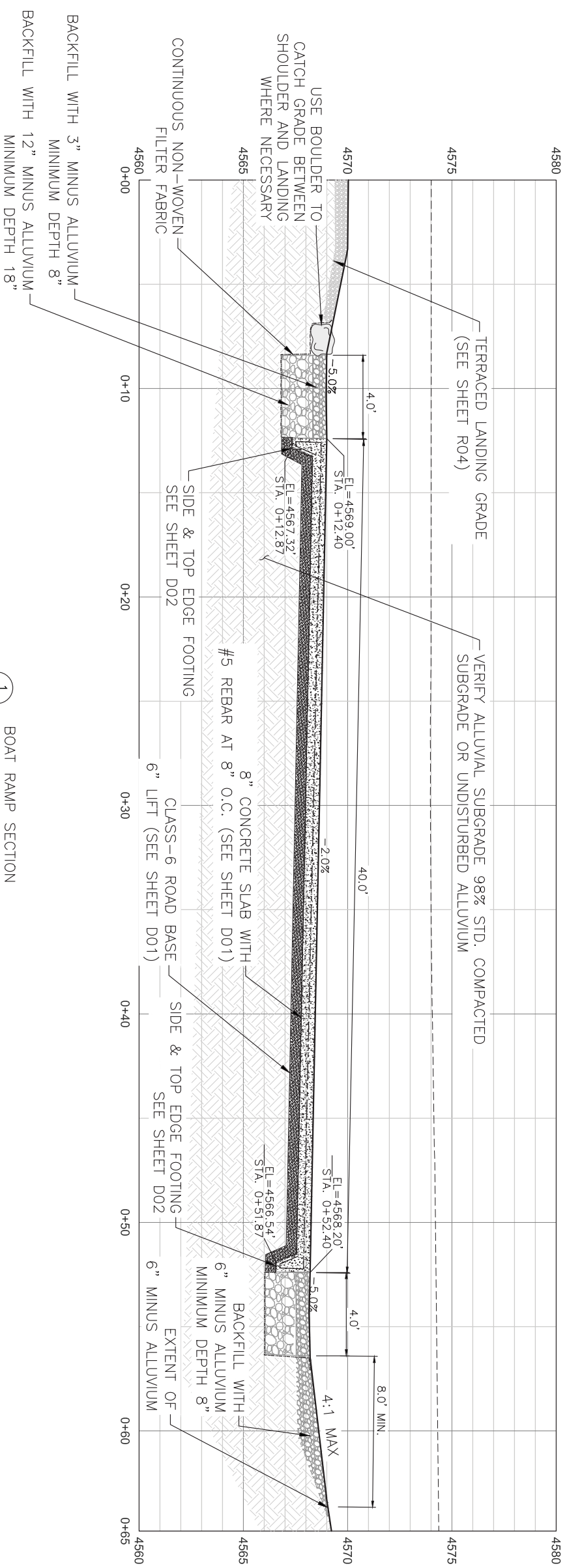
PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project: 11.CO24.003
Date: JULY 2016
Scale: VARIES

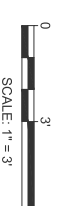
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CONSTRUCTION NOTES:

1. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
2. ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
 - DIMENSIONS AND SPECIFICATIONS OF SUBGRADE
 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR
 THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA



1
R03 BOAT RAMP SECTION



NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STAMP

PENDING STRUCTURAL REVIEW

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP DESIGN SECTION

No.	REVISION/UPDATE	Date



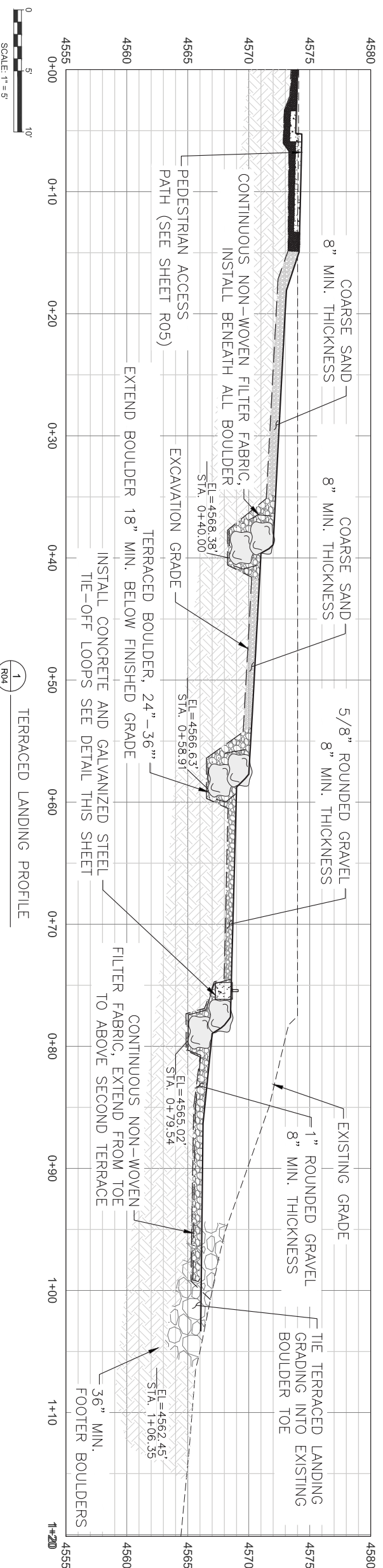
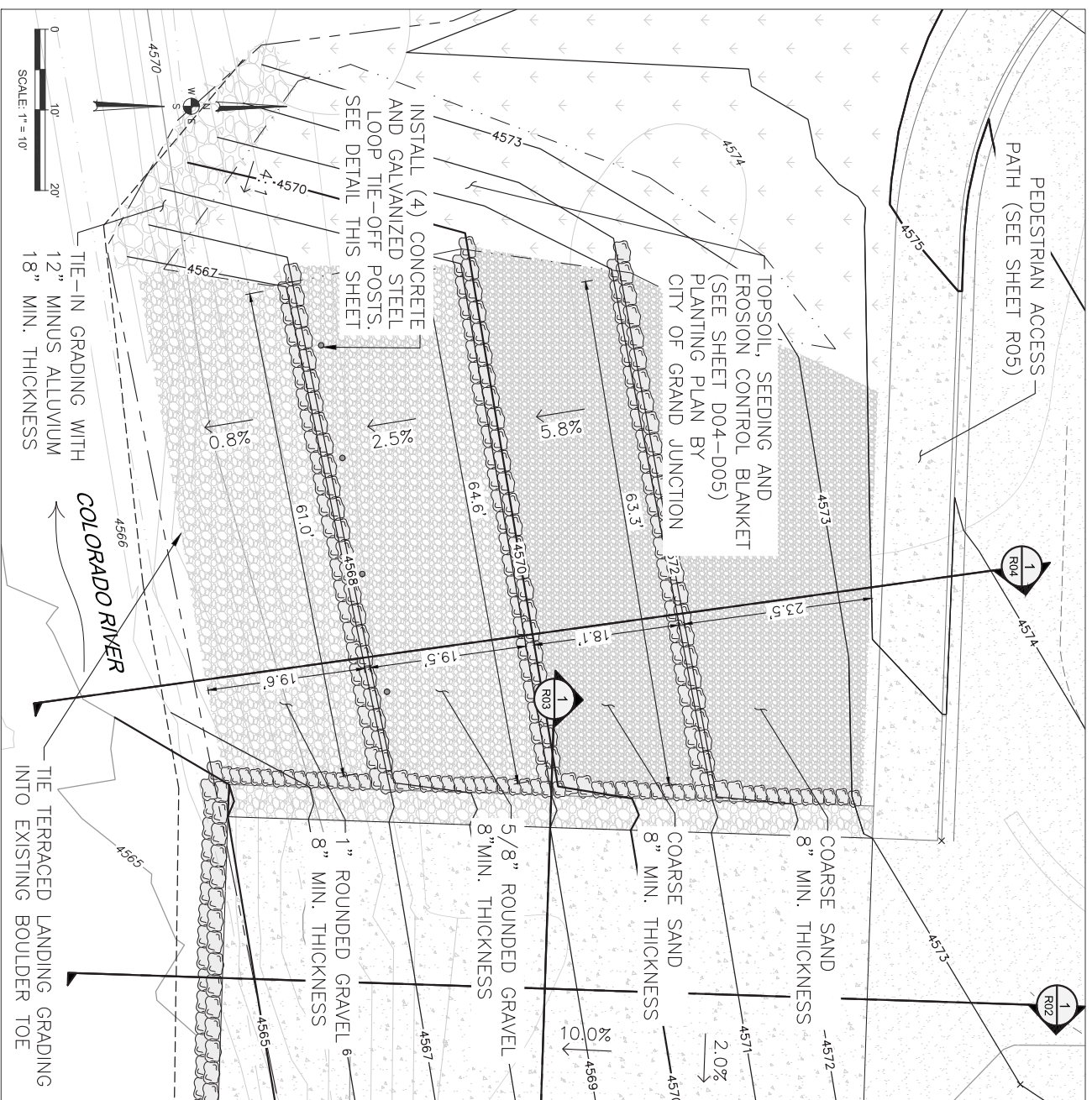
City of Grand Junction
Parks and Recreation
250 North 5th Street
Grand Junction, CO 81501
970.245.3866



RiverRestoration
P.O. Box 248
Carbondale, CO 81623
www.RiverRestoration.org

PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project	11.CO24.003	Sheet	R03
Date	JULY 2016	Scale	1" = 3' (FULL SIZE)

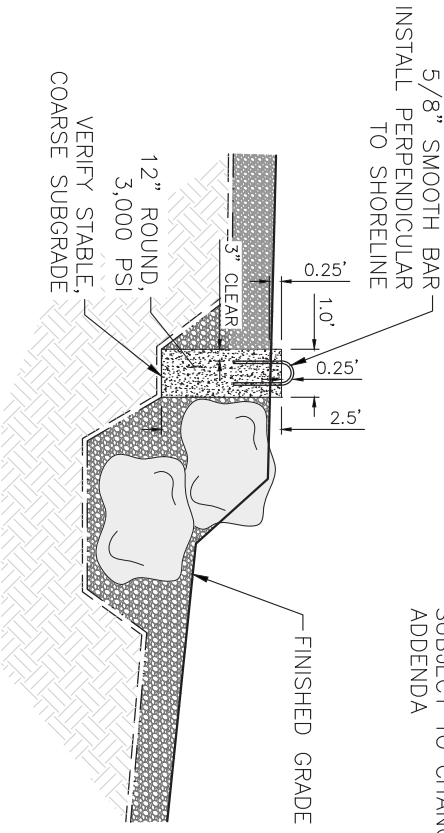


1 TERRACED LANDING PROFILE

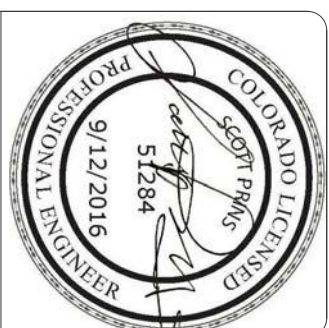
SCALE: 1" = 5'

SCALE: 1" = 10'

- CONSTRUCTION NOTES:**
- SCALE OF PLAN IS 1"=10'; SCALE OF PROFILE IS 1" = 5'
 - CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
 - ALL STRUCTURAL COMPONENTS OF DESIGN TO BE REVIEWED AND STAMPED BY STRUCTURAL ENGINEER, WHICH INCLUDE:
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 - DIMENSIONS AND SPECIFICATIONS OF CONCRETE AND REBAR
 THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA



2 TIE-OFF LOOP DETAIL, TYPICAL



LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
TERRACED LANDING
PLAN AND PROFILE



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Parks and Recreation
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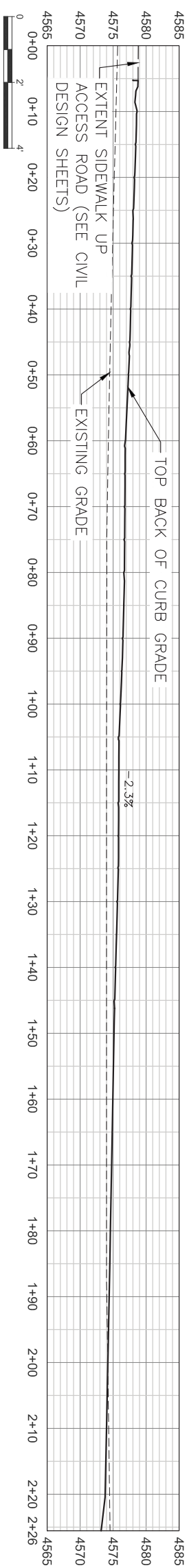
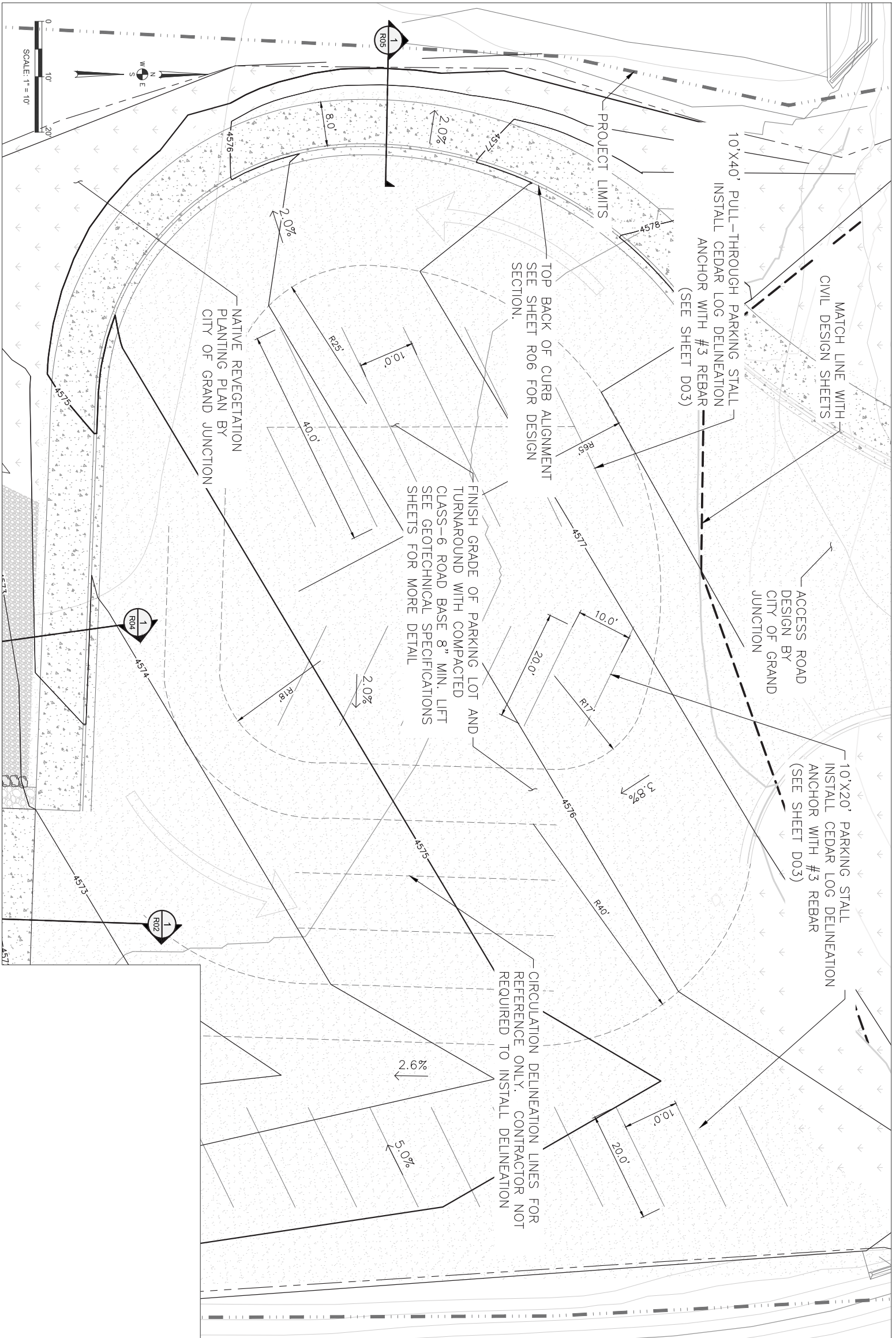
PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project 11.CO24.003
Date JULY 2016
Scale VARIES

No.	REVISION/UPDATE	Date

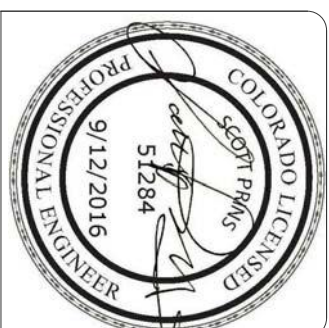
CLIENT NAME AND ADDRESS

Sheet
RO4



CONSTRUCTION NOTES:

1. SEE SHEET R06 FOR STAKING ALIGNMENTS FOR SIDEWALK AND GRADE BREAKS AND PARKING STALL DELINEATION
2. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE BOAT RAMP ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.
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 - THESE DESIGN DETAILS AND QUANTITIES SUBJECT TO CHANGE THROUGH ISSUED ADDENDA
3. SPECIFIC DIMENSIONS AND MATERIAL SPECIFICATION OF ROAD BASE TO BE DETERMINED BY OWNER. UPDATES TO DETAILS AND QUANTITIES MAY BE ISSUED VIA ADDENDA IF DETERMINED NECESSARY BASED ON PENDING GEOTECH BORING INFORMATION.
4. REFER TO STANDARD CITY DETAIL AND SPECIFICATIONS FOR CURB AND GUTTER CONSTRUCTION



LAS COLONIAS PARK SHORELINE AMENITIES PROJECT PARKING LOT AND TURNAROUND PLAN AND PROFILE

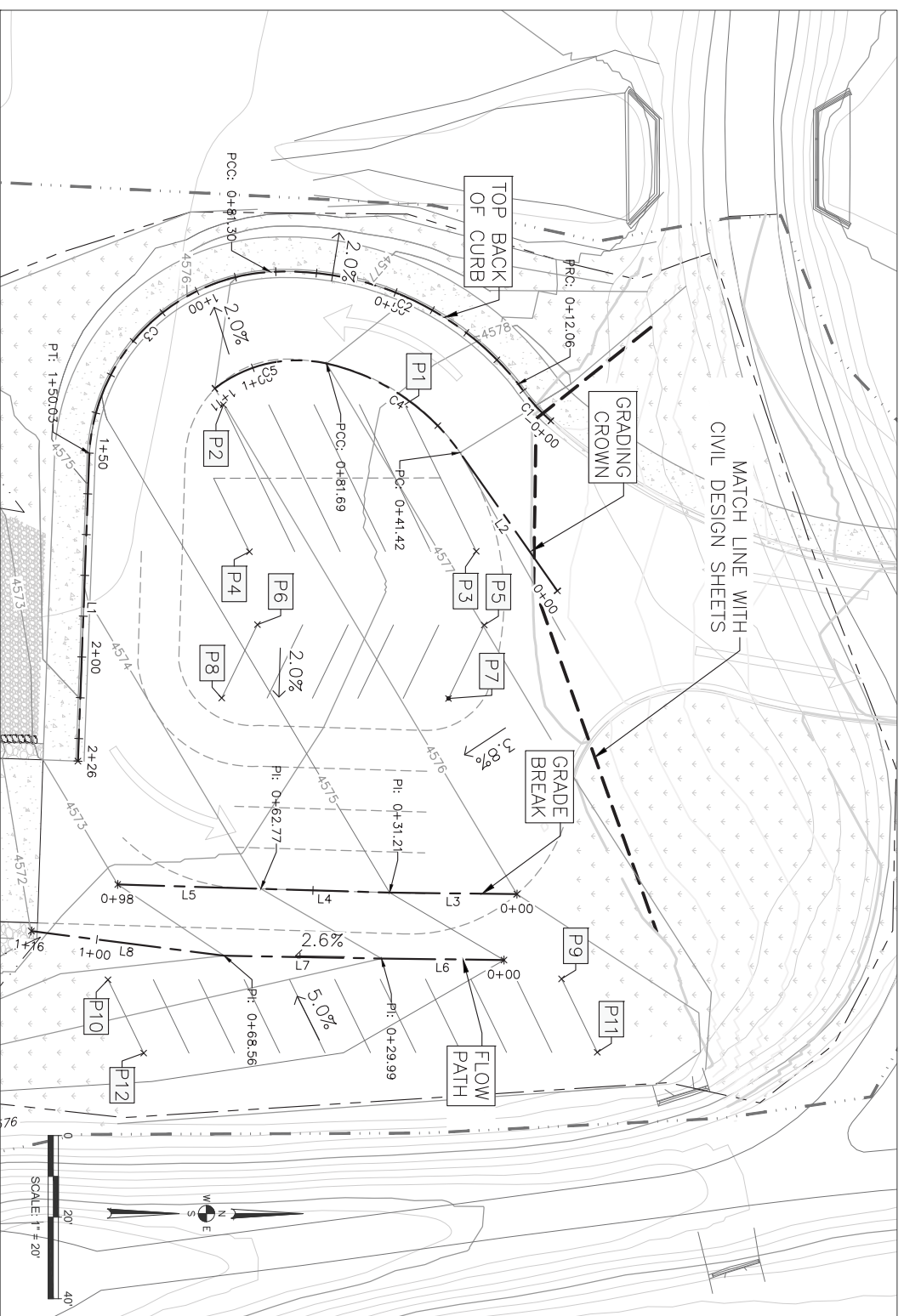
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Project: LAS COLONIAS PARK SLOUGH RESTORATION PROJECT
 Date: JULY 2016
 Sheet: **R05**



CONSTRUCTION NOTES:

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PARKING STALL DELINEATION	
POINT	LOCATION
P1	N=31,148.30 E=96,439.05
P2	N=31,03.87 E=96,439.13
P3	N=31,165.80 E=96,475.01
P4	N=31,110.25 E=96,475.12
P5	N=31,163.77 E=96,493.09
P6	N=31,112.22 E=96,492.99
P7	N=31,159.02 E=96,511.07
P8	N=31,103.47 E=96,510.97
P9	N=31,186.71 E=96,579.79
P10	N=31,075.60 E=96,580.02
P11	N=31,195.46 E=96,597.78
P12	N=31,084.35 E=96,597.98

TOP BACK OF CURB				
Number	Length	Radius	Line/Chord Direction	A Value
C1	12,061	49.5	S48° 36' 50.84"W	
C2	69,239	72.5	S24° 20' 49.81"W	
C3	68,733	47.1	S45° 01' 59.18"E	
L1	75.5		S87° 52' 47.62"E	

START OF ALIGNMENT COORDINATES: N=31,194.07
E=96,443.05
END OF ALIGNMENT COORDINATES: N=31,068.24
E=96,528.43

GRADING CROWN				
Number	Length	Radius	Line/Chord Direction	A Value
L2	41.4		S54° 52' 14.08"W	
C4	40,266	54.5	S33° 42' 40.28"W	
C5	28,928	32.9	S12° 39' 12.28"E	

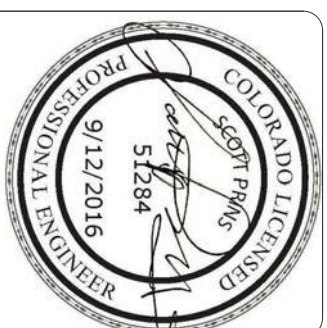
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E=96,484.71
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E=96,435.12

GRADE BREAK				
Number	Length	Radius	Line/Chord Direction	A Value
L3	31.2		S00° 41' 20.72"W	
L4	31.6		S01° 41' 27.18"W	
L5	35.1		S01° 44' 18.44"W	

START OF ALIGNMENT COORDINATES: N=31,125.79
E=96,559.03
END OF ALIGNMENT COORDINATES: N=31,072.98
E=96,556.66

FLOW PATH				
Number	Length	Radius	Line/Chord Direction	A Value
L6	30.0		S00° 42' 34.07"W	
L7	38.6		S01° 00' 50.34"W	
L8	47.6		S07° 17' 12.45"W	

START OF ALIGNMENT COORDINATES: N=31,122.61
E=96,575.17
END OF ALIGNMENT COORDINATES: N=31,056.84
E=96,588.08



LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
PARKING LOT AND TURNAROUND
GRADING PLAN

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Restoration Project
Las Colonias Park
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LAS COLONIAS PARK SHORELINE AMENITIES PROJECT BOAT RAMP DETAILS I

No.	REVISION/UPDATE	Date

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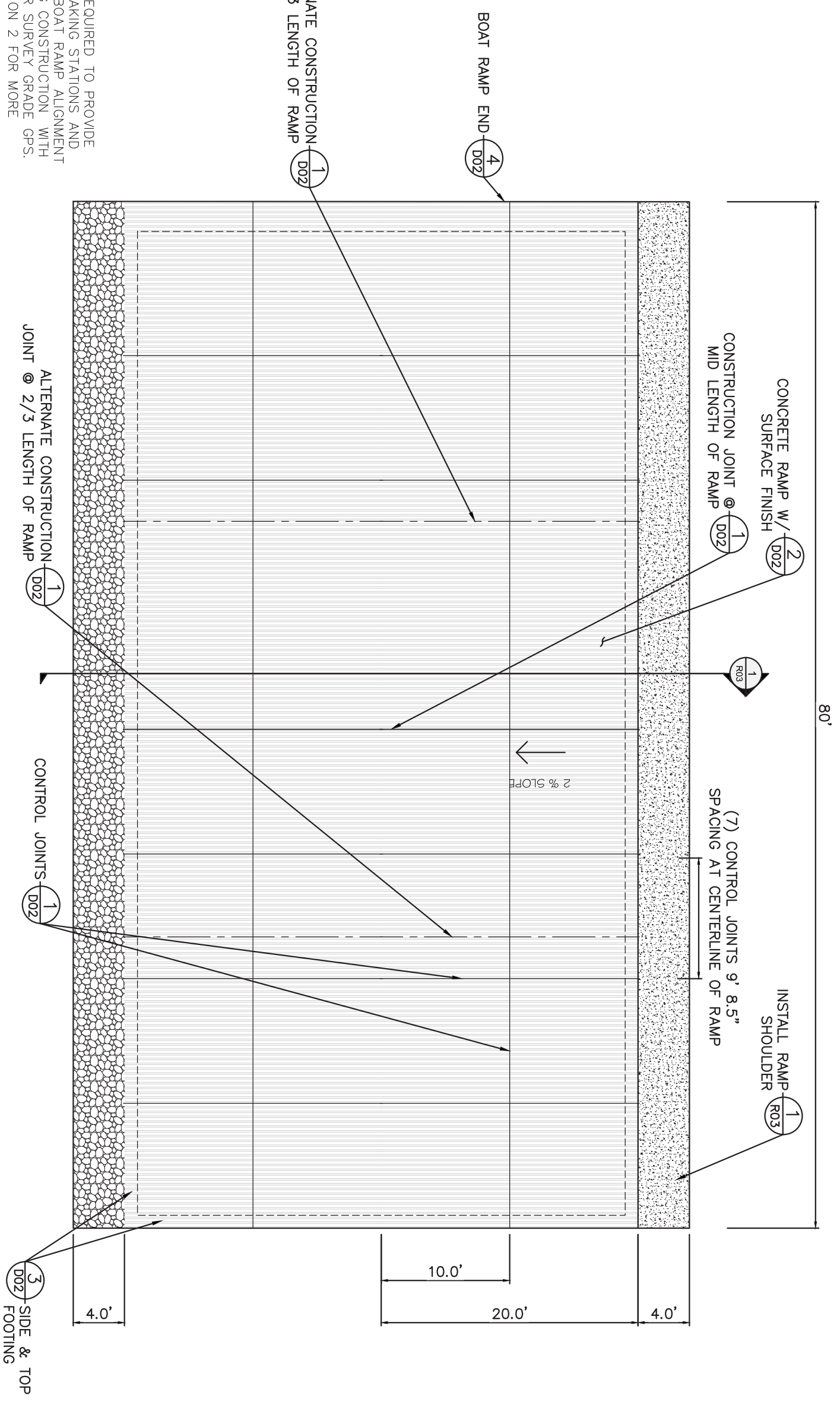


DESIGN FIRM NAME AND ADDRESS

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www.RiverRestoration.org

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Grand Junction, CO 81501

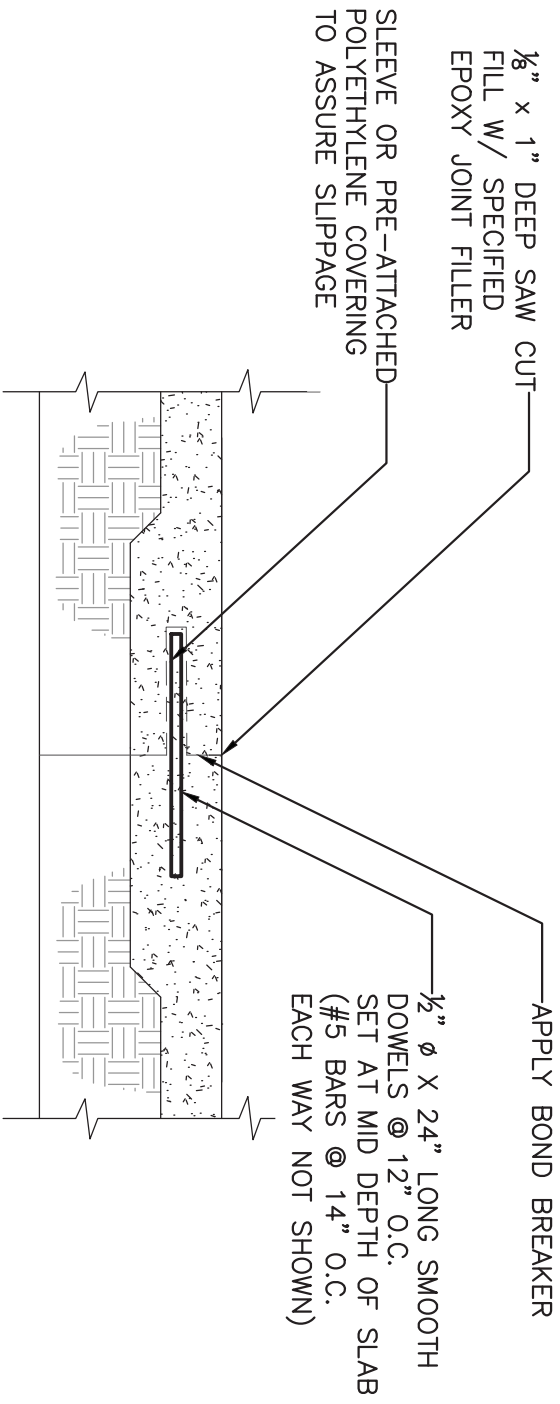
Project	11.CO24.003	Sheet	DO1
Date	JULY 2018		
Scale			



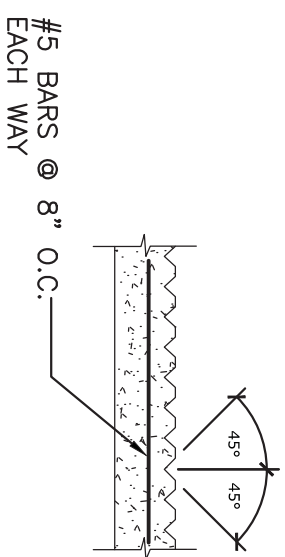
CONSTRUCTION NOTES:

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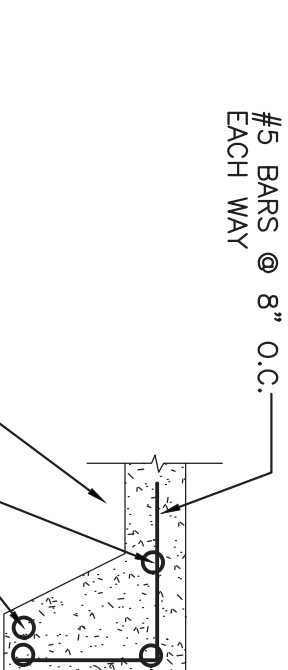
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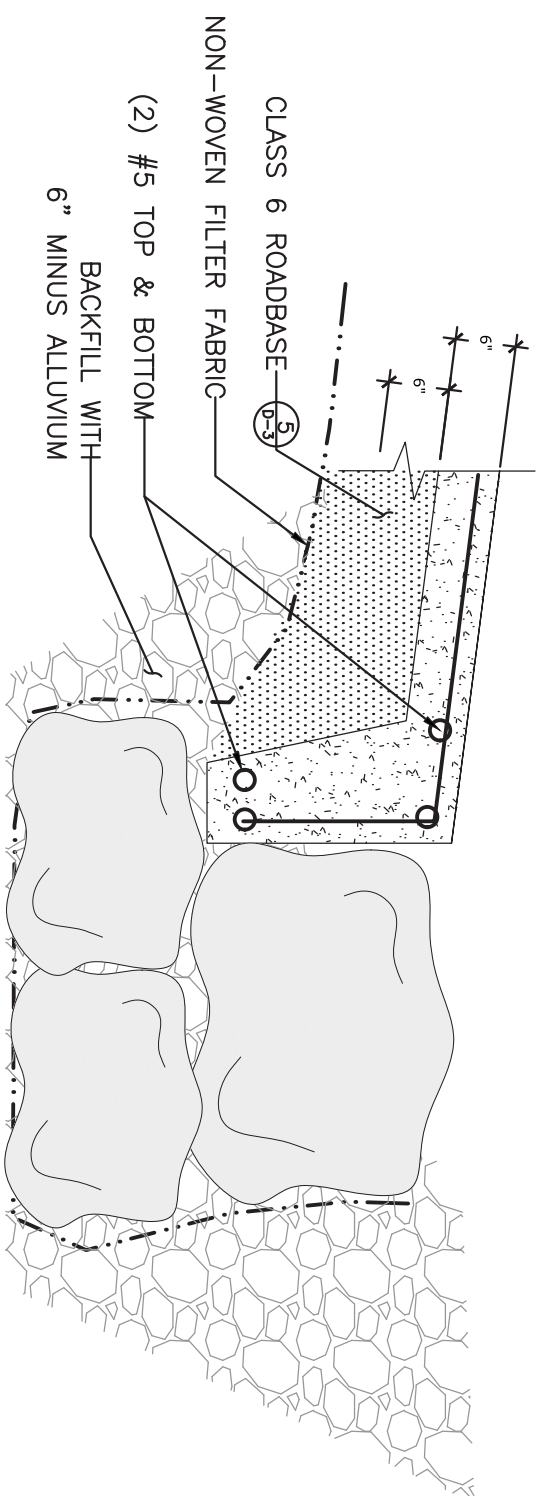
1 CONSTRUCTION JOINT
SECTION D02



2 CONCRETE RAMP SURFACE FINISH
SECTION D02



3 SIDE & TOP EDGE FOOTING
SECTION D02



4 BOAT RAMP END
SECTION D02

CONSTRUCTION NOTES:

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NOTE:
ONLY REMOVE EXISTING BOULDER TOE TO ELEVATION OF BOTTOM OF CONCRETE FOOTER RE-PURPOSE BOULDER IF SPECIFICATION ARE MET (SEE TECHNICAL SPECIFICATION FOR MORE INFORMATION)

NOT FOR CONSTRUCTION

LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
BOAT RAMP DETAILS 2

No.	REVISION/UPDATE	Date

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DESIGN FIRM NAME AND ADDRESS

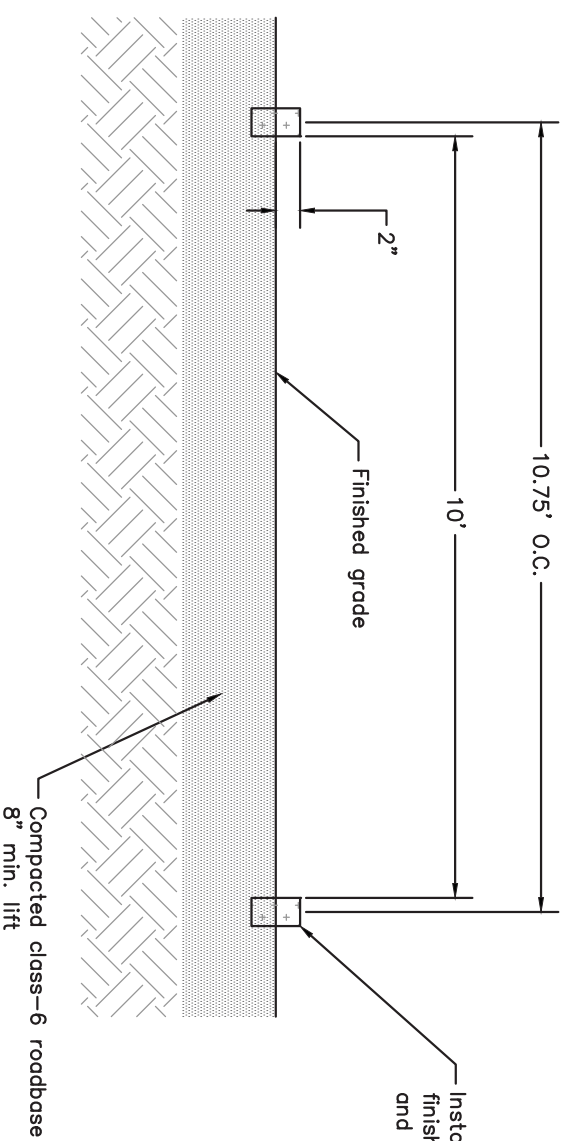
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Restoration Project
Las Colonias Park
Grand Junction, CO 81501

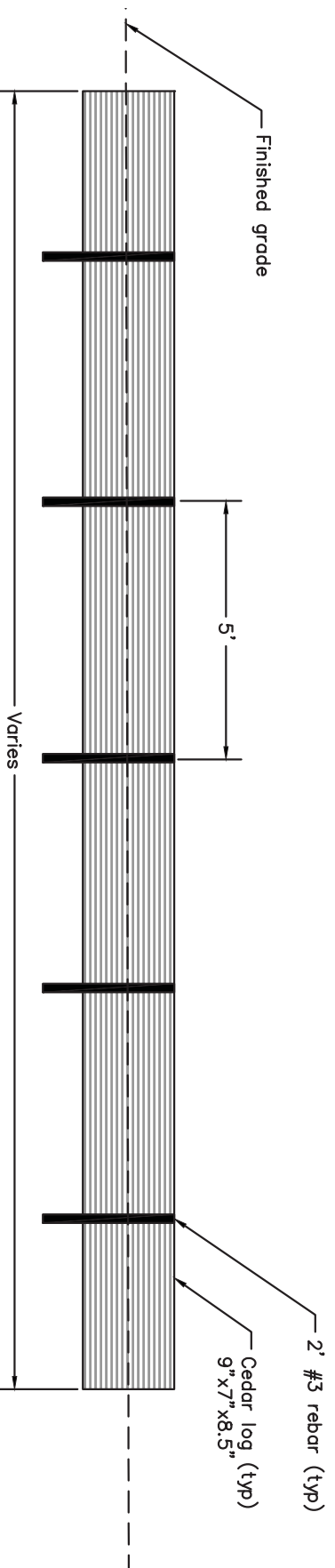
Project	11.CO24.003	Sheet	D02
Date	JULY 2016	Scale	

- Note:
1. Install 2' #3 rebar evenly spaced through cedar log to fasten to ground 5' o.c.
 2. Set top of rebar even with top of wood



Install delineator cedar log. Bury below finished grade leaving 2" above finished grade and anchor using #3 rebar 5' o.c.

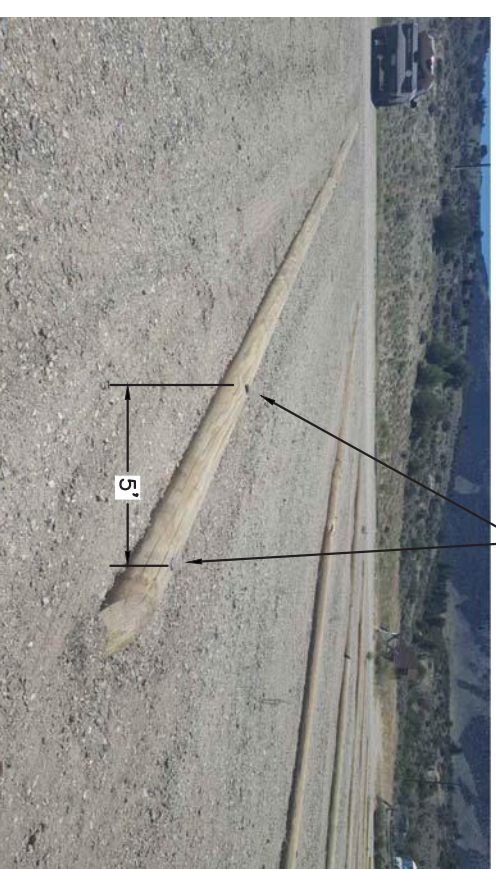
Parking Stall Cross-Section



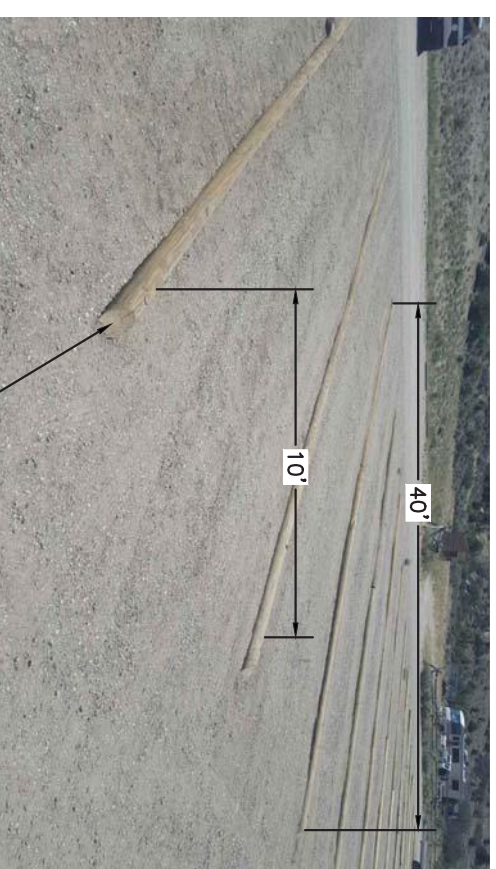
Cedar Log Cross-Section

CONSTRUCTION NOTES:

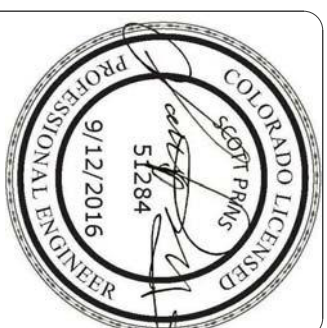
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2' #3 rebar (typ)



Cut log ends at 45 deg. angle



LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
PARKING STALL DETAIL

No.	REVISION/UPDATE	Date



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PROJECT NAME AND ADDRESS
Las Colonias Park Slough
Restoration Project
Las Colonias Park
Grand Junction, CO 81501

Project	11.CO24.003	Sheet	D03
Date	JULY 2016	Scale	

PARKING STALL DETAIL

1
D03

Notes:

1. Erosion Control Material Must Be Placed Loosely Over Ground Surface. Do Not Stretch.
2. Excavate A 6" Wide By 6" Deep Trench Along The Top Of The Slope. The Trench Shall Run Along The Length Of The Installation. Staple Blanket Along Bottom Of Trench, Fill With Compacted Soil, Overlap Blanket Towards Toe Of Slope, And Secure With Staples Every 2'.
3. Upstream and downstream extents of erosion control blankets shall be finished with a 6" wide by 6" deep trench running down bank at extents of limits shown in plan.

MATERIAL SPECIFICATION

EROSION CONTROL BLANKETS SHALL BE EROSION CONTROL BLANKET C32 BD OR APPROVED EQUIVALENT.
 THE APPROVED EQUIVALENT SHALL BE ALL NATURAL, DOUBLE NETTED, 100% BIODEGRADABLE BLANKET OF COCONUT (COIR) FIBER.
 IT SHALL HAVE A FUNCTION LONGEVITY OF UP TO 36 MONTHS. MINIMUM TENSILE STRENGTH SHALL BE 19.9 LBS/IN AND 11.9 LBS/IN (ASTM D6818) IN THE MACHINE AND TRANSVERSE DIRECTION, RESPECTIVELY.
 THE MATTING SHOULD BE CAPABLE OF WITHSTANDING SHEAR STRESS OF AT LEAST 2.90 LBS/SQFT AND FLOW VELOCITY AT LEAST OF .10 FT/SEC.

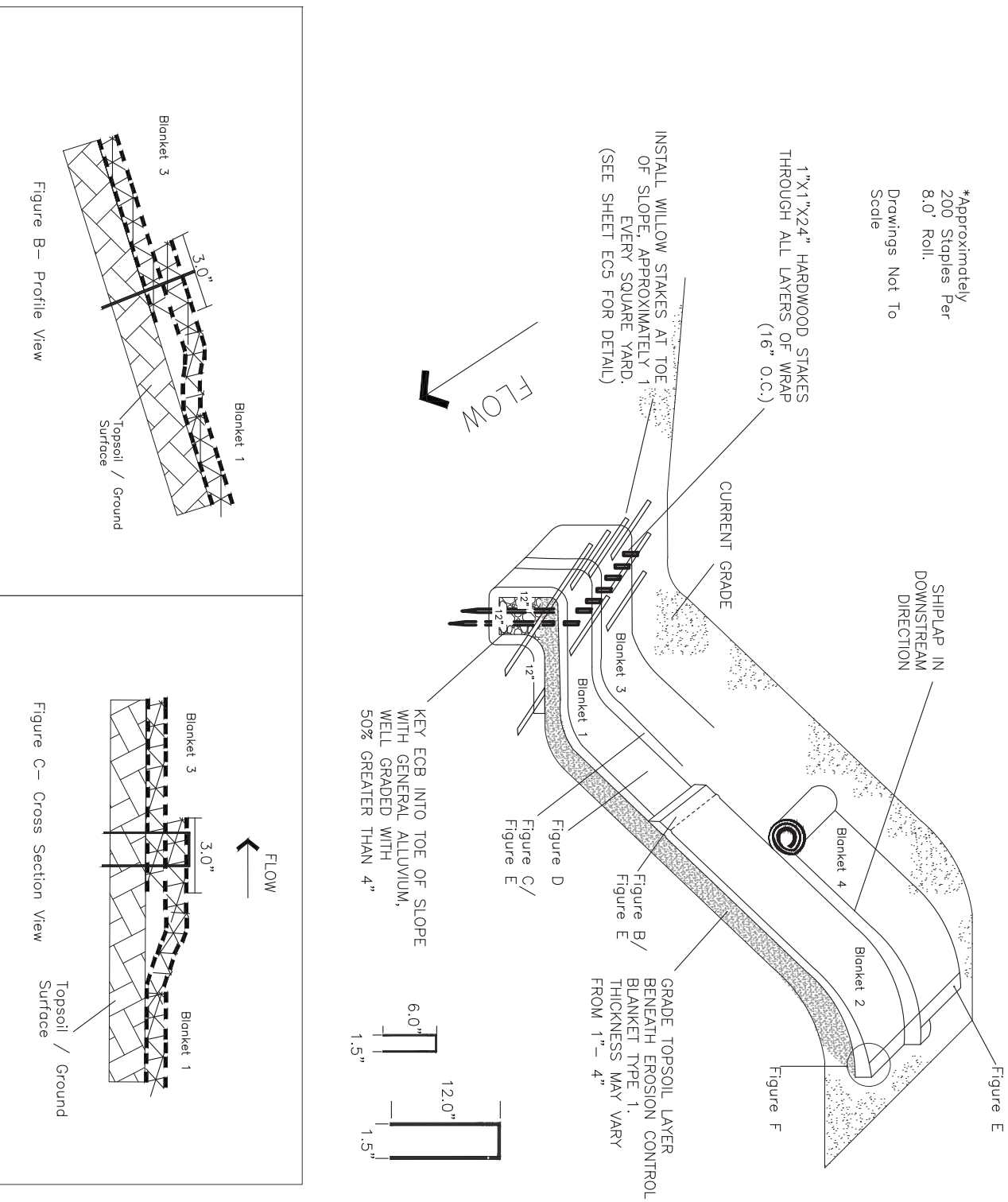


Figure B— Profile View

Figure C— Cross Section View

EROSION CONTROL BLANKET (ECB) INSTALLATION ACROSS BANK

NTS

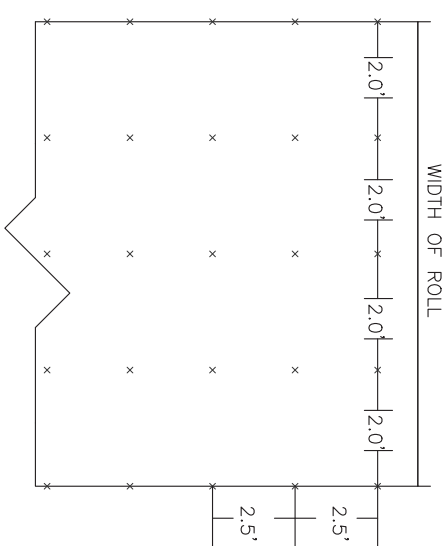


Figure D— Plan View

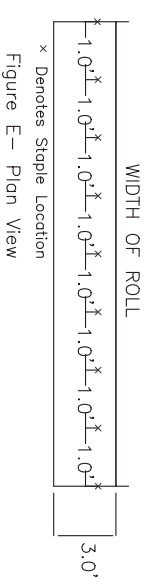


Figure E— Plan View

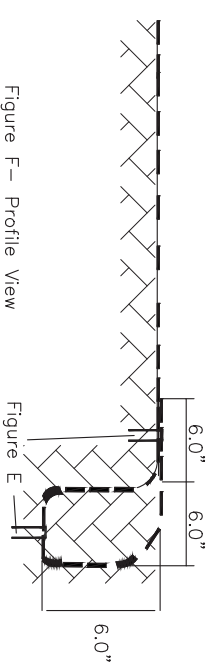


Figure F— Profile View

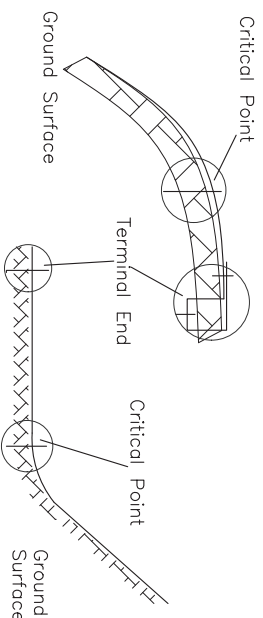
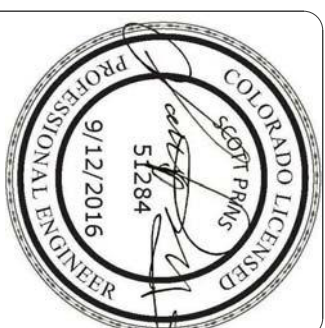


Figure G— Critical Point Securing



LAS COLONIAS PARK
 SHORELINE AMENITIES PROJECT
 EROSION CONTROL BLANKET
 INSTALLATION DETAIL I



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Project	11.CO24.003	Sheet	D04
Date	JULY 2016		
Scale			

Notes:

1. Erosion Control Material Must Be Placed Loosely Over Ground Surface. Do Not Stretch.
2. Excavate A 6" Wide By 6" Deep Trench Along The Top Of The Slope. The Trench Shall Run Along The Length Of The Installation. Staple Blanket Along Bottom Of Trench. Fill With Compacted Soil. Overlap Blanket Towards Toe Of Slope. And Secure With Staples Every 2'.
3. Upstream and downstream extents of erosion control blankets shall be finished with a 6" wide by 6" deep trench running down bank at extents of limits shown in plan.

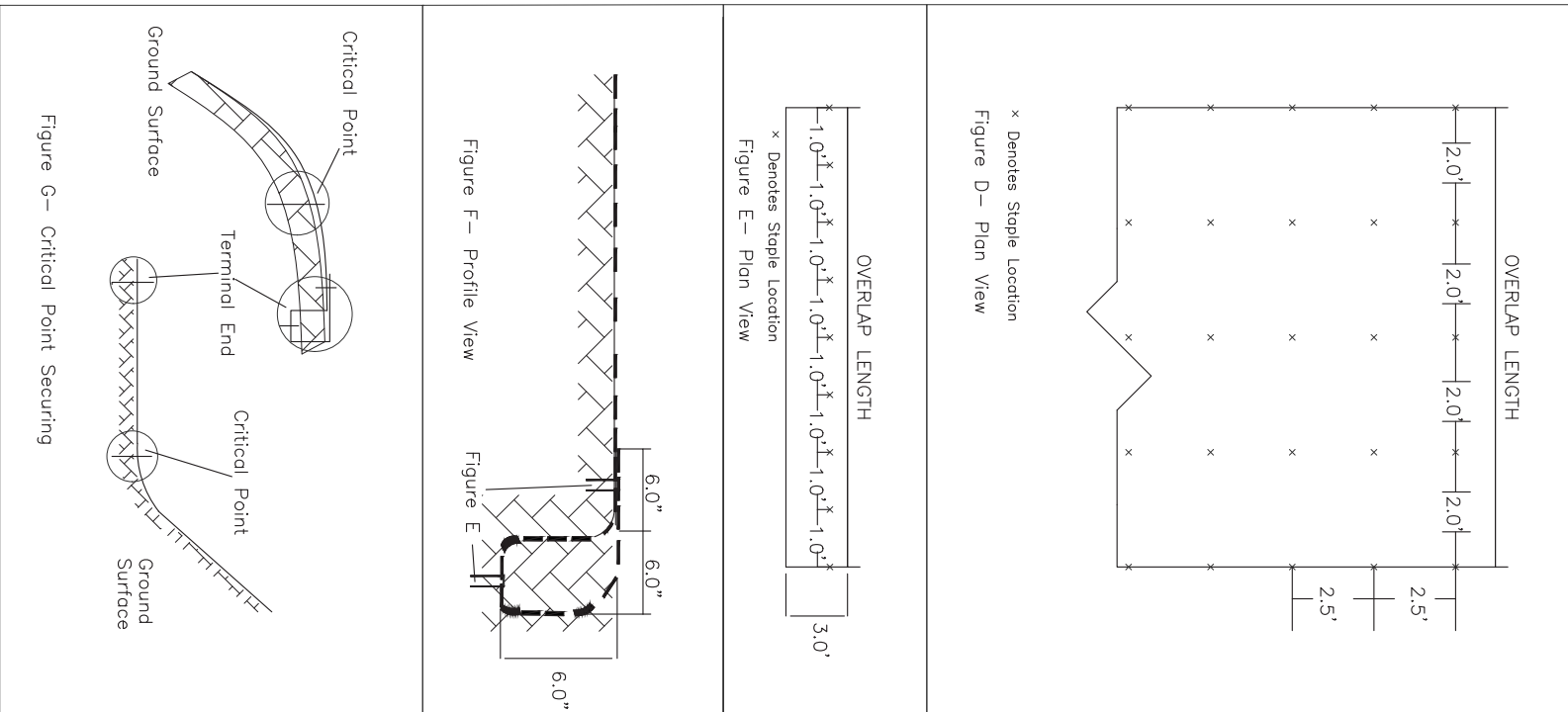
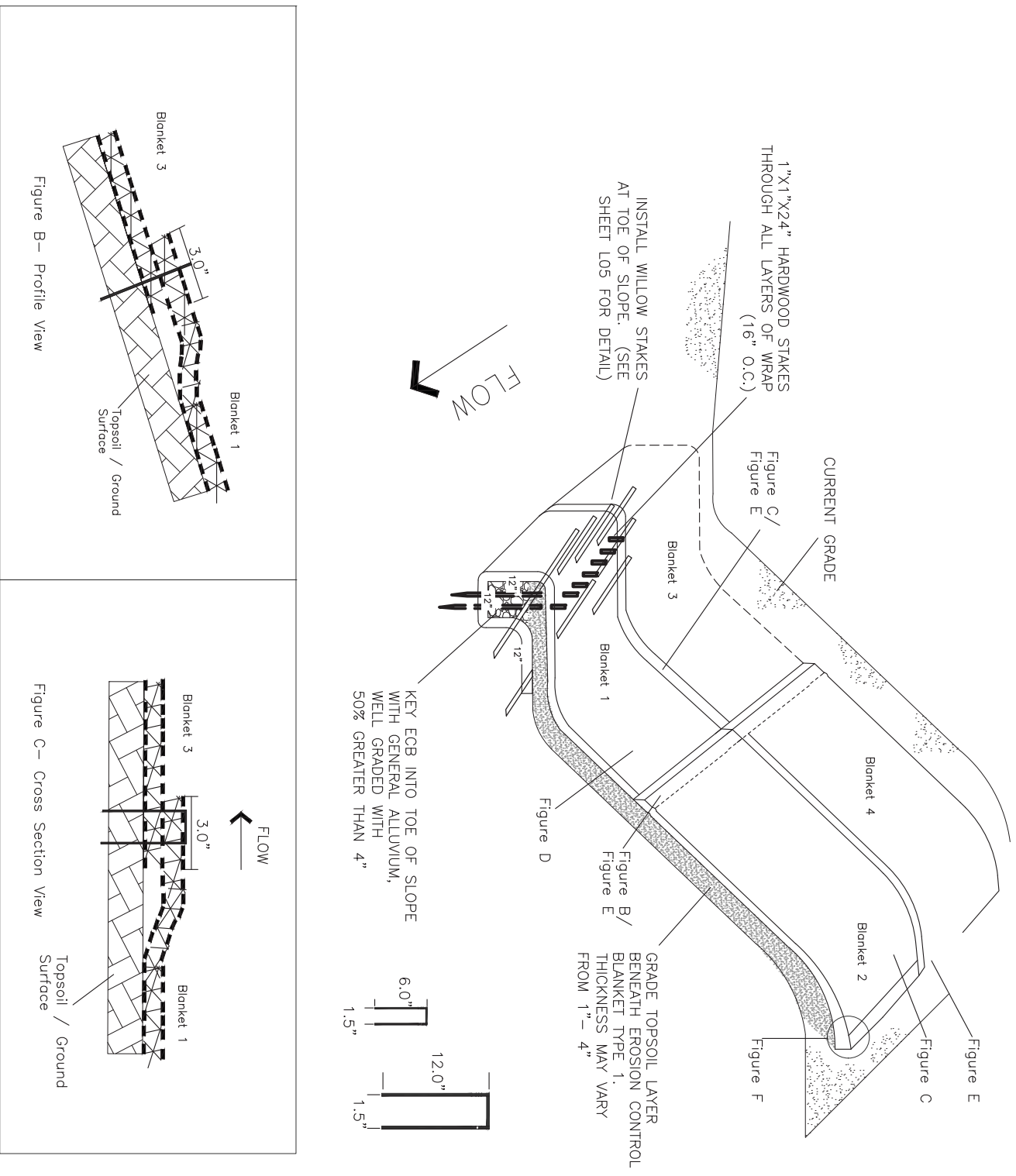
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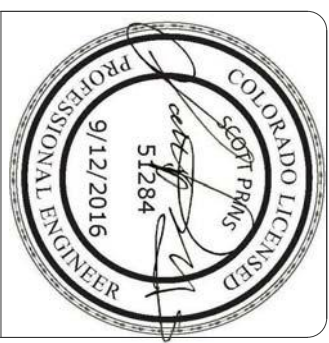
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THE MATTING SHOULD BE CAPABLE OF WITHSTANDING SHEER STRESS OF AT LEAST 2.90 LBS/SQFT AND FLOW VELOCITY AT LEAST OF 10 FT/SEC.



EROSION CONTROL BLANKET (ECB) INSTALLATION ALONG BANK



LAS COLONIAS PARK
SHORELINE AMENITIES PROJECT
EROSION CONTROL BLANKET
INSTALLATION DETAIL II



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Grand Junction, CO 81501

Project: 11.0024.003
Date: JULY 2016
Scale:
Sheet: D05

RIVER CONSTRUCTION SPECIFICATIONS

**Las Colonias Park Shoreline Amenities Project
Grand Junction, CO
Colorado River**

July 8, 2018

**OWNER:
City of Grand Junction
Parks and Recreation Department
250 N 5th Street
Grand Junction, Colorado 81501**

**ENGINEER:
RiverRestoration
Jason Carey PE
Scott Prins PE
P.O. Box 248
Carbondale, CO 81623**

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SECTION 1 SCOPE OF WORK

1.01 GENERAL

The scope of this Project is to construct shoreline improvements and a boat launch at Las Colonias Park on the Colorado River in Grand Junction, Colorado. Specifications contained herein are intended solely for the purpose of this project. This Project is expected to have all construction complete by February 28, 2018.

The scope of this project is to construct 1 boat ramp and terraced landing with features including:

- Identify and maintain erosion control measures and BMPs.
- Protect in-place park and facilities, all utilities, paths, parking lots, all structures, and all mature trees;
- Divert and care for the Colorado River;
- Install approximately 82 CY of Concrete Slab with filtered backing;
- Install approximately 252 tons of granite boulders (24"-36" diameter) for the stabilization of the ramp toe and terraced landing;
- Install concrete sidewalk, curb and gutter access path;
- Install approximately 328 square feet of erosion control blankets with topsoil and seeding;
- Topsoil and seed approximately 0.2 acres;
- Excavate approximately 3,000 cubic yards of unclassified bank material
- Transport and stockpile onsite approximately 2,700 cubic yards of unclassified excavation removed from the channel and banks and dewatered as necessary; and
- Restore construction staging areas and access areas to equal or better than condition before construction began;

in accordance with these Construction Specifications and as shown on the Project Drawings. Project Drawings include 15 plates; G01 is the cover page, EC01-EC03 are erosion control drawings and details for work not included in these specifications, R01-R06 are construction drawings for work included in these specifications, and D01-D05 show associated details.

Exhibit A: Letter of Compliance for U.S. Army Corps of Engineers Nationwide Permits (NWP) 42 and 33. All activities must be performed in compliance with the stated general and specific conditions described herein.

1.02 KEY PROJECT PERSONNEL CONTACTS

References to the OWNER are to City of Grand Junction, Colorado.

A. The following is a list of Project stakeholders and their contact information. CONTRACTOR shall notify all stakeholders 7 days prior to commencing work:

1. City of Grand Junction (OWNER)

Scott Hockins, Special Projects Manager
250 N 5th Street
Grand Junction, CO 81501
(970) 244-1484
scotth@gjcity.org

2. Mr. Jason Carey, PE (ENGINEER)

RiverRestoration.org, LLC.
PO Box 248
Carbondale, CO 81623
(970) 947-9568 (w)
jason.carey@riverrestoration.org

3. Terry Ireland, US Fish and Wildlife Service (USFWS)

Western Colorado Ecological Services Field Office
445 West Gunnison Ave, Suite 240
Grand Junction, CO 81501
(970) 243-2778
Terry_Ireland@fws.gov

1.03 CONTRACTOR PRE-QUALIFICATIONS

Please refer and adhere to all City of Grand Junction Specifications

SECTION 2 GENERAL CONSTRUCTION METHODS

2.01 PROJECT LIMITS

All construction activity shall be confined to the Project Limits as defined on the Plans. These are properties owned or leased by the City of Grand Junction but may include other utility easements or Right of Way.

2.02 PERMITS

The CONTRACTOR shall comply with all applicable requirements set forth in all permits obtained for this project. A partial list of permits required, with associated terms and conditions, includes:

- **US Army Corps of Engineers Permit SPK-2017-01049**
- **Nationwide Permit (NWP) #33 and #42**

2.03 SITE INTEGRITY

The CONTRACTOR is required to document the condition of the Utilities, Riverside Parkway adjacent to the project site, construction entrance on Riverside Parkway, mature vegetation and the general area with video recordings, submitted to ENGINEER and OWNER prior to any construction phase and after each phase of construction is completed. The video recording shall document the surface integrity of the structures with clear and recognizable reference features or established and repeatable reference markers in the field of view. The CONTRACTOR is responsible for rehabilitating, repairing or replacing, to better than pre-construction conditions, any damage to the structures, roads, and vegetation directly or indirectly related to construction activities.

2.04 UTILITIES

CONTRACTOR shall field-locate and mark all utilities within or adjacent to the Project. Any utility locations marked on plans are approximate and actual field location of any utility is wholly the responsibility of the CONTRACTOR. CONTRACTOR shall protect in place all utilities.

2.05 TEMPORARY FACILITIES

CONTRACTOR shall provide all temporary facilities required for performing the work. Temporary construction facilities and utility connections are solely the CONTRACTOR's responsibility based on his selected method of operation and schedule. CONTRACTOR is responsible for providing a clean and safe environment for all workers on the job site.

CONTRACTOR is responsible for providing sanitary facilities. CONTRACTOR shall follow Occupational Safety and Health Administration regulations. CONTRACTOR is responsible for providing all electrical, water and utility needs. CONTRACTOR shall keep the Project Limits in a neat and orderly manner. CONTRACTOR is responsible for removing temporary facilities and controls after completion of all Work.

2.05.A. Staging Areas.

Preliminary Staging Areas are shown on the Plans. Final staging and access are to be pre-approved in writing by the OWNER. All construction staging, stockpiling of materials, equipment storage, and other, shall take place in designated areas with adequate barriers to protect the public from entry. Staging areas shall have a designated office or contact information posted for public inquires. Staging areas shall provide employees all necessary facilities, legal postings, and safety protocol. Staging area shall include trash disposal container and portable toilet maintained and serviced as necessary. The CONTRACTOR is responsible for maintaining a clean and organized staging area and restoration of all disturbed areas equal to pre project conditions.

2.05.B. Dewatering Areas.

Project areas disturbing greater than 1 acre may require a COR030000 permit from the CDPHE and must implement an erosion control plan. Construction activities are anticipated to produce clean fill materials, as well as some other waste materials. All excess materials produced by construction activities shall be properly disposed in authorized areas. Dewatering areas shall have adequate BMPs in place to stockpile material prior to disposal. Dewatering areas may also be configured to include a Washout Area for concrete pours. Pours shall not be conducted during or before an anticipated storm event. All excess concrete and concrete washout slurries from the concrete mixer trucks and chutes shall be discharged off site, or temporarily into a washout area designated in an unvegetated upland and completely isolated from stormwater and drainage. All concrete residues shall be hauled off-site and properly disposed. Returning water from dewatering areas to surface flow routes may require a dewatering permit from the Colorado Department of Public Health and the Environment (CDPHE) and is wholly the responsibility of the CONTRACTOR.



Example of dewatering.

2.05.C. Oiling Areas.

Any and all fueling and oiling of equipment shall be in designated upland locations, with adequate BMP's to contain any potential spill. All major equipment/vehicle maintenance shall be performed off-site. Fuel tank may be kept on-site in the staging area with drip pans underneath the fueling area. All equipment fluids generated from maintenance activities shall be disposed of into designated drums stored on spill pallets in accordance with hazardous waste management practices. Drip pans shall be placed under all equipment receiving minor or routine maintenance.

A Spill Cleanup Plan is wholly the responsibility of the CONTRACTOR and shall be posted and available at all times on site for all work areas prior to any construction activities and shall include coordination with local emergency response agencies. A release of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the State of Colorado (which include surface water, ground water and dry gullies or storm sewers leading to surface water) shall be reported to the Colorado Department of Public Health and Environment immediately (25-8-601 CRS) and form <http://www.cdphe.state.co.us/hm/spillselfreportform.pdf> and/or Toll-Free 24-hour Environmental Emergency Spill Reporting Line 1-877-518-5608 may be used. Written notification to the Department shall follow within five (5) days (5 CCR 1002-61, Section 61.8(5)(d)). Releases of petroleum products and certain hazardous substances listed under the Federal Clean Water Act (40 CFR Part 116) must be reported to the National Response Center as well as to Colorado Department of Public Health and Environment as required under the Clean Water Act and the Oil Pollution Act. Furthermore, contact must be made immediately, reporting any spill incident with the OWNER, ENGINEER and Colorado Parks and Wildlife (CPW).

2.05.D. Hauling Routes:

The import and export of materials from the Project Limits shall occur at designated locations on defined haul routes as shown on the plans or as agreed upon with the OWNER. The haul route should be selected to minimize the amount of imported material required to operate the needed machinery and equipment. Haul routes shall be clearly marked if there is interference with the existing, detour, or new trail system. The CONTRACTOR is responsible for establishing and maintaining haul routes, including snow removal if required. Haul routes shall be repaired, at the completion of the work, to pre project conditions as determined by OWNER. CONTRACTOR is responsible for restoring haul routes to pre-project conditions at the conclusion of construction.

2.05.E. Channel Access Areas.

CONTRACTOR shall be responsible for designating and maintaining channel access sites for equipment and workers within Project Limits defined on plans and for rehabilitating access sites once construction is complete. Random or multiple channel access areas shall not be used. Gravel berms shall be installed at the top of the access ramp and other areas to eliminate sheet flow or drainage onto the exposed or disturbed Riverbanks. A silt barrier shall be erected along the toe of any and all out-of-channel open cuts to eliminate the migration of material outside of the limits of work. Straw Bales shall be used at the toe of the ramp when the access is not in use to prevent the migration of material into the River.

2.05 F. Disposal Area:

OWNER has provided on site disposal areas for inert, clean fill materials required to be removed from the site such as alluvium and bank material. Disposal areas to be directed by OWNER. Material shall be sorted and neatly stockpiled at Disposal Area clear of all haul routes.

THIS PROJECT SHALL ADHERE TO THE CURRENT VERSION OF THE "URANIUM MILL TAILINGS MANAGEMENT PLAN" (UMTMP)

https://www.colorado.gov/pacific/sites/default/files/HM_umilltail-mgt-plan.pdf

PER THE DOCUMENT MENTIONED ABOVE, IF ANY SITE MATERIAL IS TO BE REMOVED FROM THE SITE, IT MUST BE FIRST CHECKED FOR RADIOACTIVITY. IF IT IS UNDER THE LIMITS FOUND IN THE UMTMP THEN IT MAY BE REMOVED, BUT NOT BEFORE. A LOG OF THIS SHOULD BE KEPT. IF IT IS NOT UNDER THE LIMITS, THEN IT MAY LEAVE THE SITE TO A LICENSED DISPOSAL FACILITY OR TO THE INTERIM STORAGE FACILITY AT THE CITY YARD, AS DESCRIBED IN THE UMTMP.

2.06 CONSTRUCTION STAKING

The OWNER shall provide adequate horizontal and vertical control points for the CONTRACTOR to establish the lines and grades shown on the plans. The OWNER shall provide initial construction staking. Grade elevations and additional construction staking shall be wholly the responsibility of the CONTRACTOR.

Established control points shall be provided with special colored flagging and it shall be the responsibility of the CONTRACTOR to protect those control points. In the event they are lost, due to any cause, the CONTRACTOR shall re-establish adequate and permanent control markers.

There is an expectation that the CONTRACTOR will use GPS controlled equipment for the grading on the site. The ENGINEER will provide a proposed conditions XML compatible digital surface model and channel alignments to the CONTRACTOR. The CONTRACTOR shall have the means to load the alignment and surface into a field survey controller, for use in layout, checking, and as-builts of any location in the project area. CONTRACTOR shall provide a surveyor to be available for ENGINEER inspection at 2 days notice to provide measurements in the field at ENGINEER'S request.

Point	Northing	Easting	Elevation	Description
1	31,597.82	96,030.38	4574.65	N 273

2.07 SITE GRADING

CONTRACTOR shall establish and identify required lines, levels, contours and datum. Grade Site to match all lines, elevations and grades shown on the Project Drawings.

2.08 ACCEPTABLE AS BUILT ELEVATION VARIATIONS (feet)

Average Elevations across each Cross-Section shall be exact and conform with Mesa County Floodplain regulations and any State of Colorado applicable regulations. With natural building materials variances are expected and shall be allowed for average locations of individual particles. The following As-Built Variances are allowed.

Table 1. Acceptable As-Built Variances for Average Locations of Individual Particles (feet)

<u>Description</u>	<u>Variance Elevation</u>	<u>Variance Horizontal</u>
Top of Terracing	+0.2;-0.2	+/-1.0 bank alignment
Top of Boulder	+0.5;-0.5	+/-2.0 bank alignment
Top of Road Base	+0.1, -0.1	+/-, 0.5' bank alignment
Top of concrete	+0.05;-0.05	+/-0.2 bank alignment

2.09 TURBIDITY MONITORING

During periods of in-river construction turbidity of the water 300 yards downstream of the Project Limits shall not be visually greater than the turbidity of the water upstream of the Project Limits. BMP's to limit turbidity increases shall include: intermittent excavation; construction during periods of elevated background turbidity; Care of Water; and structural BMP's such as turbidity curtains.

CONTRACTOR shall continually visually monitor and daily record turbidity increases. If turbidity increases cannot be avoided at a point 300 yards downstream of the Project Limits, the CONTRACTOR shall supply a turbidity monitoring device and recorder suitable to record half hour increments for allowable increases, above background, of less than 20 NTU. CONTRACTOR shall take all precautions and implement any and all necessary BMP's to maintain turbidity increases less than 20 NTU. If measurements are lower than the 20 NTU maximum criteria for 2 consecutive days, measurements increments may increase to 4 hours on the third day and visual observations may be reinstated thereafter. When the nature of the instream activity changes and turbidity appears to change, then the original ½ hour increments must be reinstated. OWNER may stop construction during ineffective BMP's, visual increases of downstream turbid conditions, or exceedance of 20 NTU increases in turbidity above background. CONTRACTOR is wholly responsible for time delays associated with inadequate BMP's, inadequate Care of Water, or stopped work. CONTRACTOR is wholly responsible for environmental damage associated with uncontrolled sedimentation outside of the Project Limits.

2.10 UTILIZING IN-CHANNEL MATERIALS

Clean Native Alluvium that is excavated for structure placement and is to be backfilled in the channel may be utilized in channel as temporary cofferdams or other water control practices. Exposed Alluvium resulting in noticeable downstream turbidity shall be isolated from the flow of the channel.

Excavated clean native alluvium, boulders and clean bedrock may be allowed to be backfilled in the channel around structures within the limits of excavation as defined in plans. All other excavated material including fines and bank material shall not be placed in any flow path, shall be properly disposed of in upland area and shall have appropriate erosion control measures in place. All in-stream structures shall be constructed in sections sized to minimize open

excavation area. Each day of work shall be a completed work and no excavations of the bank or streambed shall be left open.

Existing boulder and riprap on bank shall only be disturbed to meet proposed grades. The presence of existing boulder or riprap (18" or greater) at the excavation grade elevation at the toe of the concrete ramp shall be verified; if substrate less than 18" is present at this elevation, the CONTRACTOR shall notify the ENGINEER.

2.11 TEMPORARY DIVERSION STRUCTURES

Control of the River stage and associated erosion during construction is wholly the responsibility of the CONTRACTOR. Setting boulders and grading of clean native alluvium may be performed in the wet channel. However, any and all wet cement work shall be isolated from the flow of the River. For In-Stream Boulder Placement, it is by CONTRACTOR's discretion whether to have a diversion and of what type. For In-Stream Construction (i.e. below Ordinary High Water (OHW)), a temporary erosion control and care of water BMP's will be required. An example used for cost estimating and permitting purposes has been included in the plan set. This example is provided for reference only.

Other diversion methods may be suitable and the CONTRACTOR is wholly responsible for the diversion methods implemented. In addition to controlling the stage of the river, seepage and ground water will likely require additional control methods such as pumping, sand bagging, impermeable membranes and jersey barriers. The CONTRACTOR shall be wholly responsible for the selection of suitable method(s), and for design, installation, and operation of the diversion and care of the river required during the performance of the work under these specifications. The CONTRACTOR is required to design and install adequate diversion and care of water facilities in a timely fashion in accordance with his/her schedule of construction and the requirements of these specifications. Areas disturbed for diversion practices shall be restored and stabilized to pre project conditions. Failure of the CONTRACTOR to become adequately familiar with and address the existing structures, access and river conditions which impact the work may result in unnecessary construction delays and associated increased efforts for which the CONTRACTOR shall be solely responsible. Pumping and returning of coffered water may require a dewatering permit from the CDPHE and is wholly the responsibility of the CONTRACTOR.

Any planned closure of the main channel in a coffered area shall give the OWNER, ENGINEER and USFWS 14 days notice to prior to the closure. CPW shall be coordinated with for the removal of any fish within the coffered area of the main channel during diversion.

2.12 TRAFFIC CONTROL PLAN

If necessary, CONTRACTOR shall submit a Traffic Control Plan, to include the Roads, Parking Areas, Path and River, to be approved by the OWNER. No construction activities shall impede public traffic patterns prior to written approval from the OWNER. Any necessary traffic control Plan shall be submitted to the OWNER for approval with 7 days notice for review. If CONTRACTOR finds it necessary to close any Roads or Paths or re-route traffic, the OWNER

shall work with CONTRACTOR approve a reasonable alternative route.

2.13 TIMING OF PLANTING.

OWNER will be responsible for planting and vegetation on this project.

SECTION 3 BEST MANAGEMENT PRACTICES

3.01 GENERAL

The Work covered by this section includes the furnishing of all labor, materials, equipment and incidentals for installation and maintenance of all on shore and in-channel BMPs. Within the Project Limits all disturbed surfaces shall utilize best management practices such as Turbidity Curtains, Silt Fences, Construction Sequencing, Care of Water, etc.; to minimize potential environmental damage, turbid conditions, locations of ponding, sediment loading in any flow path, dust, noise, light, etc. Adequate numbers, locations and properly functioning BMPs and erosion control are wholly the responsibility of the CONTRACTOR. CONTRACTOR is responsible for maintaining all BMPs during construction activities, and for the removal post construction activities and/or adequate stabilization periods. The OWNER or ENGINEER may stop work in any area due to improperly installed, inadequate, or non-functioning BMP's.

3.02 CHANNEL ACCESS

Stone Berms shall be installed at the top of the access ramp and other areas to eliminate sheet flow or drainage onto the exposed or disturbed banks. A silt barrier shall be erected along the toe of any and all out-of-channel open cuts to eliminate the migration of material outside of the limits of work. Straw Bales shall be used at the toe of the ramp when the access is not in use to prevent the migration of material into the body of water.

3.03 CONSTRUCTION SEQUENCING

Prior to starting construction, the CONTRACTOR shall notify the ENGINEER and the OWNER of the date the CONTRACTOR intends to start construction with a written notice delivered a minimum 7 days in advance.

The sequence of the critical construction processes are defined by the ENGINEER and CONTRACTOR shall follow the sequence.

I. INITIAL SITE SETUP

1. Notify OWNER and ENGINEER of start date as required.
2. Document with photographs and video the project vicinity, structures and vegetation and submit to ENGINEER.
3. Submit Diversion Plan and methods to ENGINEER.
4. Establish and post, construction site safety protocol.
5. Place Barriers, Post Signs, Install Safety Fencing and Isolate Project Site.
6. Locate in field, all Utilities.
7. Protect in Place Bridges, Utilities, Boulders, Trees and other.
8. Locate and flag Project Limits.
9. Locate construction staging and stockpile areas.
10. Install oil booms across wet channel downstream of work area, replace used oil booms per manufacturers specifications.

11. Locate area for storage of spare oil booms and designate oiling and petroleum handling areas with appropriate and adequate BMPs outside of the riparian zone.
12. Establish and post protocol for potential oil spill cleanup and emergency response.

II. STAGING

1. Install temporary portable toilet
2. Implement OWNER approved Traffic Control Plan.
3. Install BMPs
 - i. Control erosion and concentrated runoff
 - ii. Maintain and facilitate any and all existing Drainage Channels
 - iii. Identify and install any other BMPs as necessary
4. Trim back brush on access slopes
5. Protect in Place Mature Trees
6. Locate and Protect in Place Survey Control
7. Grade Access and Staging Areas
8. Maintain, add and repair BMP structures as necessary throughout project

III. IN-CHANNEL STRUCTURE CONSTRUCTION

All construction activities shall follow U.S. Army Corps of Engineers Permit Conditions. In-stream work shall be performed during low water periods. Prior to construction activities, Best Management Practices (BMPs) shall be in place in order to minimize turbidity and sedimentation, as well as prevent pollution and the potential release of contaminants from equipment. Construction activities shall be sequenced and sized to minimize temporary impacts to flowing water.

1. Stake out grades, lines, offsets and spot elevations as necessary.
2. Install all BMP's as per plans and specs.
3. Stage pump with sediment filter and adequate hose length to remove contaminants before return flow.
4. Install turbidity curtains;
5. Install temporary coffer as necessary;
6. Complete construction of in-channel structures;
7. Remove temporary coffer;
8. Grade and stabilize banks;
9. Complete construction of all bank structures;
10. Remove turbidity curtains and coffer;
11. Backfill around structures and in-stream boulders to specified elevations;
12. Remove all excess materials from channel;
13. Remove all remaining BMP's from channel;
14. Remove turbidity curtains;
15. Restore access ramp
16. Remove and dispose of filters as required.
17. Re-vegetate all disturbed soils with native erosion control grasses and erosion control blankets per plans and specifications.

18. Identify and install any other BMP's as necessary to control erosion from disturbed areas, constructed structures and potential storm water runoff.

IV. FINAL SITE RESTORATION

1. Remove water control structures in accordance with Project Specifications and Project Drawings;
2. Plant remaining stream-bank riparian vegetation areas;
3. Dispose of any excess materials in onsite disposal areas;
4. Restore Temporary Equipment and Haul Routes to original grade and vegetation;
5. Remove all materials from staging areas;
6. Re-grade or repair staging areas to pre-construction condition;
7. Identify and install BMPs down-gradient from all disturbed areas until establishment of vegetation to at least 80% cover of species found in the seed mixes (approx. 1 growing season);
8. Remove all waste materials;
9. Remove utilities protection;
10. Remove temporary signs, barriers and safety fencing;
11. Repair damage to any adjacent property, structures or vegetation;
12. Establish erosion control grasses (upland seed mix) in all disturbed areas above the Ordinary High Water Line; and
13. Remove non-biodegradable BMPs after the establishment of vegetation covering at least 80% of the disturbed areas with plant species found in the seed mixes (after approximately 1 growing season).

3.04 EQUIPMENT OPERATING IN WET CHANNELS

Equipment shall be allowed to operate in the wet channels. Equipment operating in wet channels shall be limited to the minimum area and minimum time necessary to perform the work. Equipment operating in or adjacent to any wet channels shall be free of any fluid leaks and in excellent operating condition. Biodegradable hydraulic fluids shall be utilized for any equipment operating in the flowing river channel or sloughs. CONTRACTOR shall submit a list of equipment operating with certified bio degradable hydraulic fluids to the OWNER prior to use of the equipment in the flowing channel and shall provide the specification sheets for the fluids upon request. No equipment shall be left unattended at any time in any wet channel or below the Ordinary High Water (OHW) Line. Any and all fueling and oiling of equipment shall be in a designated upland location, with adequate BMPs to contain any potential spill.

All equipment shall be cleaned prior to being on-site to minimize potential for spreading of invasive species and OWNER will check equipment prior to start of work. Equipment shall be power-sprayed and free of weeds, soil and untreated water. If any equipment being used for the Project has been previously working in another stream, river, lake, pond or wetland, one of the following disinfection practices is necessary prior to construction to prevent the spread of whirling disease, New Zealand mud snails, zebra mussels, didymosphenia, and other aquatic hitchhikers. These practices are also necessary after project completion, prior to the equipment being used in another stream, river, lake, pond, or wetland, for the same purpose:

Offsite, remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, hand tools, boots, etc.) and spray/soak equipment in a 1:15 solution of Sparquat institutional cleaner and water. Keep equipment moist for at least 10 minutes;

or

Offsite, remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, hand tools, boots, etc.) and spray/soak equipment with water greater than 140 degrees Fahrenheit for at least 10 minutes.

The excavators and backhoes may need to be cleaned on site to remove excess native sediments stuck to the track or hoes. Sediments that are removed with a shovel shall be placed in designated clean fill material storage areas. Sediments removed with clean water shall be washed into the dewatering area. All dewatering areas shall have erosion control logs staked at flow lines before discharge into dewatering area.

3.05 OIL BOOM

An adequate number of oil boom SPC 5510 manufactured by SPC (<http://www.sorbentproducts.com>) or equivalent shall be placed in a designated location onsite, visible and unobstructed at all times. Any spills shall be contained and cleaned by the CONTRACTOR. Oil booms shall be installed across the channel at the downstream end of the Project Limits at all times equipment is working in or crossing the flowing. All Booms shall be replaced as needed, approximately weekly with new Oil Booms or per manufacturer's recommendations.

3.06 PERMEABLE TURBIDITY BARRIER

All exposed bank excavations and disturbances shall be separated from the main flow of the river by a Permeable Turbidity Curtain. The turbidity curtain shall have a non-woven 8 oz filter fabric (Mirafi 180N or equivalent) for at least 50% of the curtain area between the float and the ballast.



Example turbidity curtain

3.07 STRAW BALES

Straw Bales shall be certified “Weed-Free” and not hay bales. Bales shall be secured with wood or metal stakes driven a minimum of 2 feet into ground. 4 inches of 3 inch minus washed gravel shall be placed on the up-gradient toe of the bales. Bales can be removed when 80% cover of plant species found in the seed mixes is established.

3.08 SILT FENCE

Silt Fences shall be placed to contain construction activities on land. Silt Fence shall be constructed with 4oz. Non-Woven Filter Fabric (Mirafi 140n or equivalent) with a 6 inch by 6 inch anchor trench up-grade (i.e. uphill) of the fence line and fence posts in 6 ft centers. The anchor trench shall be backfilled to existing grade with native material compacted to 95% of maximum as determined by the Standard Proctor Method (ASTM D-698-66T or AASHTO T 99).

3.09 FILTERING OF PUMPED WATER

Any pumped water being returned to the main flow of the river or other drainage shall first be processed through a Filter or settling pond. Turbid waters that are clean of contaminants or concrete residue shall be filtered or settled to prevent excessive turbidity. Waters with contaminants or concrete residue shall be filtered clean before returning to the natural flow. Dewatering permits may be required. It is the wholly responsibility of the CONTRACTOR to obtain these permits.

3.10 REMOVAL OF BMPs

All BMPs below the Ordinary High Water Line are to be removed prior to the completion of the work. All BMPs above the Ordinary High Water Line are to remain in place until the establishment of vegetation, approximately one year. Any non- biodegradable BMPs shall be removed after the establishment of vegetation cover at least 70%, approximately one year. All non-biodegradable BMPs are the property of the CONTRACTOR. The locations of the BMP installations shall be graded, seeded and restored to preconstruction conditions after removal.

3.11 RIPARIAN PROTECTION

Any and all riparian areas and riparian vegetation outside of the limits of excavation shall be protected in place. No construction supplies, fuels nor oils shall be stored in riparian areas, no vehicles nor heavy equipment shall be allowed into riparian areas other than the designated channel access sites. No discharge of any materials shall be allowed into any riparian areas. Riparian areas shall be traversed only by foot and leak free hoses may cross riparian vegetation. Any incidentally disturbed riparian areas shall be restored to better than pre-construction conditions. Care should be taken not to spread any existing weed infestations in riparian areas.

3.13 MATURE TREE PROTECTION

The preservation of existing mature trees is an important component of the work and a measure of the successful completion thereof. Healthy root mass at the toe of the riverbanks is essential to the stability of the river channel. The healthy mature native trees that are adjacent to excavating activities shall be Protected In Place. The work shall include the preservation from injury or defacement of all vegetation that is NOT designated for removal by the ENGINEER in the field. ENGINEER shall mark all trees and large shrubs approved for removal prior to excavation work. Areas of tree removal shall be determined and marked in collaboration between the CONTRACTOR and the ENGINEER.

- a) CONTRACTOR guarantees that care, caution and best management techniques are implemented to maximize the survivability of native mature trees not designated for removal.
- b) All Protect in Place trees shall have 100% success rate, showing vigor and general health, for one year after PIP measures are conducted.
- c) Post construction monitoring may recommend additional pruning, irrigation, or fertilizer to restore health to a damaged tree. The CONTRACTOR is responsible for all measures to restore the health of trees for one year after construction disturbances around protect-in-place trees.
- d) If negligence results in potential mortality of trees, as determined by the ENGINEER, the CONTRACTOR shall replace all damaged trees with new native trees to reclaim an equivalent canopy cover at CONTRACTOR's sole expense.

Special care shall be applied when working under driplines or near the toe of the riverbank. The majority of critical roots are expected to run parallel to the River. The CONTRACTOR shall take great care when any earth disturbing activities beneath the drip line of trees are conducted. Protect in Place mature trees shall follow the below guidelines:

3.13.A. Hand Excavations under the drip line.

Under the drip line, or at a minimum of 10 feet from the base of a PIP Tree, all necessary excavating activities shall be done by hand to expose the roots.

- a. Expose all roots greater than 1" and preserve.
- b. If it is necessary for the removal of concrete litter, or for the installation of bank and in-channel features, the roots may be cleanly cut, and shall not be ripped or torn.

3.13.B. Treatment of cut and exposed roots.

Backfill all cut and exposed roots the same day of root cutting, and water until backfilling is accomplished.

3.13.C. Root Care.

Roots can be up to 2-3 times the diameter of the drip line.

The CONTRACTOR shall take as much care as possible to preserve roots.

- a. All roots that are necessary to remove for excavation activities shall be cleanly cut.
- b. The CONTRACTOR shall apply all root cuts with approved root stimulator.

3.13. D. Areas of fill near PIP trees

- a. If necessary, any fill material shall be held away from PIP trees with a boulder retaining wall with a discontinuous footing.
- b. If fill is necessary adjacent to the PIP tree, then air vents shall be installed.
- c. No soils shall be compacted under the drip line without ENGINEER approval.

3.14 ENVIRONMENTAL PROTECTION

The construction site shall be maintained to minimize dust, noise, erosion, and water ponding. Any and all fuel operated equipment near or within drainage areas, riparian areas or open water areas shall be leak-free and in excellent operational condition. Equipment shall also use biodegradable fluids when feasible. The CONTRACTOR is wholly responsible for any environmental damage directly or indirectly related to storage of supplies and equipment, equipment operation, any fluid spills or any other construction activities.

3.15 BARRIERS

The CONTRACTOR shall furnish, install and maintain suitable barriers, as required to prevent public entry; and to protect the work, facilities, trees and wetland areas from any associated construction activities. Remove temporary barriers at the completion of work.

3.16 PROJECT SITE REHABILITATION

After all other construction activities are completed, all disturbed areas are to be rehabilitated to pre-construction conditions. Clean the site of trash and debris and remove all construction measures, equipment and supplies. Permanent riparian plantings and seeding shall be installed immediately after the final design grades are achieved, but no later than 14 days after construction activities have permanently ceased at the disturbed area.

One year after installation the CONTRACTOR shall guarantee that containerized and B&B plants have 100% success rate, seed plantings shall have 70% success rate, and all PIP mature trees shall have 100% success rate.

3.17 CULTURAL RESOURCES

The project area has been disturbed by bank construction, road alignments, multiple utilities, pedestrian path construction and is within the main channel of the River. No cultural resources are anticipated to be impacted by the project. If potential cultural resources in the project area are discovered during construction and cannot be avoided, CONTRACTOR shall suspend construction activities in that area until the properties can be evaluated for listing in the National Register of Historic Places in consultation with Colorado State Historical Preservation Office.

SECTION 4 IN-CHANNEL AND BANK CONSTRUCTION

4.01 CONSTRUCTION OF IN-CHANNEL BOULDER STRUCTURES

All Boulder Structures constructed In-Channel or below the Ordinary High Water Line (OHWL) shall be constructed with Footer Rocks and Keying Techniques (See Drawing Details). Construction of Boulder Structures shall include selection, rotation, placement and adjustment of each individual rock to minimize void spaces and maximize interlocking of boulders and smooth transition between boulders. The ENGINEER may identify each imported boulder that may affect surface flow, and direct the placement of surface flow boulders.

Boulder Structures shall be constructed by placing individual boulders in designed cross-sections of the channel. Each cross-section has specific average elevations and alignments for the placement of rock as shown on the Project Drawings. Each structure shall include footer boulders extending below the footer elevation or 4 feet of depth below the thalweg if an elevation is not specified. Stacked boulders shall have a minimum 0.5:1 horizontal to vertical slope with the footer offset in the downstream direction when buried and footer offset in all directions when exposed.

Each individual boulder shall be set with the “B” axis in the direction of flow when exposed or the “A” or “B” axis when the boulder is interlocked between other boulders (See Drawing Details). Minimum acceptable boulder size is 42 inches along the B-axis.

4.02 CONSTRUCTION OF BANK TERRACING BOULDER STRUCTURES

Boulder terracing structures shall be constructed by placing individual boulders in designed sections of the bank. Each boulder shall include selection, rotation, placement and adjustment of each individual rock to minimize void spaces and maximize interlocking of boulders. Each section has specific elevations and alignments for the placement of rock as well as spot elevations as shown on the Project Drawings. Each Surface Boulder shall include footer boulders placed at least to depth shown on Project Drawings or at a minimum of 3 feet of depth below the existing grade and placed on 8oz non-woven Filter Fabric. Boulders placed at the toe of the slope shall be a minimum of 36 inches along the B-axis. All boulders shall have intimate contact with all adjacent boulders with less than 6 inch diameter voids.

4.03 SECTION NOT USED

4.04 FILTER FABRIC SPECIFICATION

An undamaged filter fabric with geo-composite drainage shall overlay all exposed earthen embankment materials to be covered with rock. Filter fabric shall be placed to eliminate migration of fines through the boulder structures and the composite allows water to drain from structure. Geo-composite **Hydrodrain 300** by www.hydrotechusa.com/drainage2.htm, or approved equivalent shall be used at a minimum of 4 feet width on 10 feet center (approximately 40% of total filter fabric coverage). An acceptable non-woven 8oz filter fabric (Mirafi 180N or equivalent) shall be used for the bank coverage not overlaid by drainage. Filter fabric shall be

placed to have intimate contact with intact bank material. Filter Fabric shall not be torn or ripped by boulder installation and preventative measures such as less than 6 inches of 6 inch minus well graded gravel bedding material, or approved native alluvium shall be used. Install per manufacturers recommendations.

Table 2. Graded gravel bedding.

Weight	Indicator	6 inch minus
100%	Passing	6"
50%-100%	Passing	3"
40%-60%	Passing	3/4"
10%- 30%	Passing	No. 20
0%- 4%	Passing	No. 200

4.05 IMPORTED OR REPURPOSED BOULDER AND ALLUVIUM SPECIFICATION

Imported or repurposed Boulders may be quarried or excavated and generally smooth in shape with the largest rock faces being approximately flat. Boulders shall be of a consistent material for the entire project and shall be a color that is aesthetically neutral with the native landscape. Boulder gradations shall conform to Table 3 by number, and measurement of the intermediate axis ("B"-Axis). The minor axis (shortest dimension or "C"-Axis) shall not be less than indicated in Table 3.

Table 3. B-Axis Boulder Gradations (inches)

Number of Stones	Indicator	18 inch	24 inch	36 inch	48 inch
< 10%	Greater	24	36	48	60
> 75%	Between	25&15	30&20	42&30	56&40
0%	Less	12	18	24	30

Imported Boulders shall consist of hard, dense durable stone, resistant to weathering. Surface stones shall have a aesthetic neutral color. Stone shall be suitable for incidental human contact. CONTRACTOR shall submit source information and samples to ENGINEER. The ENGINEER shall approve Boulder material before use. Granitic and Basaltic boulders subjected to weathering such as glacial or alluvial flows will be preferred.

Boulders may be approved by the Engineer if, by visual inspection, the rock is determined to be sound and durable. The Engineer may reject boulder material if, in the Engineer's opinion, the material is marginal or unacceptable or has poor aesthetic value. At the request of the Engineer, the Contractor shall furnish laboratory test results indicating that the material meet the requirements including those below:

---Boulders shall have a minimum specific gravity of 2.65.

---Abrasion resistance by Los Angeles Machine; Test Method ASTM C535; Specification Requirement: 15% loss, maximum.

--Soundness by use of Sodium/Magnesium Sulfate, Test Method ASTM D5240-04 Standard Test Method for Testing Rock Slabs to Evaluate Soundness of Riprap by Use of Sodium Sulfate or Magnesium Sulfate; Specification Requirement: 5% loss, maximum.

--Soundness by Freezing and Thawing, Test Method ASTM D5312-04 Standard Test Method for Evaluation of Durability of Rock for Erosion Control Under Freezing and Thawing Conditions; Specification Requirement: 5% loss, maximum.

Imported or repurposed alluvium to be used for backfill or terraced landing shall adhere to the following gradation specifications. All alluvium used for backfill or finished grade must be rounded.

Table 4. Alluvium Gradations (inches)

Weight	Indicator	6 inch minus	12 inch minus	1" Rounded Gravel	5/8" Rounded Gravel	Coarse Sand
100%	Passing	6"	12"	1"	5/8"	No. 10
50%-100%	Passing	3"	6"	1/2"	1/4"	No. 14
40%-60%	Passing	3/4"	2"	3/8"	No. 5	No. 18
10%- 30%	Passing	No. 20	No. 20	No. 20	No. 20	No. 20
0%- 4%	Passing	No. 200	No. 200	No. 200	No. 200	No. 200

SECTION 5 CONSTRUCTION OF CONCRETE STRUCTURES

5.01 GENERAL

The following specifications, standards and codes shall govern the construction of any and all concrete structures, where applicable, with modifications as specified herein:

CDOT Construction Standards and Specifications

ACI 318 - Building Code Requirements for Reinforced Concrete.

ACI 301 - Structural Concrete

ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete

ASTM A884/A884M-04 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement

5.02 CONCRETE

Concrete shall be:

- A. CDOT Class D 4,500 psi 28 day strength;
- B. Air content 5.5% \pm 0.5%;
- C. 4-6 inch slump;
- D. Number 5 grade 60 epoxy coated reinforcing steel; and
- E. Epoxy joint filler (100% solids) shall be specific for exterior use with continuous exposure to water or submerged conditions.

Contractor shall protect work from vandals until set. CONTRACTOR shall deliver concrete free of marks, stains, etc... Pressure washing may be required prior to acceptance of work. .

CONTRACTOR shall deliver smooth horizontal and vertical curvature on paving segments as determined by OWNER. All elevations and grades set using appropriate survey equipment. Paving segments with wavy edges, humps, and/or dips will be removed and replaced at the expense of the contractor.

5.02.A. ANTI-FREEZING ADMIXTURE

If freezing temperatures are present, an accelerator such as Polarset may be used per manufacturers recommendations, as 1-2% of total.

5.03 CONCRETE TESTING

Provide an ASTM D 1077 compliant and ACI certified laboratory and provide level I ACI certified field sampling technicians. For every 50 CY of concrete provide one (1) test of:

- A. Temperature per ASTM C 1064
- B. Air content per ASTM C 231
- C. Slump per ASTM C 143
- D. Compressive strength per ASTM C 31
- E. Flexure strength per ASTM C 78.

SECTION 6 LANDSCAPE INSTALLATION

6.01 PLANTINGS

Planting to be specified by OWNER

6.02 RIPARIAN SHRUB PLANTINGS

Planting to be specified by OWNER

6.03 RIPARIAN WILLOW STAKES

6.03.a Live Stake Harvesting.

The CONTRACTOR may harvest all live stakes within the Project Limits. Live stakes available on site are willow (*Salix spp*) and redosier dogwood (*Cornus sericea*) stakes. All live stakes shall be harvested during the dormant season. All live stakes shall be harvested from a healthy parent that does not have serious injuries, insect pests, diseases or shriveled. No more than one-third of the donor shrub should be harvested. The CONTRACTOR shall take care to not damage the donor shrub; cuts shall be made smooth without damage to the bark of the donor shrub. Cuts shall be made at an angle of approximately 45 degrees, 6 to 8 inches above the ground, to assist rapid regenerate. The minimum diameter of the cuttings should be 0.75 inch and the minimum length should be 40 inches; larger live stakes contain a greater amount of the stored energy required to form leaves, stems and roots. The top ends shall be blunt; butt ends shall be angled at 45 degrees. Stakes shall be stripped of all stems and leaves, taking care to minimize scarring or bruising of the stakes. Immediately upon cutting, stakes shall be placed in water in a shaded area. The live cuttings shall be planted within 6hrs, or must be carefully bound, secured, and stored submerged in clean fresh water.

6.03.b Live Stake Installation.

Live stakes shall be planted to a depth where the roots are able to reach the water table during all seasons. Stakes must be harvested and planted when the willows are dormant. This period is generally from late fall to early spring, or before the buds start to break. If the willow stakes cannot be installed during the spring or dormant season, cut during the dormant season and hold in cold storage at temperatures between 33 and 39 degrees F and store for up to 3 months. Insert the cutting vertically (i.e., oriented in the same direction which it grew on the shrub) into the substrate so that approximately two-thirds of the total length is below the surface. Make pilot hole for all installation. Stakes should be placed randomly at a rate of two holes per square yard. Install three live stakes per hole (where possible). Backfill all voids with topsoil. The cutting must be inserted deep enough to ensure that it reaches the water table throughout the entire growing season. After the live stakes are inserted, the planting hole must be backfilled with native soil and lightly tamped to prevent air pockets.

6.04 EROSION CONTROL BLANKET

All Natural biodegradable Erosion Control Blankets (ECB) shall be placed on all disturbed slopes greater than 10 percent grade. All Natural biodegradable Erosion Control Blankets (ECB) shall be placed on restored banks. One types of Erosion Control Blankets have been pre-approved: CC-4 by Western Excelsior or approved equivalent, www.westernexcelsior.com. Do not order, deliver, or install other products without a written approval by the ENGINEER.

Install per manufactures recommendations, and details. Store all coir fabric elevated off the ground and insure that it is adequately covered to protect the material from damage. Protect fabric from sharp objects that may damage the material. Materials damaged during transport, storage or placement shall be replaced at the CONTRACTOR expense. The ENGINEER shall inspect and approve all materials prior to installation.

6.05 TOP SOIL

Available topsoil shall be salvaged a minimum of 6 inches in depth from all disturbed areas. Salvaged topsoil shall be stockpiled in areas that shall not interfere with construction phases and at least 15 feet away from areas of concentrated flows or pavement. The slopes of the stockpile shall not exceed 2:1 horizontal to vertical. A silt fence or other adequate erosion control shall be installed around the perimeter of each stockpile.

6.05. A. Top Soil Application.

Top soil shall be applied to all areas for seeding and planting. Top soil shall be applied at a minimum of 6 inches depth on all seeded areas, and shall be used to backfill all shrub and tree plantings to the depth and twice the width of the root ball. Topsoil shall not be placed when the ground or Topsoil is frozen, or excessively wet. Following the spreading operation, the Topsoil surface shall be raked to final grades without surface irregularities that could contribute to concentrated waterflow downslope. Top soil shall be raked with 0.5 inch undulations for a seed bed.

6.05. B. Top Soil Material.

Imported topsoil shall be a natural sandy loam that is weed free. Imported Topsoil shall be properly stored and protected, and shall be free of roots, hard clay and stones which shall not pass through a 1-inch square opening. It shall be a loamy mixture having at least 90 percent passing No. 10 sieve. Below lists the soil properties:

1. Contain no less than 2 percent nor more than 13 percent organic matter, as determined by the test for organic matter in accordance with ASTM D2974.
2. Contain no less than 12 percent or more than 40 percent clay, as determined in accordance with ASTM D422.
3. Sand content shall not exceed 55 percent, as determined in accordance with ASTM D422.

4. The pH shall not be lower than 5.0 or higher than 8.0. The pH shall be determined with an acceptable pH meter on that portion of the sample passing the No. 10 sieve, in accordance with the —Suggested Methods of Tests for Hydrogen Ion Concentration (pH) of Soils, included in the ASTM Procedures for Testing Soils issued December 1964.
5. One hundred percent shall pass the 1-inch screen; 97-100 percent shall pass the 1.5-inch screen, and 40-60 percent shall pass the No. 100 mesh sieve.
6. Topsoil shall be free of clods, gravel, and other inert material. It shall be free of thistle, reed canary grass, creeping foxtail, noxious vegetation and seed. Should such regenerative material be present in the soil, the CONTRACTOR shall remove, at his expense and in a manner satisfactory to the Owner's Representative, all such growth, both surface and root, which may appear in the imported Topsoil within 1 year following acceptance of the work.
7. All soil to be seeded shall be amended with Humate and fertilizer product. The method of incorporation of amendments shall result in a uniform application of material as approved. Humate shall be applied at a rate of 1500 pounds per acre. The humate shall be applied using approximately 1 gallon of water for 1 pound of dry powder. The fertilizer product shall be applied at a rate of 2000 pounds per acre.

SECTION 7 HYDROLOGY

7.01 HYDROLOGY

Hydrology herein is based on gage USGS Gage 09106150 COLORADO RIVER NEAR PALISADE for water years 1990 thru 2016, modified for average diversion and returns between the gage and the project site. The USGS point of contact (Grand Junction Field Office) for the gage may be telephoned at (970) 245-5257 for daily discharge data, or accessed online at: http://waterdata.usgs.gov/co/nwis/uv?site_no=09106150

Real time data may be seasonal and is provisional, subject to change. Statistical Analysis of historical data is not a guarantee for the flow rates during construction and are provided herein solely for the information of the CONTRACTOR. Maintenance of the River Flows, diversions, erosion, environmental protection, BMPs and River stages during the construction period are wholly the responsibility of the CONTRACTOR.

TABLE 5. *Percent of record that average daily flows were exceeded on the Colorado River near the Project Area (cfs)*

Month	Day	Max (cfs)	Min (cfs)	5% (cfs)	25% (cfs)	50% (cfs)	75% (cfs)	95% (cfs)
Sept	1	2080	60	158	722	1040	1490	2010
Sept	2	2120	61	156	733	1020	1450	2030
Sept	3	2020	60	150	769	986	1410	2010
Sept	4	2140	59	178	750	985	1370	2090
Sept	5	2100	62	164	702	956	1350	2050
Sept	6	2220	74	164	726	946	1360	2070
Sept	7	2380	80	162	763	959	1330	2190
Sept	8	2370	109	163	785	1050	1320	2280
Sept	9	2260	100	152	865	1090	1440	2210
Sept	10	2920	106	159	872	1210	1520	2670
Sept	11	3050	120	169	840	1250	1460	2710
Sept	12	2560	249	271	825	1170	1480	2320
Sept	13	2200	277	315	845	1190	1430	2160
Sept	14	2150	351	380	881	1160	1540	2090
Sept	15	1930	341	369	855	1200	1550	1900
Sept	16	1920	278	305	829	1190	1500	1900
Sept	17	2170	240	267	831	1290	1610	2090
Sept	18	2350	321	334	850	1190	1580	2320
Sept	19	2400	310	364	899	1150	1480	2330
Sept	20	2720	316	368	1070	1200	1450	2540
Sept	21	4630	302	354	986	1190	1470	3910
Sept	22	4300	297	301	904	1250	1690	3680
Sept	23	3690	267	271	979	1330	1820	3260
Sept	24	3250	233	247	954	1320	1710	2970
Sept	25	2990	191	236	922	1200	1630	2760
Sept	26	2840	170	238	850	1140	1570	2670
Sept	27	2910	146	229	781	1120	1520	2690

Month	Day	Max (cfs)	Min (cfs)	5% (cfs)	25% (cfs)	50% (cfs)	75% (cfs)	95% (cfs)
Sept	28	3030	281	331	733	1150	1460	2900
Sept	29	2820	466	473	697	1120	1430	2820
Sept	30	2570	467	522	783	1130	1520	2520
Oct	1	2840	451	455	791	1130	1540	2700
Oct	2	2980	423	432	744	1220	1530	2740
Oct	3	2800	385	420	757	1170	1540	2710
Oct	4	3130	369	429	697	1220	1580	2810
Oct	5	2730	284	366	715	1270	1710	2470
Oct	6	3140	243	336	709	1260	1710	2930
Oct	7	3530	255	335	734	1260	1610	3150
Oct	8	3160	239	309	771	1240	1550	3030
Oct	9	2820	214	292	910	1280	1620	2640
Oct	10	2670	209	281	894	1240	1670	2560
Oct	11	2680	200	279	900	1270	1590	2510
Oct	12	2890	219	272	859	1220	1530	2590
Oct	13	2830	344	361	853	1200	1560	2560
Oct	14	2710	359	366	863	1270	1580	2500
Oct	15	2700	325	364	875	1290	1580	2470
Oct	16	2680	303	355	866	1290	1550	2450
Oct	17	2710	290	340	886	1280	1540	2510
Oct	18	2680	323	352	858	1170	1580	2530
Oct	19	2590	337	361	842	1170	1590	2390
Oct	20	2560	331	352	806	1220	1520	2330
Oct	21	2440	360	366	816	1200	1540	2240
Oct	22	2260	418	419	807	1280	1550	2120
Oct	23	2170	412	420	835	1320	1540	2070
Oct	24	2360	467	476	898	1340	1530	2190
Oct	25	2470	505	514	1010	1330	1570	2280
Oct	26	2290	520	583	1080	1320	1650	2240
Oct	27	2210	510	588	1070	1320	1650	2200
Oct	28	2220	530	603	1070	1350	1650	2170
Oct	29	2250	540	624	955	1490	1670	2180
Oct	30	2330	550	635	1010	1480	1890	2260
Oct	31	2290	530	585	1290	1580	1790	2280
Nov	1	2430	540	590	1260	1550	1930	2400
Nov	2	2490	600	602	1290	1530	1920	2460
Nov	3	2380	580	635	1380	1730	1970	2360
Nov	4	2320	689	843	1400	1750	2100	2320
Nov	5	2490	775	875	1460	1820	2180	2480
Nov	6	2690	870	958	1560	2000	2180	2660
Nov	7	2540	1170	1170	1570	2020	2340	2540
Nov	8	2540	1190	1220	1810	2030	2280	2540
Nov	9	2980	1220	1270	1830	2060	2370	2860
Nov	10	2870	1400	1430	1820	2050	2400	2800
Nov	11	2730	1510	1540	1850	2050	2320	2710

Month	Day	Max (cfs)	Min (cfs)	5% (cfs)	25% (cfs)	50% (cfs)	75% (cfs)	95% (cfs)
Nov	12	2860	1530	1540	1860	2050	2300	2740
Nov	13	2830	1180	1270	1790	2030	2320	2720
Nov	14	2760	1380	1400	1730	1990	2290	2690
Nov	15	2610	1390	1430	1730	2000	2300	2600
Nov	16	2580	1410	1410	1740	1990	2270	2530
Nov	17	2580	1250	1290	1700	1990	2200	2540
Nov	18	2520	1220	1290	1670	1980	2150	2490
Nov	19	2670	1130	1250	1680	1940	2180	2630
Nov	20	2630	1300	1340	1710	1880	2150	2600
Nov	21	2680	1170	1250	1640	1980	2210	2580
Nov	22	2650	1300	1320	1700	2000	2230	2640
Nov	23	3190	1350	1390	1650	2010	2160	2960
Nov	24	2820	1350	1360	1680	1940	2260	2690
Nov	25	2530	1250	1270	1660	1810	2200	2510
Nov	26	2570	1260	1270	1570	1810	2090	2560
Nov	27	2490	1280	1320	1580	1840	2170	2470
Nov	28	2690	1160	1190	1610	1820	2180	2610
Nov	29	2570	1160	1180	1500	1850	2170	2510
Nov	30	2480	1210	1210	1470	1780	2090	2480
Dec	1	2480	1240	1250	1520	1740	2170	2460
Dec	2	2490	1190	1220	1540	1710	2140	2480
Dec	3	2580	1080	1150	1540	1780	2090	2550
Dec	4	2460	1110	1140	1520	1660	2030	2450
Dec	5	2260	1020	1030	1450	1670	2040	2230
Dec	6	2210	1090	1110	1440	1660	2030	2190
Dec	7	2430	1080	1130	1410	1620	1960	2390
Dec	8	2400	1200	1220	1420	1610	2010	2380
Dec	9	2440	1230	1230	1390	1700	2010	2370
Dec	10	2430	1040	1070	1290	1720	1940	2390
Dec	11	2500	972	992	1390	1710	1920	2460
Dec	12	2500	987	1050	1460	1710	1910	2380
Dec	13	2430	1110	1120	1500	1690	1990	2380
Dec	14	2540	1220	1230	1580	1740	2020	2470
Dec	15	2560	1210	1230	1470	1730	1910	2470
Dec	16	2470	1160	1200	1480	1610	1920	2460
Dec	17	2590	1180	1200	1390	1610	1920	2560
Dec	18	2600	1200	1210	1390	1580	1920	2580
Dec	19	2640	1280	1290	1390	1600	1970	2550
Dec	20	2600	1180	1190	1350	1690	2010	2490
Dec	21	2850	1050	1070	1380	1760	1950	2710
Dec	22	2490	807	896	1430	1680	2000	2470
Dec	23	2570	719	766	1290	1640	1970	2540
Dec	24	2420	642	762	1270	1650	1850	2390
Dec	25	2290	682	814	1300	1600	1810	2280
Dec	26	2180	879	949	1270	1610	1820	2180

Month	Day	Max (cfs)	Min (cfs)	5% (cfs)	25% (cfs)	50% (cfs)	75% (cfs)	95% (cfs)
Dec	27	2380	1010	1020	1370	1570	1880	2320
Dec	28	2490	1020	1050	1270	1520	1920	2410
Dec	29	2440	1100	1100	1270	1570	1980	2400
Dec	30	2440	1070	1120	1360	1610	2060	2400
Dec	31	2670	1070	1120	1430	1650	1870	2520
Jan	1	2630	1140	1140	1420	1570	1840	2520
Jan	2	2560	1130	1140	1260	1520	1860	2450
Jan	3	2670	1090	1090	1210	1540	1980	2660
Jan	4	2670	1050	1080	1270	1590	1900	2670
Jan	5	2600	1020	1080	1340	1610	1960	2520
Jan	6	2500	981	1010	1450	1660	1990	2370
Jan	7	2340	921	984	1420	1650	1890	2280
Jan	8	2220	1080	1100	1460	1610	1890	2200
Jan	9	2240	1100	1100	1510	1730	1970	2180
Jan	10	2340	1120	1120	1520	1750	1990	2310
Jan	11	2990	1140	1160	1450	1730	1960	2790
Jan	12	3130	1210	1220	1380	1670	2000	2910
Jan	13	2470	1170	1180	1360	1580	1980	2360
Jan	14	2440	1070	1100	1410	1570	1860	2320
Jan	15	2340	1070	1110	1410	1520	1880	2240
Jan	16	2300	1080	1100	1380	1550	1890	2230
Jan	17	2380	1050	1060	1350	1590	1830	2350
Jan	18	2380	1100	1100	1330	1660	1790	2320
Jan	19	2360	1090	1110	1280	1640	1890	2280
Jan	20	2350	1040	1090	1250	1620	1910	2280
Jan	21	2310	1080	1100	1340	1610	1820	2280
Jan	22	2220	1120	1130	1350	1630	1890	2200
Jan	23	2200	1120	1120	1320	1560	1810	2180
Jan	24	2310	1140	1140	1340	1580	1770	2270
Jan	25	2380	1140	1140	1300	1580	1820	2360
Jan	26	2370	1080	1100	1360	1610	1820	2320
Jan	27	2370	1140	1140	1360	1610	1870	2350
Jan	28	2380	1130	1170	1440	1630	1810	2340
Jan	29	2250	1140	1170	1410	1600	1770	2210
Jan	30	2250	1120	1160	1400	1600	1700	2250
Jan	31	2410	1120	1130	1350	1580	1720	2370
Feb	1	2470	1100	1100	1370	1510	1740	2410
Feb	2	2230	1120	1120	1270	1490	1780	2210
Feb	3	2240	1120	1130	1270	1490	1810	2230
Feb	4	2260	1050	1080	1320	1490	1790	2250
Feb	5	2270	1120	1140	1340	1510	1800	2220
Feb	6	2360	1090	1110	1340	1500	1860	2300
Feb	7	2410	1020	1090	1360	1570	1850	2390
Feb	8	2360	931	1030	1420	1590	1860	2340
Feb	9	2360	931	1010	1420	1680	1860	2350

Month	Day	Max (cfs)	Min (cfs)	5% (cfs)	25% (cfs)	50% (cfs)	75% (cfs)	95% (cfs)
Feb	10	2350	912	1000	1330	1710	1950	2340
Feb	11	2280	1040	1070	1320	1610	1950	2270
Feb	12	2200	1130	1140	1350	1570	1900	2190
Feb	13	2230	1120	1140	1400	1650	1820	2220
Feb	14	2220	1130	1140	1410	1710	1820	2200
Feb	15	2290	1150	1160	1430	1680	1890	2250
Feb	16	2320	1160	1180	1380	1620	1890	2290
Feb	17	2300	1100	1150	1370	1620	1970	2270
Feb	18	2370	1120	1150	1360	1600	1980	2340
Feb	19	2360	1130	1140	1390	1620	1920	2350
Feb	20	2440	1050	1080	1410	1680	2040	2420
Feb	21	3510	1110	1110	1410	1710	1990	3100
Feb	22	4800	1120	1120	1420	1630	1830	4030
Feb	23	3560	1100	1120	1450	1630	1910	3210
Feb	24	2710	1050	1070	1430	1680	1960	2610
Feb	25	2570	1120	1130	1400	1640	1990	2540
Feb	26	2390	1090	1130	1380	1580	2010	2390
Feb	27	2320	1110	1130	1390	1670	1980	2310
Feb	28	2360	1090	1110	1420	1670	2010	2320
Feb	29	2160	1400	1420	2100	2130		

7.02 APPROXIMATE WSEL

Water Surface Elevations (WSEL) are based on limited survey and one/two-dimensional hydraulic modeling. Actual WSELs in the field may vary from those listed herein. Approximate WSELs are provided herein solely for the information of the CONTRACTOR.

Water Surface Elevations would be affected an unknown degree with temporary flow obstructions of equipment, coffer, temporary alluvium placement or other construction activities. The CONTRACTOR is wholly responsible for monitoring and controlling WSELs during construction and any associated erosion, flooding, structure integrity or environmental damage.

TABLE 6, Pre-Construction AND Care of Water Approximate Water Surface Elevations (feet)

Flow rate (cfs)	Predicted Water Surface Elevation (feet)
810	4566.5
1600	4567.3
3000	4568.4
5000	4569.4
7000	4569.6
9000	4570.0

SECTION 8 MODIFICATIONS TO TIME OF COMPLETION

8.1 CONSTRUCTION WINDOW

The IN-STREAM construction shall not commence prior to September 15.

The date of beginning and the time for completion of the work are essential conditions of the Contract Documents and the work embraced shall be commenced on a date specified in the Notice to Proceed. The Contractor will proceed with the work at such rate of progress to ensure full completion within the Contract time. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract time for the completion of the work described herein is a reasonable time, taking into consideration the climatic and other factors prevailing in the locality of the work. Every effort shall be made by the Contractor to complete the project within the "Contract Time" shown in the bid, quote or proposal. The "Contract Time" anticipates "Normal" weather and climate conditions in and around the vicinity of the Project site during the times of year that the construction will be carried out.

Contractor acknowledges that the Project site is located in a high altitude environment where weather patterns can be variable and extreme during winter months. Freezing conditions are likely to be regularly encountered during the construction window.

Frazil ice is a winter occurrence throughout much of the Colorado River in Colorado. Ice can pile up significantly on many in-channel obstructions. Contractor is wholly responsible for maintaining conditions that prevent buildup of ice during construction and for delays associated with ice.

SECTION 9 DEFINITIONS

B-Axis

The intermediate (and overturning) axis on a boulder.

Best Management Practices (BMPs)

Water and Soil Care Measures designed to prevent sediment soil erosion, minimize turbidity and protect wetlands.

Coffer Dam

Structure used to isolate an area for dewatering.

Ordinary High Water Line (OHWL)

Approximate Water Surface Elevation at the 1 ½ year Flood.

In-Channel Work

All construction work occurring below the ordinary high water line or one and a half year flood or in a wet channel.

Invert

The cross-section that controls water flow.

On-Shore Work

All construction work occurring above the ordinary high water line or one and a half year flood.

Protect-In-Place

Protection of Structures or Vegetation by not disturbing them with adjacent construction activities.

Thalweg

Lowest elevation of the river channel in cross section perpendicular to the direction of the main current flow.

Toe

Point where a ground slope meets a low point and flattens out. Most commonly in rivers it refers to the point where the bank slope meets the channel bottom slope.

River Right

The right side of the channel when looking downstream.

River Left

The left side of the channel when looking downstream.

Riparian Vegetation Vegetation which is rooted in the water table of the adjacent river.

Water Surface Elevation Elevation on the project datum, of the surface of water at a specified location.

BID SCHEDULE

The Construction Contract is known as:

LAS COLONIAS PARK SHORELINE AMMENITIES PROJECT

PART 1 BID SCHEDULES

Cost is for all work basic to the Contract. The estimated quantities and prices are as follows:

Las Colonias Park Shoreline Amenities Project Bid Schedule

PART 2 MEASUREMENT AND PAYMENT

2.1 GENERAL

A. ENGINEER will compute all quantities.

B. CONTRACTOR will verify measurement and quantities.

C. CONTRACTOR will provide all equipment, workers, and survey crews to assist ENGINEER in making measurements.

D. Units of measurement are listed above in the bid schedule(s).

E. Refer to Technical Specifications and Details for more detailed information to the following bid items, if applicable.

F. Bids shall encompass all costs associated with each bid item. This includes, but is not limited to planning, delays, measuring, locating, surveying, executing, supplying, testing, cleaning, protecting, and finalizing Work and any and all incidentals. Bids shall include all costs associated with purchasing all materials necessary to complete Work. Bids shall encompass all costs associated with minimizing impacts upon the natural environment during any and all construction activities, including delays associated with sequencing and environmental conditions.

G. Payment for all Lump Sum (LS) items will be made on a percentage basis as follows.

Percent of Original Contract Amount Earned	Percent of Amount Bid Item to be Paid
5	20
15	20
40	20
60	20
100	20

The estimated quantities and prices are as follows:

Las Colonias Park Shoreline Amenities Project Bid Schedule

ITEM	DESCRIPTION	Units	Estimated Quantity	Unit Price	Total
A	Preconstruction Services	LS	1		
1	Mobilization, General Conditions & Best Management Practices	LS	1		
2	Construction Survey/Stake/As-Built	NA	NA		
3	Traffic Control	LS	1		
				Sub Total	
B	Erosion Control and Care of Water				
4	General Staging Area BMPs	LS	1		
5	Care of Water (COW) Practices	LS	1		
				Sub Total	
C	BOAT RAMP CONSTRUCTION AND SITE IMPROVEMENTS				
6	Clear and grub site	SF	40,000		
7	Unclassified Bank Excavation	CY	2,765		
8	Placement and Rough Grading of Excavated Material On Site	CY	400		
9	Stockpile Excavated Alluvium Nearby	CY	2,365		
10	Scarify and Recompact Subgrade (Depicted Parking Area & Under Concrete)	SF	27,000		
11	Furnish and Rough Grade Suitable Subgrade Base Course per Geotechnical Specifications	tons	447		
12	Furnish and Compact 8" min. of CDOT Class-6 Road Base (Depicted Parking Area and Turn Around)	tons	990		
13	Furnish and Install 6" Concrete Sidewalk, Including Curb and Gutter	CY	37		
14	Furnish and Install Cedar Log Parking Delineation	LF	660		
15	Furnish and Install #3 Rebar for Railroad Timber Installation	LF	132		
16	98% Compacted Subgrade on Undisturbed Alluvium (Boat Ramp)	SF	4,000		
17	Furnish and Compact 6" CDOT Class-6 Road Base (Boat Ramp)	Tons	124		
18	Reinforced Concrete Cast in Place and Texture Boat Ramp (8" Thick Slab)	CY	79		
19	Furnish and Install 3" Minus Ramp Shoulder (8" depth)	CY	11		

20	Furnish and Install 12" Minus Ramp Shoulder (18" depth)	CY	25		
21	Furnish and Import Boulder for Ramp Toe and Terraced Landing	tons	49		
22	Place Boulder for Ramp Toe and Terraced Landing	tons	200		
23	Furnish and Install Non-woven Filter Fabric	SY	715		
24	Furnish and Install 1-2mm Sand (8" depth)	CY	63		
25	Furnish and Install 5/8" Rounded Gravel (8" depth)	CY	32		
26	Furnish and Install 1" Rounded Gravel (8" depth)	CY	28		
27	Furnish and Install Boat Staging Tie-offs	EA	4		
28	Topsoil, Seeding, and Planting	LS	1		
29	Furnish and Install Erosion Control Blankets	SY	328		
30	Irrigation	LS	1		
				Sub Total	
	Total Lump Sum Bid			Total	

2.2 BID ITEM DESCRIPTIONS

Bid Item No. 1

MOBILIZATION/DEMOBILIZATION/BONDING/INSURANCE

A. Measurement is per Lump Sum (LS).

B. Work includes, but is not limited to: providing all required bonds and insurance; mobilization; demobilization; installation of temporary work area facilities; protecting in place vegetation and utilities, bringing and removing all necessary construction equipment to and from the site; obtaining construction permits; delays; any and all incidentals; and restoration of temporary work site and disturbed areas to pre-construction conditions.

Bid Item No. 2

CONSTRUCTION SURVEY/STAKE/AS-BUILT

Work to be completed by OWNER

Bid Item No. 3

TRAFFIC CONTROL

A. Measurement is per Lump Sum (LS).

B. Payment covers the complete cost of traffic control including roads, pedestrian and river traffic and includes installation and removal of any and all signage required to inform pedestrian traffic of construction activities and provide detour information if necessary. Pedestrian detour route to be supplied by OWNER. Work includes, but is not limited to: purchasing and delivery of all materials; delays; removal of work; and any and all incidentals.

Bid Item No. 4

GENERAL STAGING AREA BMP's

A. Measurement is per Lump Sum (LS).

B. Payment covers the complete installation and removal of any and all structures required to minimize environmental impact and non-point source pollution. Work includes, but is not limited to: purchasing and delivery of all materials; delays; installation of temporary work; maintaining and replacing work; removal of work and restoration of the site; and any and all incidentals.

Bid Item No. 5

CARE OF WATER (COW) PRACTICES

A. Measured is per Lump Sum (LS)

B. Payment covers complete cost of installation of structures and maintenance in place, to minimize environmental impacts and simultaneously maximize construction efficiency, by caring for water for the duration of the project. Work includes installation of turbidity curtains, coffer dams, oil booms, pumps and filters, coffer dams, sequencing, and intermittent excavation operations if exceeding 10 NTUs of turbidity, controlling concrete laden water control, and all BMPs necessary for open bank excavations and channel work in the wet, and Care of Water permit conditions adherence. Payment covers methods, precautions, delays, installations, modifications, maintenance, and incidentals required to complete work as shown on drawings or noted in specifications.

Bid Item No. 6

CLEAR AND GRUB SITE

- A. Measurement is per Lump Sum (LS).
- B. Meet or Exceed CDOT 2011 Standard Specification section 201

Bid Item No. 7

UNCLASSIFIED BANK EXCAVATION

- A. Measurement per Cubic Yard (CY) of excavation
- B. Payment covers complete cost of unclassified excavation and temporary stockpile on site. Work includes, but is not limited to: COW BMP's; supplying equipment; excavating; on-site transport; stabilizing cuts and stockpile; erosion control; and any and all incidentals.

Bid Item No. 8

PLACEMENT AND ROUGH GRADING OF EXCAVATED BANK MATERIAL ALONG LEVEE TOE

- A. Measurement per Cubic Yard (CY) of placed material
- B. Quantity includes only material that is suitable for subgrade material
- C. Payment covers complete cost of the placement and rough grading stockpiles materials along existing levee toe. Work includes, but is not limited to: BMP's; supplying equipment; on-site transport; placement and grading, and any and all incidentals.

Bid Item No. 9

STOCKPILE EXCAVATED ALLUVIUM NEARBY

- A. Measurement per Cubic Yard (CY) of alluvium
- B. Payment covers all work necessary to transport and stockpile excess excavated material at the designated stockpile area. Work includes, but is not limited to: BMP's; supplying equipment; on-site transport; stockpiling; stabilization; erosion control; and any and all incidentals.

Bid Item No. 10

SCARIFY AND RECOMPACT SUBGRADE (DEPICTED PARKING AREA & UNDER CONCRETE)

- A. Measurement per Square Foot (SF) of upland area
- B. Payment covers all work necessary to scarify and recompact subgrade. Work includes, but is not limited to: BMP's; supplying equipment; scarifying and compaction; and any and all incidentals.

Bid Item No. 11

FURNISH AND ROUGH GRADE SUITABLE SUBGRADE BASE COURSE PER GEOTECHNICAL SPECIFICATIONS

- A. Measurement per Tons (tons) of graded material
- B. Quantity depends on amount of suitable fill generated from cut. Refer to geotechnical specifications for description of suitable material
- C. Payment covers complete cost of the placement and rough grading. Work includes, but is not limited to: furnishing material; BMP's; supplying equipment; on-site transport; placement and grading, compaction, and any and all incidentals.

Bid Item No. 12

FURNISH AND COMPACT 6" OF CDOT CLASS-6 ROAD BASE (DEPICTED IN PARKING AREA AND TURN AROUND)

- A. Measurement per Tons (tons) of imported class-6 road base
- B. Payment covers all work necessary to furnish and compact road base in 8" lifts. Work includes, but is not limited to: BMP's; supplying equipment; grading and compacting road base; water supply; final grading; and any and all incidentals.

Bid Item No. 13

FURNISH AND INSTALL 6" CONCRETE SIDEWALK, INCLUDING CURB AND GUTTER

- A. Measurement per Cubic Yard (CY) of installed concrete
- B. Payment covers all work necessary to furnish and install type II concrete. Work includes, but is not limited to: BMP's; supplying equipment; installing concrete; over pours; washout; joints; finishing; and any and all incidentals.

Bid Item No. 14

FURNISH AND INSTALL CEDAR LOG DELINEATION

- A. Measurement per Linear Foot (LF) of installed cedar logs
- B. Payment covers all work necessary to furnish and install all logs to delineate parking spaces as shown on plans. Work includes, but is not limited to: BMP's; supplying equipment; excavating trenches; cutting and installing timbers; and any and all incidentals.

Bid Item No. 15

FURNISH AND INSTALL #3 REBAR FOR CEDAR LOG INSTALLATION

- A. Measurement per Linear Foot (LF) of #4 rebar
- B. Payment covers all work necessary to furnish and install rebar to anchor logs. Work includes, but is not limited to: BMP's; supplying equipment; drilling; installing rebar; and any and all incidentals.

Bid Item No. 16

98% COMPACTED SUBGRADE ON UNDISTURBED ALLUVIUM (BOAT RAMP)

- A. Measurement per Square Foot (SF) of compacted area
- B. Payment covers all work necessary to compact subgrade in footprint of concrete boat ramp. Work includes, but is not limited to: BMP's; supplying equipment; compacting; and any and all incidentals.

Bid Item No. 17

FURNISH AND COMPACT CDOT CLASS-6 ROAD BASE (BOAT RAMP)

- A. Measurement per Square Foot (SF) of installed and compacted area
- B. Payment covers all work necessary to place and compact class-6 road base in footprint of concrete boat ramp. Work includes, but is not limited to: BMP's; furnishing materials; supplying equipment; placing and compacting; and any and all incidentals.

Bid Item No. 18

REINFORCED CONCRETE CAST IN PLACE AND TEXTURE BOAT RAMP (8" THICK SLAB)

- A. Measurement per Cubic Yard (CY) of installed concrete, class D 4500 psi mix
- B. Payment covers complete cost of furnishing, installation of rebar, pouring, and texturing concrete. Work includes, but is not limited to: BMP's; supplying equipment; pouring and texturing concrete; over pours; washout; joints; and any and all incidentals.

Bid Item No. 19

FURNISH AND INSTALL 3" MINUS RAMP SHOULDER (8" DEPTH)

- A. Measurement per Cubic Yard (CY) of alluvium
- B. Payment covers complete cost of furnishing, and installing 6" minus alluvium per plans. See technical specifications for description of 3" minus alluvium. Work includes, but is not limited to: BMP's; supplying equipment; installing alluvium, and any and all incidentals.

Bid Item No. 20

FURNISH AND INSTALL 12" MINUS RAMP SHOULDER (18" DEPTH)

- A. Measurement per Cubic Yard (CY) of alluvium
- B. Payment covers complete cost of furnishing, and installing 12" minus alluvium per plans. See technical specifications for description of 12" minus alluvium. Work includes, but is not limited to: BMP's; supplying equipment; installing alluvium, and any and all incidentals.

Bid Item No. 21

FURNISH AND IMPORT BOULDER FOR RAMP TOE AND TERRACED LANDING

- A. Measurement is per Ton (tons) of installed boulders per certified scale tickets.
- B. Sources of boulder must be approved by OWNER prior to procurement installation and payment.
- C. Boulder gradation must comply with section 4 of the technical specification.
- D. Payment covers complete cost of furnishing and installing boulders for the terraced landing per the plans and under the direction of the OWNER. Work includes, but is not limited to: COW BMP's; purchase and delivery of all materials; excavating; surveying; placing boulder; protecting filter fabric with alluvium; and any and all incidentals.

Bid Item No. 22

PLACE BOULDER FOR RAMP TOE AND TERRACED LANDING

- A. Measurement is per Ton (tons) of placed boulders
- B. Boulder gradation must comply with section 4 of the technical specification. Boulder/riprap removed during bank excavation may be re-used if specifications are met.
- D. Payment covers complete cost of placing boulders, furnished or re-used for the terraced landing and ramp toe per the plans and under the direction of the OWNER. Work includes, but is not limited to: COW BMP's; excavating; surveying; placing boulder; protecting filter fabric with alluvium; and any and all incidentals.

Bid Item No. 23

FURNISH AND INSTALL NON-WOVEN FILTER FABRIC

A. Measurement per Square Yard (SY) of non-woven filter fabric

B. Payment covers complete cost of furnishing, and installing non-woven filter fabric per plans and specs. Work includes, but is not limited to: BMP's; supplying equipment; installing filter fabric, staples, overlaps, disposal of waste, and any and all incidentals.

Bid Item No. 24

FURNISH AND INSTALL COARSE SAND (8" DEPTH)

A. Measurement per Cubic Yard (CY) of Sand

B. Payment covers complete cost of furnishing, and installing sand per plans. See technical specifications for description of sand. Work includes, but is not limited to: BMP's; furnishing materials; grading; supplying equipment; installing sand, and any and all incidentals.

Bid Item No. 25

FURNISH AND INSTALL 5/8" ROUNDED GRAVEL (8" DEPTH)

A. Measurement per Cubic Yard (CY) of gravel

B. Payment covers complete cost of furnishing, and installing gravel per plans. See technical specifications for description of 5/8" rounded gravel. Work includes, but is not limited to: BMP's; furnishing materials; supplying equipment; installing gravel, and any and all incidentals.

Bid Item No. 26

FURNISH AND INSTALL 1" ROUNDED GRAVEL (8" DEPTH)

A. Measurement per Cubic Yard (CY) of gravel

B. Payment covers complete cost of furnishing, and installing rounded gravel per plans. See technical specifications for description of 1" rounded gravel. Work includes, but is not limited to: BMP's; furnishing materials; supplying equipment; installing gravel, and any and all incidentals.

Bid Item No. 27

FURNISH AND INSTALL BOAT STAGING TIE-OFFS

A. Measurement per Each (EA) tie-off post

B. Payment covers complete cost of furnishing, and installing boat staging tie-off loops per plans. Work includes, but is not limited to: BMP's; furnishing materials; concrete over pours; concrete washout and disposal; supplying equipment; installing tie-offs, and any and all incidentals.

Bid Item No. 28

TOPSOIL, SEEDING, AND PLANTING

A. Measurement per Lump Sum (LS)

B. Seeding and planting specification from City of Grand Junction

Bid Items No. 29

EROSION CONTROL BLANKETS

A. Measurement is per square yard (SY) of installed erosion control blanket surface. Embedded lengths of erosion control fabrics, vertical faces, and overlapped fabric shall not be measured for payment.

B. Payment covers the complete cost of installing erosion control blankets. Work includes, but is not limited to: BMP's; providing all necessary good quality materials; labor; installation; and any and all incidentals such as key downs at edges and stakes; differing fabrics and installations for appropriate application.

Bid Item No. 30

IRRIGATION

A. Measurement per Lump Sum (LS)

B. Irrigation specification from City of Grand Junction

Appendix D

Geotechnical Report



Huddleston-Berry
Engineering & Testing, LLC

**GEOTECHNICAL AND GEOLOGIC HAZARDS
INVESTIGATION
LAS COLONIAS BUSINESS PARK
GRAND JUNCTION, COLORADO
PROJECT#00208-0077**

**CITY OF GRAND JUNCTION
333 WEST AVENUE, BUILDING E
GRAND JUNCTION, COLORADO 81501**

JANUARY 26, 2018

**Huddleston-Berry Engineering and Testing, LLC
640 White Avenue,
Grand Junction, Colorado 81501**

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FIGURES

- Figure 1 – Site Location Map
- Figure 2 – Site Plan

APPENDICES

- Appendix A – USDA NRCS Soil Survey Data
- Appendix B – Typed Boring Logs
- Appendix C – Laboratory Testing Results

1.0 INTRODUCTION

As part of continued development in Western Colorado, the City of Grand Junction proposes to create the Las Colonias Business Park in Grand Junction. As part of the design development process, Huddlestone-Berry Engineering and Testing, LLC (HBET) was retained by the City of Grand Junction to conduct a geologic hazards and geotechnical investigation at the site.

1.1 Scope

As discussed above, a geologic hazards and geotechnical investigation was conducted for the Las Colonias Business Park in Grand Junction, Colorado. The scope of the investigation included the following components:

- Conducting a subsurface investigation to evaluate the subsurface conditions at the site.
- Collecting soil samples and conducting laboratory testing to determine the engineering properties of the soils at the site.
- Providing preliminary recommendations for foundation types and subgrade preparation.
- Providing preliminary recommendations for bearing capacity.
- Providing recommendations for lateral earth pressure.
- Providing recommendations for drainage, grading, and general earthwork.
- Providing recommendations for pavements.
- Evaluating potential geologic hazards at the site.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted geotechnical and geological engineering practices. This report has been prepared for the exclusive use of the City of Grand Junction.

1.2 Site Location and Description

The site is located east of the Las Colonias Amphitheater in Grand Junction, Colorado. The project location is shown on Figure 1 – Site Location Map.

At the time of the investigation, the site was generally open with a slight slope down to the south. A concrete path ran through the site. Vegetation consisted primarily of scattered weeds. Numerous piles of fill were present across the site. The site was bordered to the north by the Riverside Parkway and existing commercial properties, to the south by the Colorado River, to the west by the Riverside Parkway and the existing Las Colonias Amphitheater, and to the east by existing commercial property.

1.3 Proposed Construction

The proposed construction is anticipated to include grading several building pad sites, paved parking lots, and paved site roadways. A generalized site plan is included as Figure 2.

2.0 GEOLOGIC SETTING

2.1 Soils

Soils data was obtained from the USDA Natural Resource Conservation Service Web Soil Survey. The data indicates that the site is underlain by Massadona silty clay loam, 0 to 2 percent slopes. Soil survey data is included in Appendix A.

Structure construction in the Massadona soils is described as being somewhat limited due to shrink-swell. Road construction in the site soils is indicated to be very limited due to frost action, low strength, and/or shrink-swell. Excavation in the site soils is described as being somewhat limited due to dust, clay content, and/or unstable excavation walls. The site soils are indicated to have a high potential for frost action, high risk of corrosion of steel, and high risk of corrosion of concrete.

2.2 Geology

According to the *Geologic Map of the Grand Junction Quadrangle, Mesa County, Colorado* (2002), the site is underlain by alluvium, colluvium, and artificial fill.

2.3 Groundwater

Groundwater was encountered in the subsurface at depths of between 5.0 and 10.5 feet below the existing ground surface at the time of the investigation.

3.0 FIELD INVESTIGATION

3.1 Subsurface Investigation

The subsurface investigation was conducted on January 15th and 16th and consisted of nineteen borings. The borings were drilled to depths of between 8.0 and 16.0 feet. Boring locations are shown on Figure 2 – Site Plan. Typed boring logs are included in Appendix B. Samples of the native soils were collected during Standard Penetration Testing (SPT) and using bulk sampling methods at the locations shown on the logs.

As shown on the logs, the subsurface conditions were variable. The test pits in the southwestern and eastern portions of the site generally encountered sandy lean clay or lean clay with sand soils to depths of between 4.5 and 13.0 feet. The clay was underlain by dense to very dense sandy gravel and cobbles to the bottoms of most of the borings. However, in boring PL-6, shale bedrock was encountered at a depth of 15.0 feet. Groundwater was encountered in these borings at depths of between 5.0 and 9.0 feet at the time of the investigation.

The borings conducted in the northeastern portion of the site generally encountered fill materials and/or native sand and clay soils to depths of between 4.0 and 10.5 feet. Below the fill/sand/clay, medium dense to very dense sandy gravel and cobbles extended to the bottoms of the borings. Groundwater was encountered in these borings at depths of between 6.0 and 10.5 feet.

4.0 LABORATORY TESTING

Selected native soil samples collected from the borings were tested in the Huddlestone-Berry Engineering and Testing LLC geotechnical laboratory for natural moisture content, grain size analysis, Atterberg limits, maximum dry density and optimum moisture (Proctor), California Bearing Ratio (CBR), and water soluble sulfates content. The laboratory testing results are included in Appendix C.

The laboratory testing results indicate that the native clay soils are moderately plastic. In addition, the CBR results indicate that the native clay soils are slightly expansive with up to approximately 1.6% expansion measured in the laboratory.

The native sand soils were indicated to be non-plastic. In general, based upon our experience with similar soils in the vicinity of the subject site, the native sand soils are anticipated to be slightly collapsible. Water soluble sulfates were detected in the site soils in a concentration of 0.2%.

5.0 GEOLOGIC INTERPRETATION

5.1 Geologic Hazards

The most significant geologic hazard identified on the site is the potential impacts to the site of flooding of the Colorado River. However, moisture sensitive soils were also encountered at the site. In addition, shallow groundwater was encountered in portions of the site.

5.2 Geologic Constraints

In general, the primary geologic constraint to construction at the site is the presence of moisture sensitive soils. However, shallow groundwater and associated soft soil conditions may also impact the construction.

5.3 Water Resources

No water supply wells were observed on the property. As discussed previously, the site lies adjacent to the Colorado River. In general, with proper design and construction, the development of the property is not anticipated to adversely impact surface water or groundwater.

5.4 Mineral Resources

Potential mineral resources in western Colorado generally include gravel, uranium ore, and commercial rock products such as flagstone. As discussed previously, gravels were encountered in the subsurface at the site. However, based upon the location of the site and surrounding land use, HBET does not believe that the gravels at the site represent an economically recoverable resource.

6.0 CONCLUSIONS

Based upon the available data sources, field investigation, and nature of the proposed construction, HBET does not believe that there are any geologic conditions which should preclude construction at this site. However, foundations, pavements, and earthwork may have to consider the impacts of moisture sensitive soils, potential flooding of the Colorado River, and/or shallow groundwater.

7.0 RECOMMENDATIONS

7.1 Foundations

As discussed previously, moisture sensitive soils were encountered at the site. However, based upon the nature of the proposed construction, shallow foundations such as spread footings and monolithic structural slabs are likely to be appropriate for lightly loaded commercial structures at the site. However, to provide a uniform subgrade and limit the potential for excessive differential movements, foundations should be constructed above 18 to 36-inches of structural fill depending upon the results of site-specific geotechnical investigations. Where heavily loaded structures are anticipated, deep foundations such as helical piles are appropriate. The foundation alternatives are discussed in the following sections.

Shallow Foundations

As discussed previously, the native clay soils were shown to be moderately plastic and slightly expansive. Therefore, the native clay soils are not suitable for reuse as structural fill. Imported structural fill should consist of a granular, non-expansive, non-free draining material such as crusher fines or CDOT Class 6 base course. Unless it can be demonstrated that they are not free-draining, pit-run materials should not be used as structural fill.

Prior to placement of structural fill, it is recommended that the bottoms of the foundation excavations be scarified to a depth of 9 to 12-inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within $\pm 2\%$ of the optimum moisture content, as determined in accordance with ASTM D698. However, depending upon the depth of excavation and time of year during construction, shallow groundwater and associated soft soil conditions may exist. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to approximately 30-inches of granular fill to stabilize the subgrade.

Structural fill should extend laterally beyond the edges of the foundation a distance equal to the thickness of structural fill. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils and 90% of the modified Proctor maximum dry density for coarse grained soils, within $\pm 2\%$ of the optimum moisture content as determined in accordance with ASTM D698 and D1557, respectively.

For the foundation building pads prepared as recommended with structural fill consisting of imported granular materials, a maximum allowable bearing capacity of 1,500 to 2,500 psf may be used depending upon the results of site-specific geotechnical investigations. In addition, a modulus of subgrade reaction of 250 pci may be used for structural fill consisting of crusher fines or base course. The bottoms of exterior foundations should extend a minimum of 24-inches below grade for frost protection.

Helical Piles

Helical piles consist of circular or square steel shafts with load carrying helices attached to them. Some of these types of piers are proprietary. In general, the precise type, size, and quantity of piles should be established by the contractor in conjunction with the structural engineer. However, HBET provides the following preliminary design comments.

In general, helical piles should be designed to penetrate the shallow soils and bear into the dense gravel and cobble soils. It is anticipated that the helical piles will reach refusal within 3 to 10 feet of the top of the gravel and cobble soils. Therefore, pile lengths of up to approximately 23 feet may be possible. However, a minimum pile length of 10 feet is recommended.

In general, for helical piles installed to refusal, the allowable structural capacity is used. Based upon our experience with other projects utilizing helical piles, allowable axial capacities of between approximately 20 and 40 tons are anticipated for helical piles, depending upon the shaft diameter. However, higher capacities are possible, if necessary. The actual allowable capacity should be determined based upon the results of load testing conducted on the individual project sites. To eliminate reductions in capacity from group effects, the piles should be spaced a distance equal to three times the diameter of the largest helix

7.2 Seismic Design Criteria

In general based upon the results of the subsurface investigation, the site classifies as Site Class D for a stiff soil profile.

7.3 Corrosion of Concrete

As indicated previously, water soluble sulfates were encountered in the site soils in a concentration of 0.2%. This concentration represents a severe degree of potential sulfate attack on concrete. The International Building Code (IBC) specifies Type V cement for this concentration of sulfates. However, Type V cement can be difficult to obtain in Western Colorado. Where Type V cement is unavailable, Type I-II sulfate resistant cement is recommended.

7.4 Non-Structural Floor Slabs and Exterior Flatwork

As mentioned above, expansive materials are present in the subsurface at the site. **In general, slabs-on-grade cannot develop sufficient bearing pressures to resist swelling pressures. Therefore, some movement of slabs-on-grade should be expected.** The only way to eliminate the potential for excessive differential movements would be to utilize structural slabs supported by deep foundations. However, structural slabs supported by deep foundations are likely cost prohibitive. In general, the risk of excessive differential movements can be reduced by constructing non-structural floor slabs above 18 to 24-inches of structural fill depending upon the results of site-specific geotechnical investigations. Exterior flatwork should be constructed above a minimum of 12-inches of structural fill.

Floating slabs-on-grade should not be tied in or connected to the foundations in any manner. If a non-structural floating floor slab is used, interior non-bearing partitions should include a slip-joint or framing void which permits a minimum of 2-inches of vertical movement.

7.5 Drainage

In order to improve the long-term performance of the foundations and slabs-on-grade, grading around the structures should be designed to carry precipitation and runoff away from the structures. It is recommended that the finished ground surface drop at least twelve inches within the first ten feet away from the structures. However, where impermeable surfaces (i.e. sidewalks, pavements, etc.) are adjacent to the structures, the grade can be reduced to approximately 2.5-inches (ADA grade) within the first ten feet away from the structures. Downspouts should empty beyond the backfill zone. It is recommended that landscaping within five feet of the structures include primarily desert plants with low water requirements. In addition, it is recommended that automatic irrigation within ten feet of foundations, including drip lines, be minimized.

7.6 Lateral Earth Pressures

Stemwalls and/or any retaining walls should be designed to resist lateral earth pressures. For backfill consisting of the native soils or imported granular, non-free draining, non-expansive material, we recommend that the walls be designed for an active equivalent fluid unit weight of 55 pcf in areas where no surcharge loads are present. An at-rest equivalent fluid unit weight of 75 pcf may be used. Lateral earth pressures should be increased as necessary to reflect any surcharge loading behind the walls.

7.7 Excavations

Excavations in the soils at the site may stand for short periods of time but should not be considered to be stable. The native soils generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. For Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

7.8 Pavements

The proposed construction is anticipated to include new parking lots and internal site roadways. As discussed previously, the pavement subgrade materials at the site range from clay soils to fill materials. The design California Bearing Ratio (CBR) of a composite sample of the site soils was determined in the laboratory to be less than 2.0. Therefore, the minimum recommended Resilient Modulus of 3,000 psi was used for the design.

Based upon the subgrade conditions and anticipated traffic loading, pavement section alternatives were developed in accordance with the *Guideline for the Design and Use of Asphalt Pavements for Colorado Roadways* by the Colorado Asphalt Pavement Association and *CDOT Pavement Design Manual*. The following pavement section alternatives are recommended:

Automobile Parking Areas (Limited Truck Traffic)

ESAL's = 100,000; Structural Number = 3.10

ALTERNATIVE	PAVEMENT SECTION (Inches)				TOTAL
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	
A	3.0	13.0			16.0
B	4.0	10.0			14.0
C	3.0	6.0	10.0		19.0
Rigid Pavement		6.0		6.0	12.0

Mixed Use Areas (Higher Truck Traffic)

ESAL's = 350,000; Structural Number = 3.50

ALTERNATIVE	PAVEMENT SECTION (Inches)				TOTAL
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete	
A	4.0	14.0			18.0
B	5.0	11.0			16.0
C	4.0	6.0	11.0		21.0
Concrete Pavement		6.0		8.0	14.0

Internal Roadways

ESAL's = 500,000; Structural Number = 3.91

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete	TOTAL
A	4.0	16.0			20.0
B	5.0	13.0			18.0
C	4.0	6.0	14.0		24.0
Concrete Pavement		6.0		8.0	14.0

Prior to new pavement placement, areas to be paved should be stripped of all topsoil, fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompact to a minimum of 95% of the standard Proctor maximum dry density, within $\pm 2\%$ of optimum moisture content as determined by AASHTO T-99. However, as discussed previously, soft soils may be encountered associated with shallow groundwater. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to approximately 30-inches of granular fill to stabilize the subgrade.

Aggregate base course and subbase course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% and 93% of the maximum dry density, respectively, at -2% to +3% of optimum moisture content as determined by AASHTO T-180. In addition to density testing, base course should be proofrolled to verify subgrade stability.

It is recommended that Hot-Mix Asphaltic (HMA) pavement conform to CDOT grading SX or S specifications and consist of an approved 75 gyration Superpave method mix design. HMA pavement should be compacted to between 92% and 96% of the maximum theoretical density. An end point stress of 50 psi should be used. It is recommended that rigid pavements consist of CDOT Class P concrete or alternative approved by the Engineer. In addition, pavements should conform to local specifications.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement

8.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction.

As discussed previously, the subsurface conditions encountered in the borings were variable. However, the precise nature and extent of subsurface variability may not become evident until construction. The recommendations contained herein are designed to reduce the risk and magnitude of differential movements and it is extremely critical that **ALL** of the recommendations herein be applied to the design and construction. However, HBET cannot predict long-term changes in subsurface moisture conditions and/or the precise magnitude or extent of any volume change in the native soils. **Where significant increases in subsurface moisture occur due to poor grading, improper stormwater management, utility line failure, excess irrigation, or other cause, during or after construction, significant movements are possible.**

In addition, the success of the structure foundations, slabs, etc. is critically dependent upon proper construction. Therefore, HBET should be retained to provide materials testing, special inspections, and engineering oversight during **ALL** phases of the construction to ensure conformance with the recommendations herein.

Huddleston-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC



Michael A. Berry, P.E.
Vice President of Engineering

FIGURES

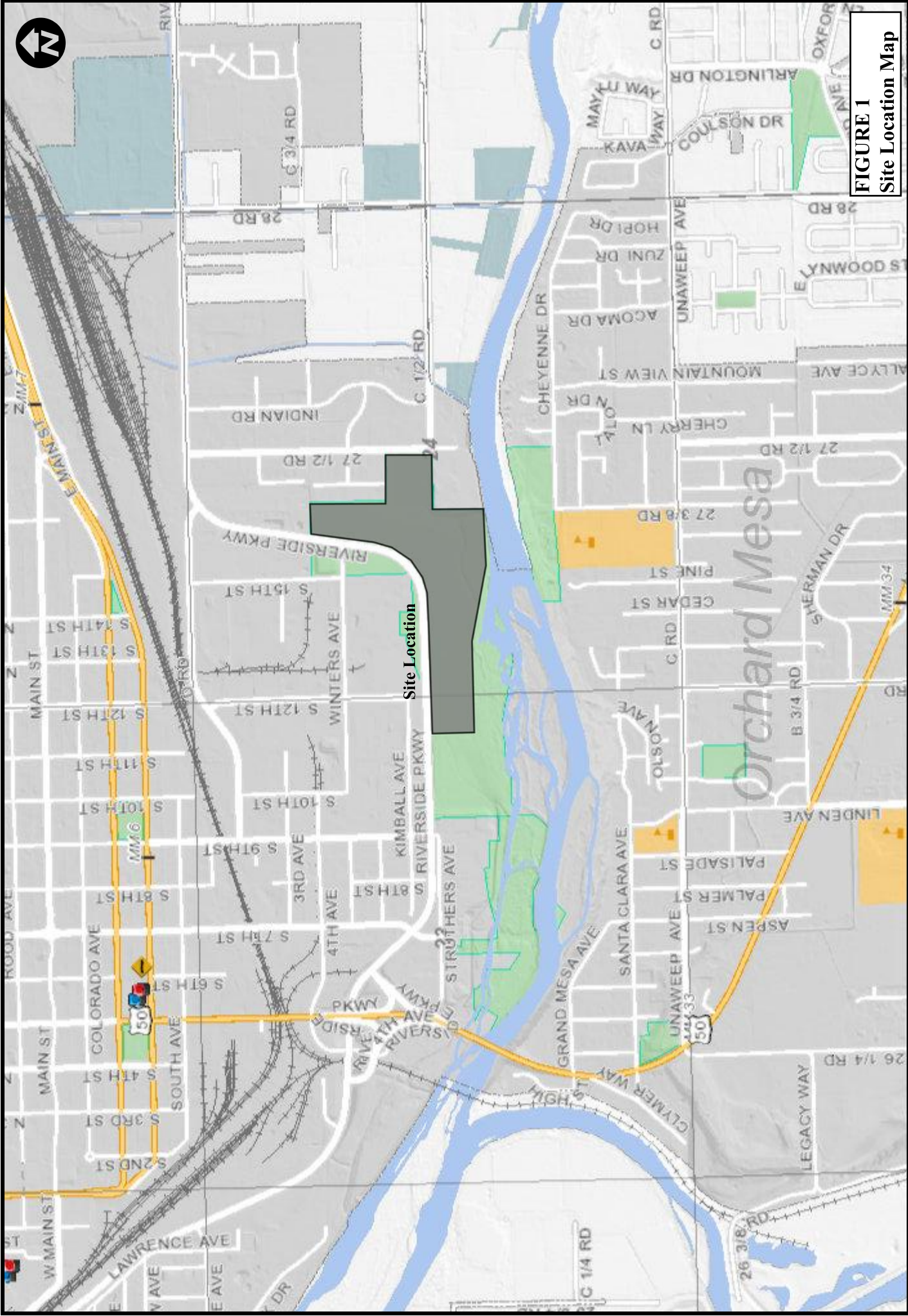


FIGURE 1
Site Location Map

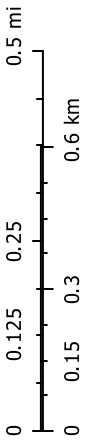
Print Date: January 26, 2018

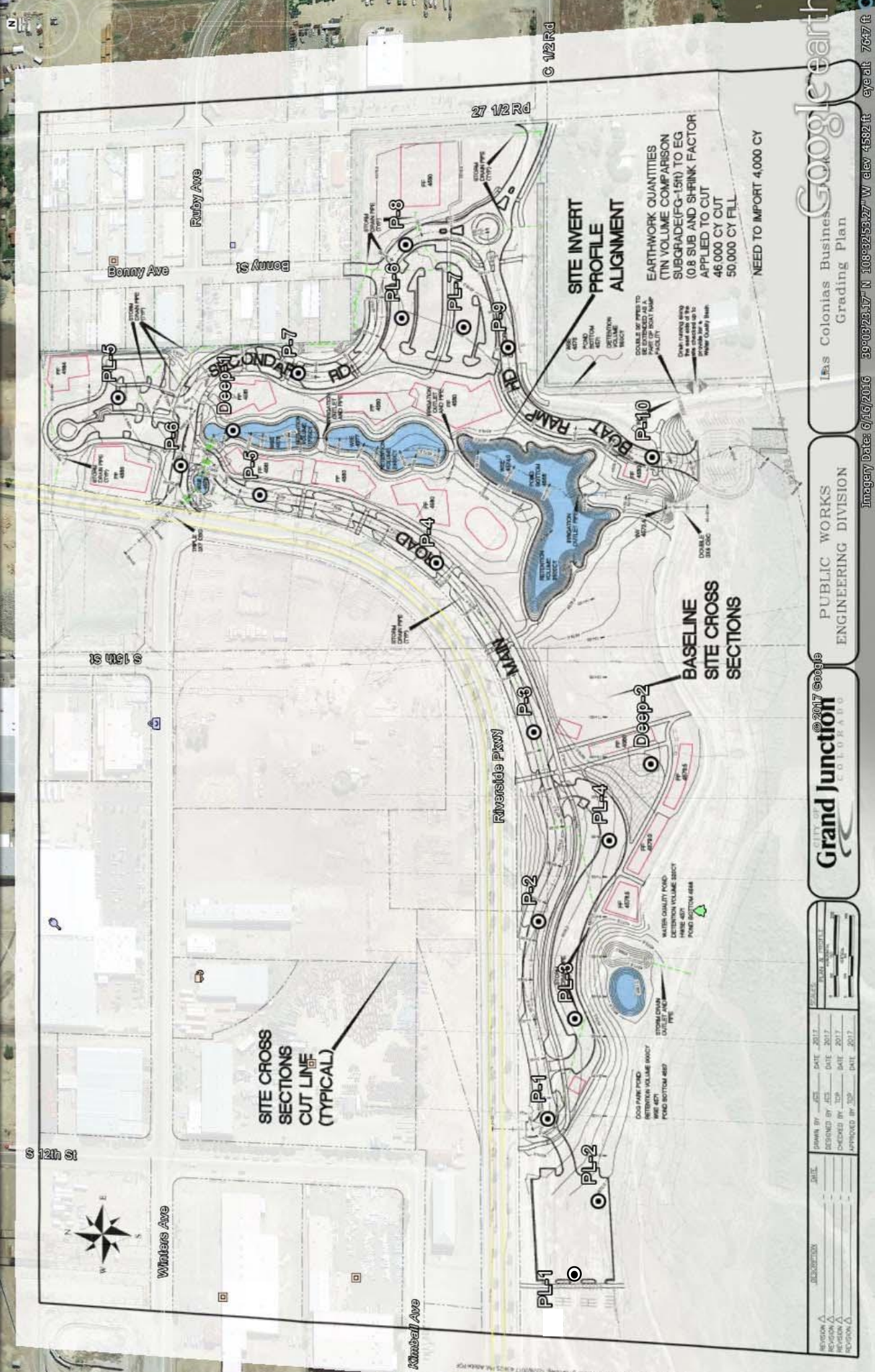


Mesa County, Colorado
GIS/IT Department
gis.mesacounty.us

Mesa County Map

The Geographic Information System (GIS) and its components are designed as a source of reference for answering inquiries for planning and for modeling. GIS is not intended or does not replace legal description information in the chain of title and other information contained in official government records such as the County Clerk and Recorder's office or the courts. In addition, the representations of location in this GIS cannot be substituted for actual legal surveys. The information is provided as a reference only and is not intended to be used for any other purpose. Users assume all risk and responsibility for any and all damages, including consequential damages, which may flow from the user's use of this information.





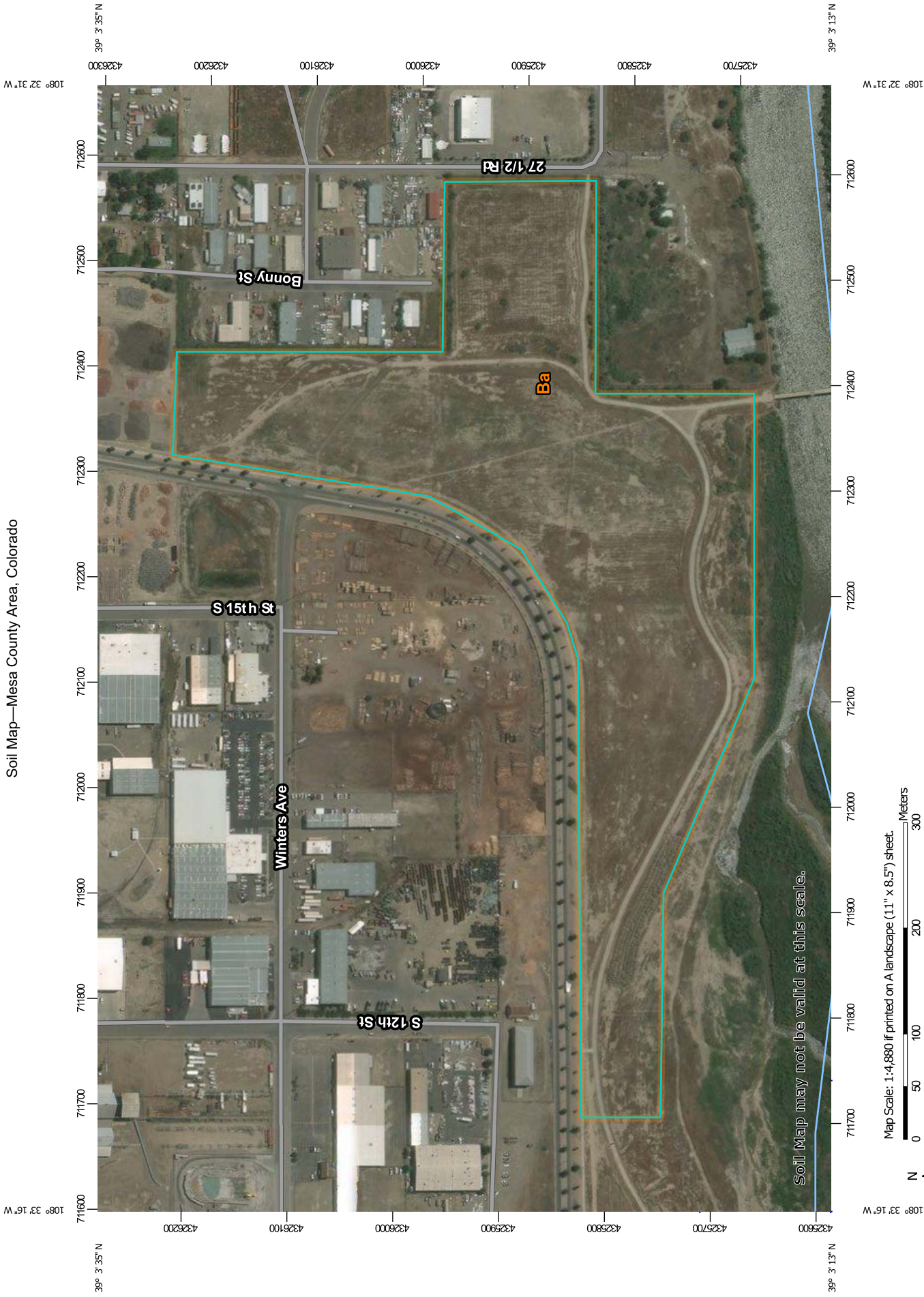
REGION DESIGNER DATE 2017
 REGION DESIGNED BY JES DATE 2017
 REGION CHECKED BY TSP DATE 2017
 REGION APPROVED BY JSP DATE 2017

PUBLIC WORKS ENGINEERING DIVISION
 IAS Colonias Business Grading Plan
 Google earth
 Imagery Date: 0/16/2016 33°08'23.17" N 108°32'53.27" W elev 4582 ft eye alt 7647 ft

FIGURE 2
Site Plan

APPENDIX A
Soil Survey Data

Soil Map—Mesa County Area, Colorado



Soil Map may not be valid at this scale.

Map Scale: 1:4,880 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features
- Water Features**
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mesa County Area, Colorado
 Survey Area Data: Version 8, Oct 12, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Mar 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ba	Massadona silty clay loam, 0 to 2 percent slopes — DRAFT	41.0	100.0%
Totals for Area of Interest		41.0	100.0%

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Mesa County Area, Colorado

Ba—Massadona silty clay loam, 0 to 2 percent slopes — DRAFT

Map Unit Setting

National map unit symbol: k06n

Elevation: 4,500 to 4,900 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Massadona and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Massadona

Setting

Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from clayey shale

Typical profile

A - 0 to 2 inches: silty clay loam
Bw - 2 to 12 inches: silty clay
Bky - 12 to 24 inches: silty clay
BCky1 - 24 to 48 inches: stratified silty clay loam to fine sandy loam
BCky2 - 48 to 60 inches: stratified silty clay loam to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Moderately saline to strongly saline
(10.0 to 32.0 mmhos/cm)
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Degater

Percent of map unit: 15 percent

Landform: Fan remnants

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Pariette

Percent of map unit: 15 percent

Landform: Fan remnants

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Mesa County Area, Colorado

Survey Area Data: Version 8, Oct 12, 2017

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Dwellings and Small Commercial Buildings

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Dwellings and Small Commercial Buildings—Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ba—Massadona silty clay loam, 0 to 2 percent slopes — DRAFT							
Massadona	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.99	Shrink-swell	0.96	Shrink-swell	0.99

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 8, Oct 12, 2017

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Roads and Streets, Shallow Excavations, and Lawns and Landscaping

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Roads and Streets, Shallow Excavations, and Lawns and Landscaping—Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Lawns and landscaping		Local roads and streets		Shallow excavations	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ba—Massadona silty clay loam, 0 to 2 percent slopes — DRAFT							
Massadona	70	Somewhat limited		Very limited		Somewhat limited	
		Dusty	0.50	Frost action	1.00	Dusty	0.50
				Low strength	1.00	Too clayey	0.02
				Shrink-swell	0.99	Unstable excavation walls	0.01

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 8, Oct 12, 2017

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features—Mesa County Area, Colorado									
Map symbol and soil name	Restrictive Layer		Hardness	Subsidence		Potential for frost action	Risk of corrosion		
	Kind	Depth to top		Thickness	Initial		Total	Uncoated steel	
		Low-RV-High	Range		Low-High				
		In	In		In				
Ba—Massadona silty clay loam, 0 to 2 percent slopes — DRAFT									
Massadona		—	—		0	High	High	High	

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
 Survey Area Data: Version 8, Oct 12, 2017

APPENDIX B
Typed Boring Logs



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BORING NUMBER P-1

PAGE 1 OF 1

CLIENT City of Grand Junction **PROJECT NAME** Las Colonias Business Park

PROJECT NUMBER 00208-0077 **PROJECT LOCATION** Grand Junction, CO

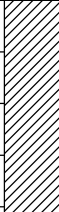

DATE STARTED 1/15/18 **COMPLETED** 1/16/18 **GROUND ELEVATION** _____ **HOLE SIZE** 4-Inches

DRILLING CONTRACTOR S. McCracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **▽ AT TIME OF DRILLING** 8.0 ft

LOGGED BY CM **CHECKED BY** MAB **▼ AT END OF DRILLING** 8.0 ft

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (cl), brown, moist, very stiff										
2.5			SS 1	33	16-12-6 (18)							
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense	SS 2	50	32-36							
10.0			SS 3	75	19-37							
		Bottom of hole at 11.0 feet.										

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BORING NUMBER P-2

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>6.5 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>6.5 ft</u>
NOTES <u>Auger Refusal at 7.5-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (cl), brown, moist, very stiff										
2.5	[Hatched pattern]		SS 1	89	8-8-7 (15)							
5.0												
7.5	[Stippled pattern]	Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense	SS 2	156	23-29- 39/0"							
		Bottom of hole at 9.0 feet.										

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BORING NUMBER P-4

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS: ▽ AT TIME OF DRILLING <u>8.0 ft</u> ▼ AT END OF DRILLING <u>8.0 ft</u> AFTER DRILLING ---
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	
NOTES _____	

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (cl), brown, moist, medium stiff										
2.5	[Hatched pattern]		SS 1	72	3-5-3 (8)							
5.0												
7.5	[Stippled pattern]	Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense	SS 2	56	4-26-25 (51)							
10.0		Bottom of hole at 10.0 feet.										

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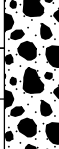
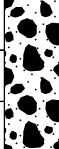


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BORING NUMBER P-5

PAGE 1 OF 1

CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McKracken</u>	GROUND WATER LEVELS: ▽ AT TIME OF DRILLING <u>6.0 ft</u> ▼ AT END OF DRILLING <u>6.0 ft</u> AFTER DRILLING <u>---</u>
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	
NOTES _____	

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy GRAVEL and COBBLES (FILL), brown, moist, very dense										
2.5												
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense										
7.5			SS 1	56	5-27-23 (50)							
10.0			SS 2	71	16-29-50/2"							
		Bottom of hole at 11.2 feet.										

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CLIENT City of Grand Junction **PROJECT NAME** Las Colonias Business Park

PROJECT NUMBER 00208-0077 **PROJECT LOCATION** Grand Junction, CO

DATE STARTED 1/15/18 **COMPLETED** 1/16/18 **GROUND ELEVATION** _____ **HOLE SIZE** 4-Inches

DRILLING CONTRACTOR S. McCracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **▽ AT TIME OF DRILLING** 7.0 ft

LOGGED BY CM **CHECKED BY** MAB **▼ AT END OF DRILLING** 7.0 ft

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Silty SAND (sm), br, moist, medium dense										
2.5			SS 1	78	8-9-9 (18)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, medium dense to dense										
7.5			SS 2	67	8-12-8 (20)							
10.0		Bottom of hole at 10.0 feet.										

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BORING NUMBER P-7

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS: ▽ AT TIME OF DRILLING <u>10.5 ft</u> ▼ AT END OF DRILLING <u>10.5 ft</u> AFTER DRILLING ---
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	
NOTES _____	

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel and trace Cobbles (FILL), brown, moist, hard										
2.5			SS 1	56	15-13-27 (40)							
5.0												
7.5		Lean CLAY with Sand (cl), brown, moist to wet, very stiff	SS 2	100	6-8-15 (23)							
10.0		Sandy GRAVEL and COBBLES (gw), brown, wet, very dense	SS 3	65	7-14-50/5"							
		Bottom of hole at 12.0 feet.										

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BORING NUMBER P-8

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>5.5 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>5.5 ft</u>
NOTES _____	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Lean CLAY with Sand (CL), brown, moist, stiff										
2.5	*** Lab Classified SS1		SS 1	89	6-4-5 (9)			18	43	21	22	73
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, dense										
7.5												
10.0			SS 2	0	20-19-14 (33)							
		Bottom of hole at 11.5 feet.										

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BORING NUMBER P-9

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CLIENT City of Grand Junction **PROJECT NAME** Las Colonias Business Park

PROJECT NUMBER 00208-0077 **PROJECT LOCATION** Grand Junction, CO



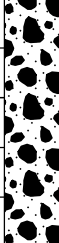
DATE STARTED 1/15/18 **COMPLETED** 1/16/18 **GROUND ELEVATION** _____ **HOLE SIZE** 4-Inches

DRILLING CONTRACTOR S. McCracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **▽ AT TIME OF DRILLING** 8.0 ft

LOGGED BY CM **CHECKED BY** MAB **▼ AT END OF DRILLING** 8.0 ft

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Lean CLAY with Sand and trace Gravel and Cobbles (cl), brown, moist to wet, stiff to hard										
2.5			SS 1	61	5-5-6 (11)							
5.0												
7.5			SS 2	44	4-39-14 (53)							
10.0		Sandy GRAVEL and COBBLES (gw), brown, wet, dense	SS 3	83	13-17-21 (38)							
		Bottom of hole at 11.5 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



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BORING NUMBER P-10

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>6.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>6.0 ft</u>
NOTES <u>Auger Refusal at 7-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (cl), brown, moist, very stiff										
2.5	*** Lab Cassified SS1		SS 1	83	7-8-17 (25)			11	40	18	22	55
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense										
7.5			SS 2	58	37-32							
		Bottom of hole at 8.0 feet.										

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BORING NUMBER PL-1

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CLIENT City of Grand Junction **PROJECT NAME** Las Colonias Business Park

PROJECT NUMBER 00208-0077 **PROJECT LOCATION** Grand Junction, CO

DATE STARTED 1/15/18 **COMPLETED** 1/16/18 **GROUND ELEVATION** _____ **HOLE SIZE** 4-Inches

DRILLING CONTRACTOR S. McCracken **GROUND WATER LEVELS:**

DRILLING METHOD Simco 2000 Truck Rig **▽ AT TIME OF DRILLING** 9.0 ft

LOGGED BY CM **CHECKED BY** MAB **▼ AT END OF DRILLING** 9.0 ft

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Granular Base Course										
		Sandy GRAVEL (FILL), brown, moist, medium dense										
2.5		Sandy Lean CLAY (CL), brown, moist, very stiff *** Lab Classified SS1	SS 1	78	11-10-9 (19)			12	38	19	19	61
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense	SS 2	67	21-35							
10.0			SS 3	83	12-47							
		Bottom of hole at 11.0 feet.										

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BORING NUMBER PL-2

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>7.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>7.0 ft</u>
NOTES _____	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY (cl), brown, moist, very stiff										
2.5	█	Sandy GRAVEL (gw), brown, moist, medium dense	SS 1	72	6-6-11 (17)							
5.0	█	Sandy Lean CLAY (cl), brown, moist to wet, very stiff										
7.5	█	Sandy GRAVEL and COBBLES (gw), brown, wet, very dense	SS 2	83	21-35							
10.0	█	Bottom of hole at 10.5 feet.	SS 3	83	47							

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BORING NUMBER PL-3

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	AT TIME OF DRILLING <u>dry</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	AT END OF DRILLING <u>dry</u>
NOTES <u>Auger Refusal at 7-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (CL), brown, moist, very stiff										
2.5	*** Lab Classified SS1		SS 1	83	6-8-9 (17)			15	37	19	18	54
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist, very dense										
7.5			SS 2	83	37-42							
		Bottom of hole at 8.0 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



Huddlestone-Berry Engineering & Testing, LLC
 640 White Avenue, Unit B
 Grand Junction, CO 81501
 970-255-8005
 970-255-6818

BORING NUMBER PL-4

PAGE 1 OF 1

CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	AT TIME OF DRILLING <u>dry</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	AT END OF DRILLING <u>dry</u>
NOTES <u>Auger Refusal at 7.5-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY with Gravel (cl), brown, moist, very stiff										
2.5	[Hatched Pattern]		SS 1	33	9-8-10 (18)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist, very dense										
7.5	[Stippled Pattern]		SS 2	58	21-50							
		Bottom of hole at 8.0 feet.										

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 970-255-8005
 970-255-6818

BORING NUMBER PL-5

PAGE 1 OF 1

CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS: ▽ AT TIME OF DRILLING <u>8.0 ft</u> ▼ AT END OF DRILLING <u>8.0 ft</u>
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	AFTER DRILLING <u>--</u>
NOTES <u>Auger Refusal at 9-Ft</u>	

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy GRAVEL and COBBLES (FILL), brown, moist, very dense										
2.5												
5.0		Silty SAND (SM) brown, moist, medium dense *** Lab Classified SS1	SS 1	67	9-7-8 (15)			17	NP	NP	NP	50
7.5		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, very dense	SS 2	53	14-17-50/3"							
		Bottom of hole at 9.0 feet.										

GEO TECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



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 970-255-8005
 970-255-6818

BORING NUMBER PL-6

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McKracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>9.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>9.0 ft</u>
NOTES _____	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Lean CLAY with Sand (cl), brown, moist to wet, stiff to medium stiff										
5			SS 1	33	3-4-5 (9)							
10			SS 2	61	2-2-2 (4)							
15		Sandy GRAVEL and COBBLES (gw), brown, wet, dense	SS 3	89	3-5-18 (23)							
16.0		SHALE, black, medium hard, highly weathered	SS 4	83	16-49							
		Bottom of hole at 16.0 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



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 970-255-8005
 970-255-6818

BORING NUMBER PL-7

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CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>8.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>8.0 ft</u>
NOTES _____	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Lean CLAY with Sand (cl), brown, moist, stiff										
2.5	[Hatched pattern]		SS 1	61	5-5-5 (10)							
5.0	[Dotted pattern]	Sandy Gravel (gw), brown, moist, dense										
7.5	[Hatched pattern]	Lean CLAY with Sand (cl), brown, moist, stiff										
7.5	[Dotted pattern]	Sandy GRAVEL and COBBLES (gw), brown, moist to wet, dense	SS 2	50	5-7-21 (28)							
10.0	[Dotted pattern]		SS 3	61	3-15-26 (41)							
		Bottom of hole at 11.5 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



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 Grand Junction, CO 81501
 970-255-8005
 970-255-6818

BORING NUMBER Deep-1

PAGE 1 OF 1

CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>7.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>7.0 ft</u>
NOTES <u>Auger Refusal at 9-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy GRAVEL and COBBLES (FILL), brown, moist, dense										
2.5		Sandy Lean CLAY with Gravel (cl), brown, moist to wet, very stiff	SS 1	0	6-10-13 (23)							
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, wet, very dense	SS 2	42	37-36							
		Bottom of hole at 9.0 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18



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 970-255-8005
 970-255-6818

BORING NUMBER Deep-2

PAGE 1 OF 1

CLIENT <u>City of Grand Junction</u>	PROJECT NAME <u>Las Colonias Business Park</u>
PROJECT NUMBER <u>00208-0077</u>	PROJECT LOCATION <u>Grand Junction, CO</u>
DATE STARTED <u>1/15/18</u> COMPLETED <u>1/16/18</u>	GROUND ELEVATION _____ HOLE SIZE <u>4-Inches</u>
DRILLING CONTRACTOR <u>S. McCracken</u>	GROUND WATER LEVELS:
DRILLING METHOD <u>Simco 2000 Truck Rig</u>	▽ AT TIME OF DRILLING <u>8.0 ft</u>
LOGGED BY <u>CM</u> CHECKED BY <u>MAB</u>	▼ AT END OF DRILLING <u>8.0 ft</u>
NOTES <u>Auger Refusal at 10-Ft</u>	AFTER DRILLING <u>---</u>

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Sandy Lean CLAY (CL), brown, moist, very stiff										
2.5	*** Lab Classified SS1		SS 1	67	7-7-8 (15)			14	41	20	21	59
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, dense to very dense	SS 2	50	10-11-27 (38)							
10.0			SS 3	83	51							
		Bottom of hole at 10.5 feet.										

GEOTECH BH COLUMNS 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/26/18

APPENDIX C
Laboratory Testing Results



Huddlestone-Berry Engineering & Testing, LLC
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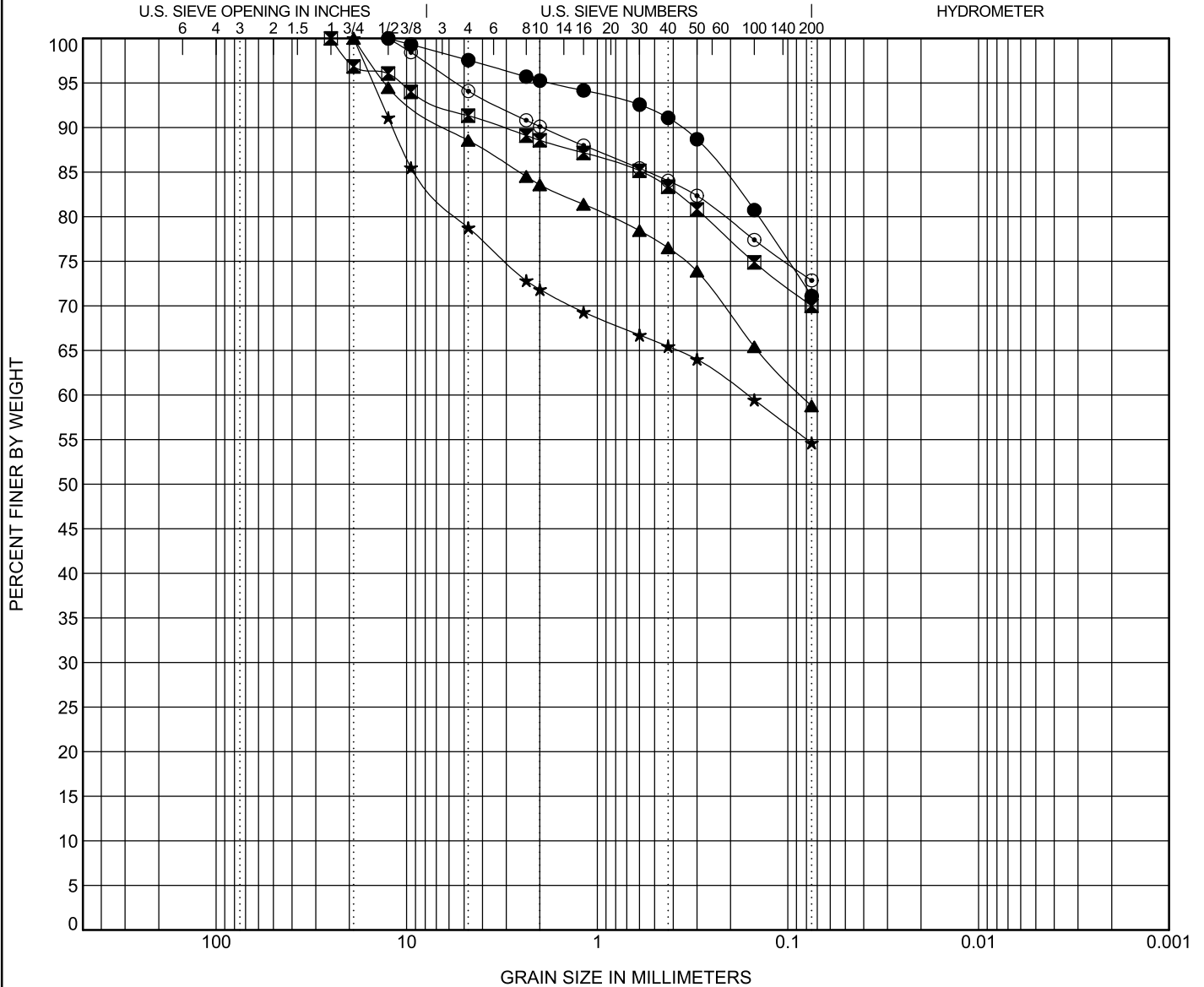
GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction

PROJECT NAME Las Colonias Business Park

PROJECT NUMBER 00208-0077

PROJECT LOCATION Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● Composite 1 1/2018	LEAN CLAY with SAND(CL)	31	18	13		
■ Composite 2 1/2018	LEAN CLAY with SAND(CL)	37	17	20		
▲ Deep-2, SS1 1/2018	SANDY LEAN CLAY(CL)	41	20	21		
★ P-10, SS1 1/2018	SANDY LEAN CLAY with GRAVEL(CL)	40	18	22		
⊙ P-8, SS1 1/2018	LEAN CLAY with SAND(CL)	43	21	22		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● Composite 1 1/2018	12.5				2.4	26.5	71.1	
■ Composite 2 1/2018	25				8.7	21.3	70.0	
▲ Deep-2, SS1 1/2018	19	0.085			11.4	29.8	58.8	
★ P-10, SS1 1/2018	19	0.163			21.2	24.1	54.6	
⊙ P-8, SS1 1/2018	12.5				5.9	21.2	72.9	

GRAIN SIZE 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/25/18



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 970-255-6818

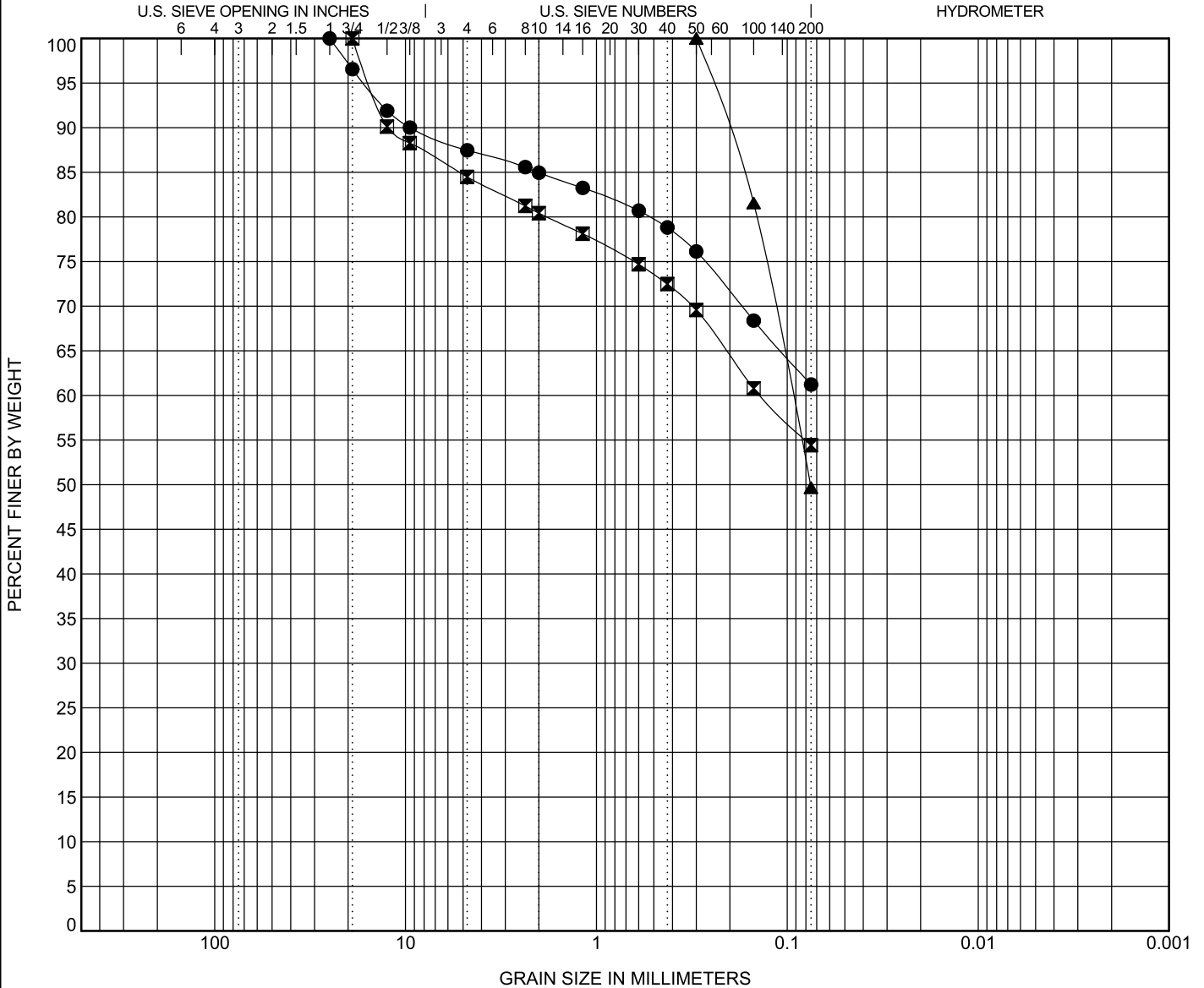
GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction

PROJECT NAME Las Colonias Business Park

PROJECT NUMBER 00208-0077

PROJECT LOCATION Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● PL-1, SS1 1/2018	SANDY LEAN CLAY(CL)	38	19	19		
▣ PL-3, SS1 1/2018	SANDY LEAN CLAY with GRAVEL(CL)	37	19	18		
▲ PL-5, SS1 1/2018	SILTY SAND(SM)	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● PL-1, SS1 1/2018	25				12.5	26.2		61.2
▣ PL-3, SS1 1/2018	19	0.138			15.5	30.1		54.4
▲ PL-5, SS1 1/2018	0.3	0.094			0.0	50.3		49.7

GRAIN SIZE 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/25/18



Huddlestone-Berry Engineering & Testing, LLC
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970-255-8005
970-255-6818

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction

PROJECT NAME Las Colonias Business Park

PROJECT NUMBER 00208-0077

PROJECT LOCATION Grand Junction, CO

Sample Date: 1/15/2018
Sample No.: 18-0044
Source of Material: Composite #1
Description of Material: LEAN CLAY with SAND(CL)
Test Method: ASTM D698B

TEST RESULTS

Maximum Dry Density 114.0 PCF
Optimum Water Content 15.0 %

GRADATION RESULTS (% PASSING)

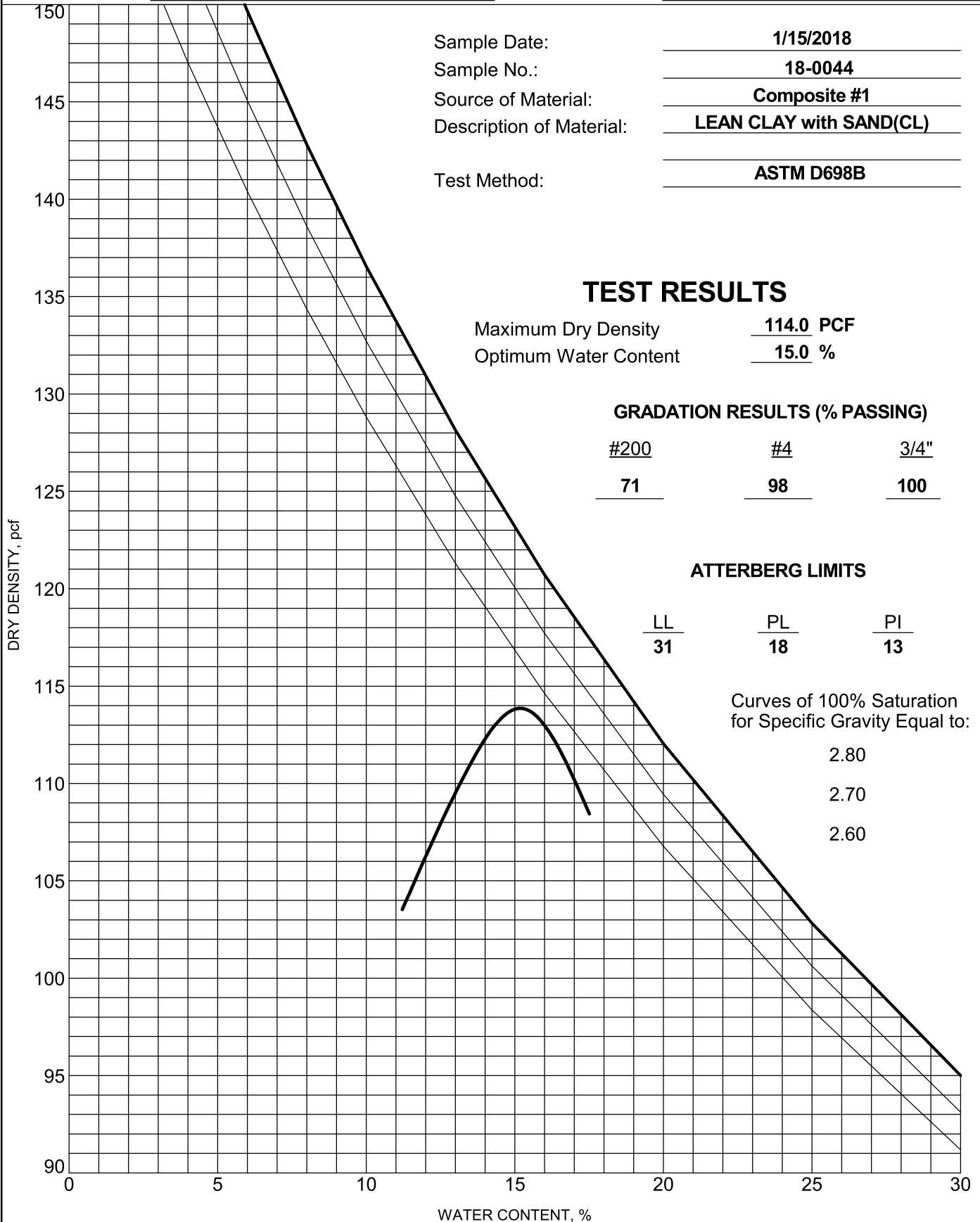
#200	#4	3/4"
<u>71</u>	<u>98</u>	<u>100</u>

ATTERBERG LIMITS

LL	PL	PI
<u>31</u>	<u>18</u>	<u>13</u>

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80
2.70
2.60





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 970-255-6818

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction

PROJECT NAME Las Colonias Business Park

PROJECT NUMBER 00208-0077

PROJECT LOCATION Grand Junction, CO

Sample Date: 1/15/2018
 Sample No.: 18-0045
 Source of Material: Composite #2
 Description of Material: LEAN CLAY with SAND(CL)
 Test Method: ASTM D698A

TEST RESULTS

Maximum Dry Density 115.0 PCF
 Optimum Water Content 15.0 %

GRADATION RESULTS (% PASSING)

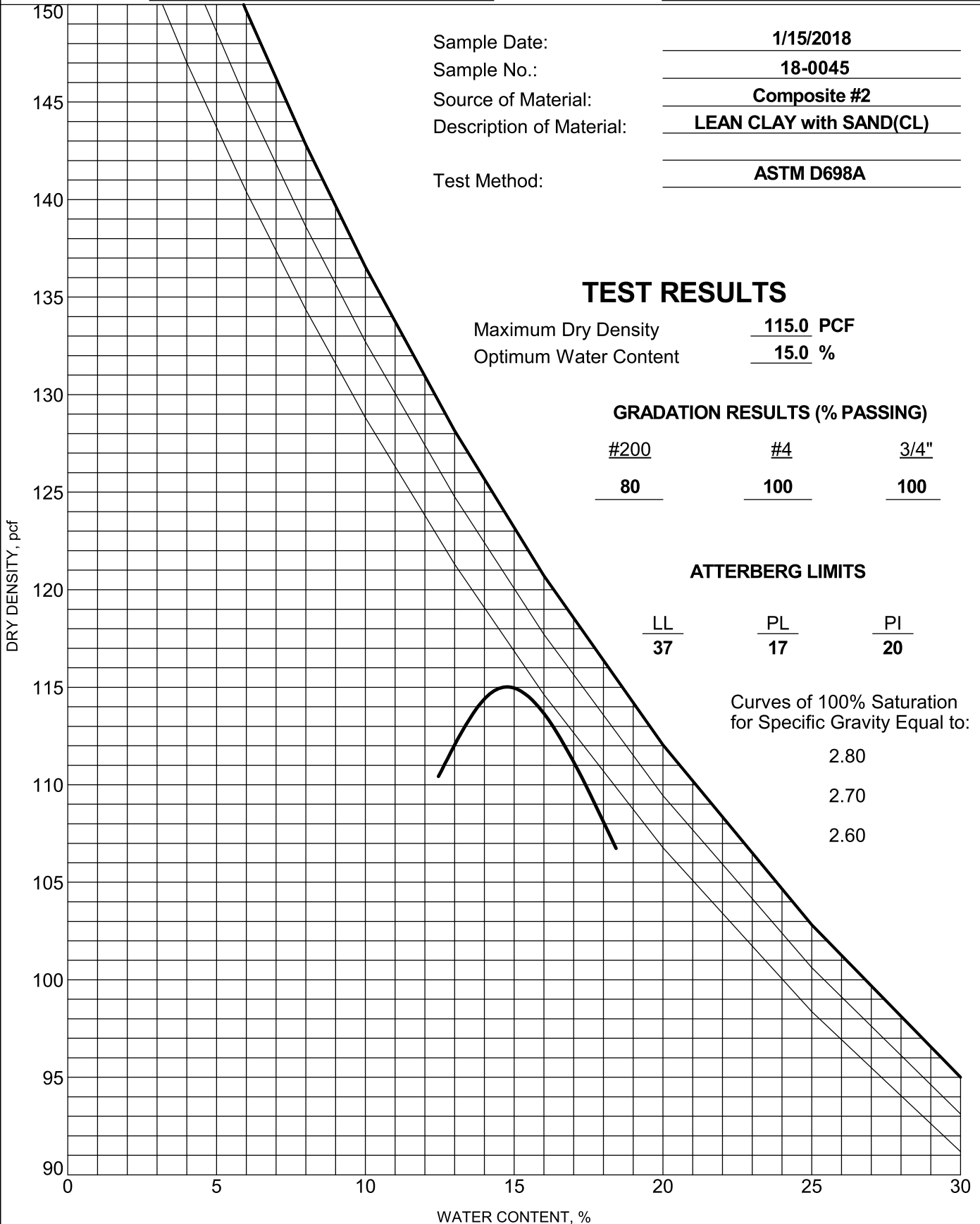
#200	#4	3/4"
<u>80</u>	<u>100</u>	<u>100</u>

ATTERBERG LIMITS

LL	PL	PI
<u>37</u>	<u>17</u>	<u>20</u>

Curves of 100% Saturation
 for Specific Gravity Equal to:

2.80
 2.70
 2.60



COMPACTION 00208-0077 LAS COLONIAS.GPJ GINT US LAB.GDT 1/25/18



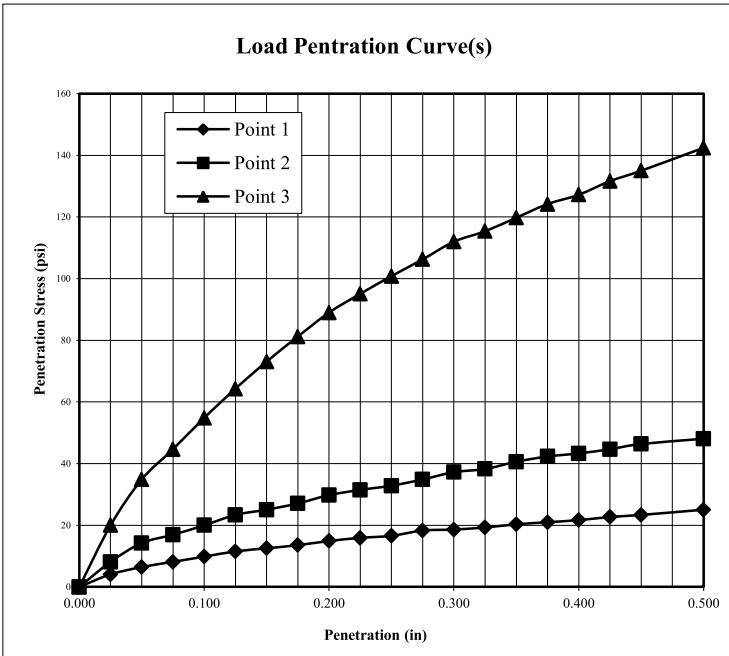
Project No.: 00208-0077
Project Name: Las Colonias Business Park
Client Name: City of Grand Junction
Sample Number: 18-044 **Location:** Composite #1

Authorized By: Client **Date:** 01/15/18
Sampled By: CM **Date:** 01/15/18
Submitted By: CM **Date:** 01/16/18
Reviewed By: MAB **Date:** 01/25/18

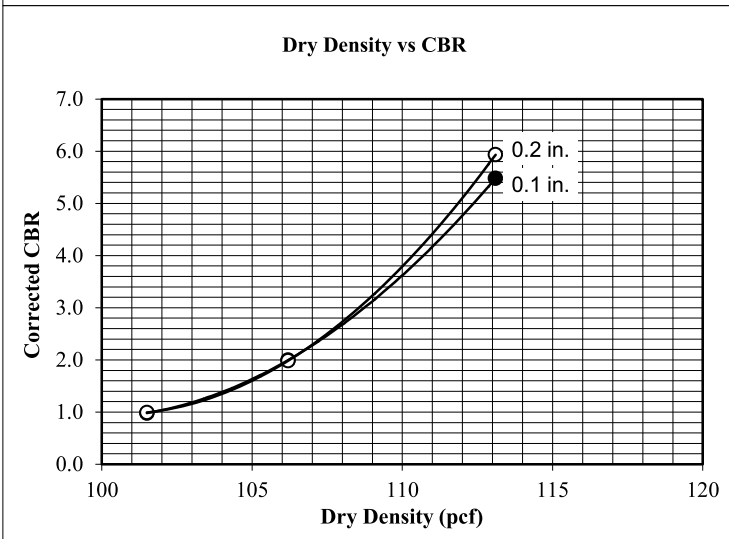
Compaction Method ASTM D698, Method B

Maximum Dry Density (pcf): 114.0
Opt. Moisture Content (%): 15.0
Sample Condition: Soaked
Remarks:

Sample Data			
	Point 1	Point 2	Point 3
Blows per Compacted Lift:	15	25	56
Surcharge Weight (lbs):	10.0	10.0	10.0
Dry Density Before Soak (pcf):	101.5	106.2	113.1
Dry Density After Soak (pcf):	99.9	104.6	112.2
Moisture Content (%)	Bottom Pre-Test	15.0	14.6
	Top Pre-Test	15.3	14.4
	Top 1" After Test	27.3	23.8
	Average After Soak:	21.4	17.0
Percent Swell After Soak:	1.6	1.5	0.8



Penetration Data								
Point 1			Point 2			Point 3		
Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)
0.000	0	0	0.000	0	0	0.000	0	0
0.025	12	4	0.025	24	8	0.025	59	20
0.050	19	6	0.050	42	14	0.050	103	35
0.075	24	8	0.075	50	17	0.075	132	45
0.100	29	10	0.100	59	20	0.100	162	55
0.125	34	12	0.125	69	23	0.125	190	64
0.150	37	13	0.150	74	25	0.150	216	73
0.175	40	14	0.175	80	27	0.175	240	81
0.200	44	15	0.200	88	30	0.200	263	89
0.225	47	16	0.225	93	31	0.225	281	95
0.250	49	17	0.250	97	33	0.250	298	101
0.275	54	18	0.275	103	35	0.275	314	106
0.300	55	19	0.300	110	37	0.300	331	112
0.325	57	19	0.325	113	38	0.325	341	115
0.350	60	20	0.350	120	41	0.350	354	120
0.375	62	21	0.375	125	42	0.375	367	124
0.400	64	22	0.400	128	43	0.400	376	127
0.425	67	23	0.425	132	45	0.425	389	132
0.450	69	23	0.450	137	46	0.450	399	135
0.500	74	25	0.500	142	48	0.500	421	142



Corrected CBR @ 0.1"		
1.0	2.0	5.5
Corrected CBR @ 0.2"		
1.0	2.0	5.9

Penetration Distance Correction (in)		
0.000	0.000	0.000

Figure: _____

Appendix E

CDPHE Section 9 Exemption



**TO: Bob Peterson, CDPHE-HMWMD-Solid Waste and Materials
Management Program-Permitting Unit
Margo Griffin, CDPHE-WQCD-Clean Water Permits Unit**

FROM: Jerod Timothy, City of Grand Junction

DATE: July 2, 2018

SUBJECT: Memo of Understanding - Section 9 Exemption

Bob and Margo,

Per our conversation on Tuesday, February 6, 2018 this letter shall be considered written request for exemption under Section 9, temporary discharge to impoundment for any necessary dewatering of utility trench or excavation during construction of the Las Colonias Business Park Phase 2 (the Project). Note that the Project is on land formerly used by a uranium/vanadium mill and is known as the Grand Junction processing site regulated under Title 1 of the Uranium Mill Tailings Radiation Control Act (Legacy Site) managed by the Department of Energy (DOE) and CDPHE-HMWMD-Remediation Program (Remediation Program). The land is also covered by an Environmental Covenant / deed restriction with Remediation Program oversight. Impacted soil and shallow groundwater remain at the site. The management of impacted soil / tailings will be completed in accordance with the Uranium Mill Tailings Management Plan (May 2015, for managing Title I uranium mill tailings encountered during construction).

Per conversations I had with Margo Griffin with CDPHE – WQCD and whom consulted internal staff member Curt Stovall and Bob Peterson with CDPHE – HMWMD-Solid Waste and Materials Management Program (SW) I have been given the following direction. They concluded that dewatering in this case shall fall under the Authority of SW and qualifies for exemption from the Regulations Pertaining to Solid Waste Sites and Facilities (SW Regulations, 6 CCR 1007-2 Part 1) under Section 9.1.2 A(15) as an impoundment used for temporary storage of solid waste.

The Project is to include the installation of domestic water, sanitary sewer, storm sewer, joint dry utility trenches, curb, gutter and sidewalk, 3 restroom facilities, concrete and asphalt pavement and the construction of 3 site ponds. See attached plan set. During the construction of the “Butterfly Pond” and installation of deeper utilities, primarily the sanitary sewer, the City anticipates encountering ground water. At times it may be necessary to dewater. The City is proposing to excavate small areas (ponds) adjacent to the trench or pond into which ground water would discharge to. The ponds would be located on-site very near the area of excavation itself. The water would then percolate

through soil and back into the shallow groundwater. This process was utilized during the Construction of Phase 1 and 1A of the Business Park and was effective when required.

Sewer mainline will likely be completed in less than 30 days. The "Butterfly Pond" construction timeline could be up to 90 days to complete excavation, concrete wall construction, pond liner installation and backfill. The pond is proposed to be constructed during winter months to take advantage of lower ground water levels if/when encountered. The planned percolation ponds will be constructed as needed along the utility corridor and adjacent to said pond in proposed green space and each pond will contain water for less than 30 days in order to retain the exemption from SW Regulations. A pond log will be maintained for each percolation pond and the City will document the days that waste water is visible. The City will contact SW if 30 days is exceeded for any pond to determine a path forward for proper permitting.

The City of Grand Junction is requesting written approval of the exemption from Section 9 of the SW Regulations for the percolation ponds.

Appendix F

Uranium Mill Tailings Management Plan

URANIUM MILL TAILINGS MANAGEMENT PLAN

**FOR MANAGING TITLE I URANIUM MILL
TAILINGS
ENCOUNTERED DURING CONSTRUCTION
ACTIVITIES IN WESTERN COLORADO**

UPDATED May 2015



**Colorado Department
of Public Health
and Environment**

URANIUM MILL TAILINGS MANAGEMENT PLAN

FOR MANAGING TITLE I URANIUM MILL TAILINGS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES IN WESTERN COLORADO

UPDATED MAY 2015



**Colorado Department
of Public Health
and Environment**

For Information or Assistance Contact:

Colorado Department of Public Health and Environment
222 South 6th Street, Room 232
Grand Junction, Colorado 81501

Michael Cosby
(970) 248-7171

Kate Elsberry
(970) 248-7164

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INTRODUCTION

PURPOSE

In 1978 the U.S. Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA Public Law 95-604) which tasked the U.S. Department of Energy with stabilizing, disposing, and controlling uranium mill tailings and other contaminated material at 24 inactive uranium processing (mill) sites located in ten different states, where uranium was processed for sale to a federal agency. Nine of the inactive uranium processing sites are located in Colorado. These Title I sites (referred to as “Title I” because the sites were listed in Title I of the law) were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). While the active cleanup required by UMTRCA has been completed, residual uranium mill tailings remain in the nine affected communities. These residual tailings deposits are referred to as “UMTRA Title I uranium mill tailings” throughout this plan, in order to clearly delineate that this plan pertains only to radioactive materials that originated from UMTRA Title I mill sites.

The Colorado Department of Public Health and Environment is authorized by Colorado Revised Statutes (C.R.S. 25-11-301 et. seq.) to assist local governments in the identification and management of uranium mill tailings remaining in western Colorado communities. Because tailings deposits are often associated with utility rights-of-ways and private property, this plan is also designed to assist utilities and private parties in the identification, proper handling and disposal of uranium mill tailings.

The purpose of this plan is to describe responsibilities and procedures for managing UMTRA Title I uranium mill tailings encountered or disturbed during construction activities in the nine UMTRA communities in western Colorado. All work procedures are designed to minimize worker contact with radioactive materials and comply with the ALARA principle, keeping radiation exposures As Low As Reasonably Achievable. All work will be performed in accordance with *Colorado Rules and Regulations Pertaining to Radiation Control*, (Regulations) 6CCR-100-7, current version.

HISTORY

Beginning around the turn of the century, exploration for ore deposits bearing radioactive elements began in the United States. Western Colorado and adjoining states in the Four Corners area, being rich in these deposits, were heavily prospected. Radium was the primary radioactive element of interest produced by the early mines and mills, followed by exploration for, and production of vanadium, which occurs in the same geologic ores. Then, in the 1940s, the demand for uranium rapidly grew as research progressed for development of atomic weapons and energy. After World War II, the continued research,

nuclear reactor use and the arms race accelerated the demand for uranium, which produced a uranium boom lasting through the 1950s and into the 1960s.

Many hundreds of mines were explored and often developed for ores. Many mill pilot plants, and later operating mill sites, were built to crush ore and separate uranium compounds from the waste materials. The mills produced a uranium product called “yellowcake” and waste tailings sands. These tailings contained most of the original natural radioactivity of the ore, since only one of the radioactive constituents was recovered in the milling process.

The waste tailings were piled at the mills, but erosion from wind and water invariably spread the tailings to adjacent areas. In addition, tailings from many of the mills were transported off site and used for construction or as fill materials. As the mills fell into disuse and obsolescence, and as the uranium boom faded, more of the tailings were eroded away or removed for construction.

The Public Health Service and the Colorado Department of Health conducted studies that demonstrated the magnitude of the health-related issues caused by the presence of uranium mill tailings in residential areas. Health effects result from exposure to gamma radiation, inhalation of radioactive particles and from radon gas, produced by natural radioactive breakdown of radium contained in the tailings. In places where uranium mill tailings were used for construction, radon can seep into buildings (homes, offices, schools) and can build up to high concentrations. Many research studies have demonstrated that people breathing air containing elevated levels of radon are at greater risk of lung cancer.

The Public Health Service documented the association between elevated radon and lung cancer during uranium mine studies conducted in the 1950s. In the 1960s, the Colorado Department of Health and the Public Health Service expanded the studies to include areas around mill sites. The studies concluded that excessive radiation exposure could result from indiscriminate use of tailings and that persons were at increased risk due to the presence of the uranium mill tailings. By this time, thousands of tons of tailings from the uranium mills had been used in residential areas for construction. In Grand Junction, Colorado, mill tailings from the former Climax Mill Site, which had been spread throughout the community, were identified as a health risk and the Colorado Department of Health soon issued an order to cease the use of tailings in construction.

Because of the availability and many possible uses of the sandy uranium mill tailings as a building material, the dispersal and misuse was widespread. Some examples of uranium mill tailings use were: soil attenuation, concrete mix, bedding for concrete and utilities, stucco, and brick production.

Experience has shown that as construction and demolition activities occur, new uranium mill tailings deposits will be discovered and disturbance of known deposits will occur. New construction close to such deposits increases potential public exposure to gamma radiation and radon.

GRAND JUNCTION REMEDIAL ACTION PROGRAM

Concerns about health risks and property values grew as the extent of the uranium mill tailings misuse became public. Nationwide publicity announced and often exaggerated the problem. Congressional hearings were conducted, and in 1972, Public Law 92-314 created the Grand Junction Remedial Action Program to reduce radiation exposures inside structures affected by uranium tailings in the Grand Junction community. The U.S. Surgeon General published cleanup guidelines for the voluntary project. During the 15-year program, 594 structures in Mesa County underwent remedial action, where the radioactive material was removed by government contractors.

URANIUM MILL TAILINGS REMEDIAL ACTION PROGRAM

From the late 1960s, it was known that the misuse of uranium tailings was not unique to the Grand Junction, Mesa County area. In 1978, the U.S. Congress passed Public Law 95-604, the Uranium Mill Tailings Radiation Control Act (UMTRCA). This law enabled the creation of the Uranium Mill Tailings Remedial Action Project and required the U.S. Environmental Protection Agency to develop cleanup standards. The U.S. Department of Energy was responsible for stabilizing, disposing, and controlling uranium mill tailings and other contaminated material in cooperation with States and Tribes. The project extended the assessment and cleanup of uranium tailings nationwide for both structure interiors and exterior deposits. By the conclusion of the Uranium Mill Tailings Remedial Action Program in 1998, approximately 5,000 properties and nine uranium mill sites had been cleaned up in Colorado. In Colorado alone, approximately 15 million cubic yards of uranium tailings were removed to controlled disposal sites.

Nine uranium mill sites in western Colorado qualified for remedial action under Title I of the Uranium Mill Tailings Remedial Action Program. These Title I sites were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). These were inactive or abandoned sites, which had sold uranium to the U.S. Atomic Energy Commission exclusively. The Department of Energy performed site assessments and environmental impact studies and developed options for permanent, environmentally safe disposal of the radioactively contaminated materials.

Disposal cells were designed and constructed to comply with strict criteria regarding ground water protection, seismology, erosion protection, settlement and infiltration. The cells were designed to last for 200 to 1,000 years. Therefore, erosion resistant, natural materials were used in the construction of the cells. The typical cell was excavated into low permeability bedrock and filled with compacted uranium mill tailings. A very low permeability layer was added on top of the uranium mill tailings as a cover to contain the radon gas and limit the entry of water. An erosion resistant rock layer capped the cells.

All of the Colorado Title I disposal cells, except for the Maybell site in Moffat County, were located away from the mill sites to situate the tailings out of floodplains and away from shallow ground water. The Maybell tailings pile was reengineered and reworked to provide compaction and erosion protection and capped in place. All of the disposal cells will be monitored and maintained under the Long Term Surveillance and Maintenance Program managed by the Department of Energy.

The Title I disposal cell for Mesa County, known as the Grand Junction Disposal Facility (GJDF) at 4800 Hwy 50 Whitewater, CO will remain open to receive tailings from all UMTRA Title I communities until at least 2023. (The GJDF was formerly known as the Cheney Disposal Site or Cell.) Recognizing the need for long term management and storage of the remaining uncontrolled tailings, Congress revised the Uranium Mill Tailings Radiation Control Act in 1996 to allow for continued use of the GJDF. The Department of Energy will continue to maintain, operate and fund the GJDF cell. The GJDF cell is the only Uranium Mill Tailings Remedial Action Program site remaining open and available to receive uranium tailings.

MANAGEMENT OF UNCONTROLLED TITLE I URANIUM MILL TAILINGS

UNCONTROLLED TITLE I URANIUM MILL TAILINGS

Despite widespread publicity, two cleanup programs extending over 25 years, and thousands of property investigations, Title I uranium mill tailings remain in several western Colorado communities. It is suspected that up to half a million cubic yards of tailings remain outside of the controlled disposal cells.

Over 70,000 properties have been surveyed in Colorado for uranium mill tailings. Because of the voluntary nature of the project and difficulty in finding hidden, shielded deposits such as those beneath soils or under foundations, not all properties were investigated and not all deposits were found. Also, in some circumstances an owner refused to participate in the cleanup project after tailings were found on their property.

In addition to tailings that were never detected, or those where the owner refused cleanup, there were several other situations where tailings were left in place, including 1) Tailings excluded from exterior removals; 2) Tailings excluded from interior removals and 3) Supplemental Standards areas. All of these situations, explained in detail below, represent potential instances where tailings may be uncovered and require safe management in the future.

TAILINGS EXCLUDED FROM EXTERIOR REMOVALS

The Environmental Protection Agency standards for exteriors allowed measurements of radiation exposure to be averaged over 100 square meters. Thus, a small area of elevated contamination was often averaged with uncontaminated areas, resulting in small quantities of uranium mill tailings being left in place. The Colorado Department of Public Health and Environment now advises/recommends that all areas of elevated concentrations (also known as “hot spots”) be removed from the construction footprint plus a ten-foot buffer area, in order to minimize future exposure to the hot spot and/or further spreading of the tailings material during future construction activities.

TAILINGS EXCLUDED FROM INTERIOR REMOVALS

The Environmental Protection Agency standards for interiors addressed the interior average gamma exposure rate and the annual average radon levels. Contaminated structural materials, such as foundations or tailings under slabs, were often left in place if the interior radiation levels were below the standards. The State advises removal of all tailings from under slabs or structures.

SUPPLEMENTAL STANDARDS

The Environmental Protection Agency cleanup standards allowed for a variance from meeting standards in certain situations. This variance was called “supplemental standards.” The most common use of supplemental standards was in situations where the cost of tailings removal was greater than the health risks associated with leaving the tailings deposit in place. The use of supplemental standards resulted in tailings being left in place. Approval of supplemental standards by the Colorado Department of Public Health and Environment and the Nuclear Regulatory Commission required that the deposit was in such an area that current and future land use would result in minimal radiation exposures to the public. Often, when Supplemental Standards were used, some partial removal would take place to remove surface contamination, but leave uranium mill tailings at depth. Records of Supplemental Standards applications are available from the Colorado Department of Public Health and Environment.

Examples of areas containing uranium mill tailings left in place through the application of supplemental standards include railroad tracks, city streets and curb/gutter, steep slopes, river islands, basements, patios, currently uninhabited structures, and utility lines. Grand Junction, Colorado, has the greatest number of supplemental standards areas, but supplemental standards deposits also exist in the Maybell, Durango, Rifle, Gunnison, Naturita and Slick Rock communities.

TAILINGS MANAGEMENT PLAN

The laws and regulations pertaining to UMTRA Title I materials did not anticipate the impacts on new construction projects or changes in land use when residual tailings were left in place after the remediation projects were completed. Thus, there is a need for a long-term management plan to help guide persons who may contact residual Title I tailings materials. This management plan is designed to be relatively simple and easy to use. The main elements of the management plan include:

- 1) the availability of an interim storage facility, useable by local governments, utilities and private parties on short notice,
- 2) the assignment of responsibilities,
- 3) health and safety concerns, including procedures to limit radiation exposure
- 4) training requirements and responsibilities,
- 5) procedures for excavation and transportation, and
- 6) the availability of a long-term disposal site.

These elements are addressed in the following sections.

The general process related to uncontrolled tailings is outlined as follows, and discussed in greater detail in the following sections. A property owner, owner’s representative or realtor requests information about a property from the Colorado Department of Public Health and Environment, either for a property transaction or a building permit application. Available records are provided to the property owner at that time. If no records exist, or if there is a question about whether or not tailings may be present, the Colorado Department

of Public Health and Environment may send an inspector to the property to conduct a gamma radiation survey. If tailings are present on the property, the Colorado Department of Public Health and Environment will provide a recommendation and information regarding the procedures for removing the material, following this plan. The removal of the material may be conducted by the property owner (referred to later in this plan as “private citizen”) or through the use a contractor. Local governments may also conduct tailings removals. The tailings are removed from the property, following the procedures outlined in this plan, and hauled to the Interim Storage Facility. Once the materials are safely stored and the vehicle and personnel have been decontaminated and released by the Colorado Department of Public Health and Environment, the materials are stored until the Grand Junction Disposal Facility is opened to accept material. The material is then hauled to the Disposal Facility by the City of Grand Junction. The Department of Energy requires compliance with the Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version).

INTERIM STORAGE FACILITY



THE FACILITY

The Interim Storage Facility (ISF) is a temporary holding area for uranium mill tailings. The facility is owned by the City of Grand Junction and operated in coordination with the Colorado Department of Public Health and Environment. The facility is located at 333 West Avenue, Grand Junction, Colorado.

The ISF provides a temporary, secure, and safe storage for uranium mill tailings excavated during construction activities in Colorado communities. Access to the ISF is facilitated through the Colorado Department of Public Health and Environment or the City of Grand Junction. The tailings will ultimately be transported to the Grand Junction Disposal Facility (GJSF) south of Grand Junction, Colorado. This transfer is normally scheduled on an annual basis.

The interim storage facility consists of an abandoned sewage treatment plant clarifier that is 75 feet in diameter and surrounded by concrete walls approximately 10 feet high. The bottom is a concrete slab, sloping to the center for drainage. A slot has been cut through the walls wide enough to admit a dump truck. A concrete ramp provides access to the entrance. A lockable gate protects the entrance. All holes in the bottom were sealed to make a water-tight storage area.

The facility also includes a shed for storage of records regarding materials brought to the ISF. The City provides a water line extension for decontamination spray or dust control upon request.

The Colorado Department of Public Health and Environment is responsible for access control, decontamination, and maintenance of records regarding materials brought to the

ISF. If Department personnel are not available, such as during an emergency water main break, the City of Grand Junction may assume these duties. Prior to accessing the ISF, the Colorado Department of Public Health and Environment will arrange for someone to meet the truck and provide a radiation meter for frisking and decontamination. Supervision of unloading, decontamination of vehicles and personnel after Colorado Department of Public Health and Environment working hours is the responsibility of the City of Grand Junction, which is the only entity authorized to access the facility after hours.

UNLOADING

The hauling truck will back into the facility to place the load as close as possible to the back wall or near already placed material. The driver should prevent tires from coming in contact with contaminated materials in order to reduce the need for decontamination. Material brought to the interim storage facility must be sized as small as possible to allow for compaction at the Grand Junction Disposal Facility site. No debris may exceed 3 feet cubed or 10 feet in any dimension. Waste brought to the ISF should be in compliance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version). No uncovered loads may be brought to the ISF unless all transported contamination is in a solid form; such as bound in concrete (see Hauling).

DECONTAMINATION

The truck bed will be inspected for visible uranium mill tailings contamination, soil and debris remaining after dumping. Material that did not dislodge will be pushed out with shovels or brooms. The truck will then proceed to the entrance for inspection of tires and undercarriage. All visible or measureable contamination will be removed from the tires and undercarriage.

Any use of the interim storage facility will be recorded. . The logbook will be kept in the facility shed. Logbook records will be transferred to the Colorado Department of Public Health and Environment office quarterly for permanent storage. The following information is required for every load brought to the ISF:

- Date
- Origin of contamination (street address)
- Estimated cubic yardage
- Name of driver/Company
- Truck identification (license number)
- Inspection for hazardous wastes
- High gamma meter reading of the material
- Time in and out of the facility
- Decontamination status/notes/information

The truck tires and tailgate will undergo frisking according to the frisking procedure in Appendix B. If the tailgate or tires will not pass the frisking limits, the water hose will be

used to further decontaminate the vehicle. If material cannot be dislodged from the bed, it can also be sprayed out at this point. After washing, the tires and tailgate will again be frisked. All water or dislodged material will drain into the interim storage facility. No uranium mill tailings contamination shall be allowed to escape containment within the facility walls.

Individuals that have had physical contact with the uranium mill tailings will have all visible contamination removed by sweeping. The individual will undergo a full body frisk with the frisking meter. If the frisking limits are exceeded, further sweeping or washing will occur, followed by another frisking. If clothing will not decontaminate visibly or pass the frisking survey, the clothing will be changed out in the storage shed. Contaminated clothing will be left at the ISF for disposal.

Once decontamination is deemed complete by the Colorado Department of Public Health and Environment, and the logbook has been filled out, the truck and users may leave the interim storage facility access area. All materials used in decontamination will be returned to the shed. The gate and shed will be locked. The final determination that all procedures, including decontamination, have been completed according to the protocols is the responsibility of the Colorado Department of Public Health and Environment.

RESPONSIBILITIES

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT



The Colorado Department of Public Health and Environment is responsible for the overall oversight of the Title I Uranium Mill Tailings Management Plan. The Department has more than 30 years experience in the management of uranium mill tailings, including expertise in radiation protection, clean up programs, record keeping, public information and health physics.

Colorado Department of Public Health and Environment's responsibilities include:

- 1) Maintaining, updating and sharing records and documentation
- 2) Conducting inspections
- 3) Conducting excavation control
- 4) Providing technical expertise
- 5) Overseeing use of the ISF
- 6) Providing instrumentation

PUBLIC RECORDS AND DOCUMENTATION

The Uranium Mill Tailings Management Plan will be used for technical information and field guidance. The Colorado Department of Public Health and Environment is responsible for the maintenance, distribution and revision of this plan.

The Colorado Department of Public Health and Environment will maintain and update uranium mill tailings records available to the general public and local government agencies. The Colorado Department of Public Health and Environment will produce or update property records as the conditions change due to excavation of the uranium mill tailings. The Colorado Department of Public Health and Environment will provide personnel to interpret records and give health risk information to the public regarding the presence of uranium mill tailings on properties.

The Colorado Department of Public Health and Environment will keep records of Title I uranium mill tailings excavated, received at the interim storage facility, and transported to Grand Junction Disposal Facility. The Colorado Department of Public Health and Environment will maintain records for decontamination of personnel and equipment.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will provide general information about uranium mill tailings to the public and local governments.

INSPECTIONS

The Colorado Department of Public Health and Environment will provide inspections of new building areas and demolition sites and inform the appropriate City and County Planning agencies for all pertinent building permits in Mesa County. All properties in Mesa County are to be monitored for the presence of mill tailings by the Colorado Department of Public Health and Environment, and if any are detected they are to be removed from all building sites before new construction commences.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will keep available Title I uranium mill tailings records and coordinate inspections of new construction in other communities as time permits and as requested.

EXCAVATION CONTROL

The Colorado Department of Public Health and Environment will provide excavation control for uranium mill tailings removals by private parties, contactors and government agencies by request.

Tailings co-mingled with other wastes cannot be hauled to the ISF or to the GJDF, as these materials are not in compliance with the Department of Energy's Waste Acceptance

Criteria for the Grand Junction Disposal Site. The Colorado Department of Public Health and Environment will conduct inspections prior to tailings removal for the presence of hazardous wastes that could be commingled with uranium mill tailings. The Colorado Department of Public Health and Environment will provide expertise on segregation, testing and storage of commingled waste. The Colorado Department of Public Health and Environment will provide documentation to the Department of Energy that materials transported to the Grand Junction Disposal Facility do not contain commingled waste.

TECHNICAL EXPERTISE

The Colorado Department of Public Health and Environment will provide technical expertise to communities, local governments or private parties in identifying, handling and management of Title I uranium mill tailings.

INTERIM STORAGE FACILITY

The Colorado Department of Public Health and Environment will routinely manage operations and record keeping at the interim storage facility. The Colorado Department of Public Health and Environment will conduct radiological surveys of the interim storage facility to insure its proper operation and containment of material. Spot checks will occur during heavy use, high winds or rain.

RADIOLOGICAL SURVEY INSTRUMENTS

The Colorado Department of Public Health and Environment will provide radiological survey instruments on loan to local governments and private parties on an as-needed basis. The Colorado Department of Public Health and Environment will maintain and calibrate the instruments annually as budgets allow and provide training in the use of the instruments.

TRAINING

The Colorado Department of Public Health and Environment will provide training to workers excavating tailings and will provide on-site safety briefings as needed. The Colorado Department of Public Health and Environment will be available to explain technical problems, options, radiation health risks or any part of the Uranium Mill Tailings Management Plan. The “Training” section of this plan describes the safety training in more detail.

LOCAL GOVERNMENTS AND PUBLIC UTILITIES



The local governments and public utilities are responsible for following the procedures in this plan, designed to locate residual uranium mill tailings in construction areas, and to excavate and transport contaminated material while minimizing impact and radiation exposure. The local governments and utilities recognize that cooperation and coordination between the Colorado Department of Public Health and Environment, the Department of Energy, utilities, and local governments is paramount. All parties recognize and understand that some inconvenience and costs are involved in the proper handling and disposal of residual uranium mill tailings.

TRAINING

Local governments and utilities will require and assign radiation training as required under this plan for workers potentially exposed to ionizing radiation from uranium mill tailings. Training requirements are described later in this document.

COSTS

The costs of excavation, handling and transporting of uranium mill tailings by local governments and public utilities will be borne by these entities. Local governments may apply for grants to cover these costs in accordance with HB 97-1248, through the Colorado Department of Local Affairs and the Associated Governments of Northwest Colorado.

ENFORCEMENT OF PROCEDURES

Local governments and public utilities will be responsible for monitoring and enforcing the procedures for workers under their direct control. Supervisors will observe operations and enforce the written procedures of the Uranium Mill Tailings Management Plan, and the Colorado Rules and Regulations Pertaining to Radiation Control.

POINT OF CONTACT

Local governments and public utilities will identify personnel responsible for contact and coordination with Colorado Department of Public Health and Environment.

INSTRUMENTS

Local governments and public utilities will maintain the radiological detection instruments provided on loan by the Colorado Department of Public Health and Environment in good working order. The instruments are expensive and require proper care and usage. The instruments will be kept on hand for ease of checking potentially contaminated areas. The

instruments will be returned to the Colorado Department of Public Health and Environment annually for an operations check.

Surveys must be performed in accordance with Appendix D and Colorado Department of Public Health and Environment training.

HAZARDOUS WASTE

Local governments and public utilities will notify the Colorado Department of Public Health and Environment of unusual coloration, smells, or materials such as car batteries or transformers discovered in excavations. Coordination with the Colorado Department of Public Health and Environment shall be made prior to the removal of such materials or soils, as they may contain hazardous wastes substances like asbestos which require special storage, handling or treatment if excavated. A certified asbestos inspector should be used to determine the presence or absence of asbestos contamination if it is suspected. If hazardous material is suspected it should be analyzed by a qualified inspector. Hazardous material may not be taken to the interim storage facility. If hazardous material is taken to the interim storage facility by any local government or public utility, that entity will be responsible for removing the hazardous waste and associated tailings within 30 days of being so notified and manage the material in accordance with all federal, state and local requirements. The Hazardous Materials and Waste Management Division technical assistance line (303) 692-3320 is available to provide instructions on how to manage the waste. All materials brought to the ISF must comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version.)

RECORDS CHECK

Local governments and public utilities are responsible for checking available records or maps prior to a planned excavation activity. Up-front knowledge of tailings locations will enable subcontractors to more accurately bid projects. The Colorado Department of Public Health and Environment has copies of the supplemental standards database to assist in locating tailings deposits. The Colorado Department of Public Health and Environment also will retain the records of several thousand properties assessed or cleaned up in Uranium Mill Tailings Remedial Action Program communities.

PERMITS

Construction activities in public right-of-ways are controlled by local governments through the issuance of permits. Work permitted in an area of known tailings involvement will have the statement "tailings procedures in effect" written on the work order and will include a requirement for coordination with the Colorado Department of Public Health and Environment.

EXCAVATION CONTROL

The local governments and public utilities supervising excavations into deposits of uranium mill tailings will minimize over-excavation. Over-excavation is the removal of uncontaminated materials or mixing of uncontaminated materials with uranium tailings for transport to the interim storage facility. Over-excavation is controlled by radiological surveys and segregation of contaminated and uncontaminated material. In most cases, tailings deposits are small and localized. For such situations, a small excavator is the appropriate equipment for this type of removal. In general, the size and capacity of the excavator should match the size of the job. The excavation tool should fit the job to prevent over excavation.

INTERIM STORAGE FACILITY

The City of Grand Junction will be responsible for providing and maintaining the infrastructure necessary for operation of the interim storage facility (ISF), including an operating water line. The City will provide a gate and lock for security of the ISF and equipment shed. The City will also consolidate stockpiles within the ISF as requested by the Colorado Department of Public Health and Environment. No material will enter the ISF without proper documentation completed and stored in the ISF shed. All non-city generated material will be cleared through the Grand Junction UMTRA CDPHE office prior to placement in the ISF.

TRANSPORT TO THE GRAND JUNCTION DISPOSAL FACILITY

The City of Grand Junction will be responsible for transport of the uranium mill tailings to the Department of Energy disposal site from the interim storage facility. All training and procedures required by the Department of Energy for entering the Grand Junction Disposal Facility site (GJDF) will be adhered to. In cases of large quantities, the Colorado Department of Public Health and Environment may arrange for direct transport of the material from the excavation to the GJDF cell. In these cases, the property owner is responsible for transportation. Transportation must meet the requirements of the Colorado Rules and Regulations Pertaining to Radiation Control Part 17 and Colorado Department of Transportation requirements. In addition, all material hauled to the GJDF must be cleared by the CDPHE and meet the Waste Acceptance Criteria for the Grand Junction Disposal Site, as established by the Department of Energy.

UNITED STATES DEPARTMENT OF ENERGY

OPERATION OF THE GRAND JUNCTION DISPOSAL FACILITY

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF disposal cell periodically from the

stockpile at the interim storage facility. Currently, it is projected that materials will be trucked from the interim storage facility to the GJDF at least once a year for a two-to-three-week period. This frequency will vary as needed.

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF during large planned construction projects, such as sewer line replacement in a supplemental standards area. Planned disturbance of large quantities of uranium mill tailings may be trucked directly to the GJDF without using the interim storage facility, if approved by the Department of Energy.

The Department of Energy is also responsible for developing and maintaining the Waste Acceptance Criteria for the Grand Junction Disposal Site and for assuring that any changes to the criteria are communicated to the Colorado Department of Public Health and Environment.

LONG TERM SURVEILLANCE AND MAINTENANCE

The Department of Energy is responsible for the long-term surveillance and maintenance of the Grand Junction Disposal Facility disposal cell. All costs associated with the operation and maintenance of Grand Junction Disposal Facility is at Department of Energy expense.

CONTACT PERSON

The Department of Energy shall provide a point of contact for coordinating and planning between local governments, utilities and the Colorado Department of Public Health and Environment. The point of contact will receive any reports that the Department of Energy requires.

MAPS

The Department of Energy will provide maps delineating supplemental standards areas to the Colorado Department of Public Health and Environment and local governments.

PRIVATE PROPERTY OWNERS

In Mesa County, private parties or their contractors will notify the Colorado Department of Public Health and Environment of a request for a building or demolition permit through the Mesa County Planning Department. The owners or contractors will follow the recommendations issued to the Planning Department by the Colorado Department of Public Health and Environment through the Building Permit Survey Program.



In Title I uranium mill tailings impacted communities, property owners bear the costs of excavating, stockpiling, and transporting of uranium mill tailings contaminated materials to the interim storage facility, a licensed disposal facility, or to the GJDF. Prior to moving material to the facility, the owner must coordinate with the Colorado Department of Public Health and Environment

The private parties or their contractors will follow the ALARA principle throughout all work with uranium mill tailings. See the ALARA section.

HEALTH AND SAFETY

IONIZING RADIATION EXPOSURE CONCERNS



Uranium mill tailings consist of sand-like wastes generated from the milling of uranium ores to extract “yellowcake,” a uranium oxide compound. These tailings contain most of the original radioactivity found in the unprocessed ores. Radioactive radium, thorium, lead and other elements in tailings are unstable and decay by ejecting alpha and beta particles from the nucleus and by releasing excess energy as radiation. The radiation from the decaying tailings atoms has the potential to cause cancer in living tissues.

The main radiation exposures from uranium mill tailings are from direct exposure to gamma radiation, inhalation of radon, and inhalation of airborne radioactive particles.

Based on a human health risk assessment conducted by the Department of Energy (DOE, 1989) gamma radiation exposure to the public from residual uranium mill tailings is expected to be below the 100 millirem per year exposure limit for the general public.

Radon is formed when the radium in the tailings decays. Radon decays by ejecting alpha and beta particles and forms a series of short-lived radioactive products. The particles ejected by radon and its products cannot travel very far in air and cannot penetrate skin, thus are not an external hazard. However, if inhaled, these particles can cause damage to the lungs that could eventually result in lung cancer. Radon is found naturally in air in small amounts. Exposure to radon becomes a health hazard when it accumulates in buildings or mines to higher levels and is inhaled for extended periods. .

A third potential source of radiation exposure is radioactive particles (dust) associated with the tailings that can become airborne. Once airborne, these particles can be inhaled, with subsequent exposure to the respiratory tract. Airborne particulate contamination is routinely controlled to negligible concentrations by the application of water mists or sprays to equipment or tailings releasing dust. Dust masks can also be worn to control this exposure for workers.

The radiation exposures to utility workers excavating uranium mill tailings are greatest in trenches. Radon is heavier than air, and before dispersal occurs, will be at higher levels at the bottom of the trench. The radon levels would probably be greatest when the trench is opened up and lessen somewhat later due to mixing with air. Gamma radiation exposure is also more likely in a contaminated trench. There may be pure tailings in the bedding of the utility line and tailings mixed with the soils in the walls of the trench. The result is radiation exposure to workers from the sides as well as the bottom of the trench.

RADIATION RISK ANALYSIS

The limit for radiation exposure from uranium mill tailings for non-radiation workers is 100 millirem per year in the Regulations, Part 4.14.1, Radiation Dose Limits for Individual Members of the Public. This is a “total dose limit” which includes both internal and external exposure, rather than only external exposure to gamma radiation. The Environmental Protection Agency is currently considering lowering this limit to 15 millirem per year, while the Nuclear Regulatory Commission believes that 25 millirem per year should be used (as applied in the decommissioning of facilities). The allowable exposure for radiation workers is 5,000 millirem per year. Radiation workers are carefully and continuously scrutinized in a radiation workers health monitoring program.

The Department of Energy prepared a health risk analysis in 1989 for utility workers entering trenches that contain uranium mill tailings. The analysis calculated potential worst-case exposures to workers in trenches and compared them to the regulatory limit, (100 millirem per year above background for non-radiation workers, required by the Code of Federal Regulations (CFR), Title 10, Part 20). In the Colorado, background radiation varies from 350 to 650 millirems per year.

The analysis was based on a series of hypothetical projects to remove uranium mill tailings surrounding buried utilities. Water line repairs were estimated to last 39 hours. It was assumed that an individual worker would be in the trench only 25 percent of the time due to scheduling rotations. Thus, 10 hours per year of exposure was allotted to water line repairs.

Approximately eight hours of exposure was allotted to sewer line work with an individual spending only 10 percent of the time in a contaminated trench. Extra exposures were added to account for potential manhole repair. Therefore, two hours of exposure was used in the calculation for sewer line work.

Twelve total hours (10 for water lines and 2 for sewer lines) of yearly potential exposure at the highest, worst-case radiation levels detected in trenches gives an estimated exposure of 9.6 millirem to a utility worker, or 1/10 of the 100 millirem limit.

No exposure limit or regulation exists for radon in outside air, except for uranium and thorium mill tailings disposal cells. The radon limit for miners is four working level months per year. The Environmental Protection Agency has set a voluntary suggested indoor action level at 0.02 Working Levels (WL). This equates to about one working level month per year. The highest radon levels encountered in trenches during the analysis were 0.058 WL. The potential annual working level months-per-year after exposure to 0.058 working levels for 12 hours is 0.004 working level months-per-year, which is below the Environmental Protection Agency indoor action level.

The conclusion of the Department of Energy health risk analysis is that based upon these presumptions, “there is no clear present or future health risk to utility workers in Mesa

County due to potential gamma or radon exposure, even based upon the worst-case scenarios.”

AS LOW AS REASONABLY ACHIEVABLE (ALARA)

Even though the Department of Energy’s risk assessment demonstrated that risk to utility workers in trenches containing uranium mill tailings is expected to remain below regulatory limits, the Tailings Management Plan supports adherence to the ALARA philosophy, as stated in Part 4.5 of the Regulations, to limit exposure to levels less than the regulatory requirement.

ALARA is an approach to radiation protection to manage and control exposures (both individual and collective to the work force and the general public) and release of radioactive materials to the environment at levels as low as is practical below the regulatory requirement, taking into account social, technical, economic, practical and public policy considerations. As used in this context, ALARA is not a dose limit but a process, which has the objective of attaining doses as far below the applicable controlling limits as is reasonably achievable.

The ALARA principle will be the primary philosophy and tool used for controlling radiation exposures during all activities of managing uranium mill tailings. The ALARA principle will be implemented by use of the following requirements to control exposure:

- The upper limit of gamma exposure allowed will be 15 millirem per year. Supervisors of local government and utility workers should maintain records regarding the number of hours of exposure for their employees who work near uranium mill tailings. If badges are not used to track actual exposures, the exposures can be roughly estimated. Using the average tailings activity, approximately 300 hours of trench work is allowable per year under this exposure limit. The local government or public utility and the Colorado Department of Public Health and Environment may consider additional rotations out of trench work when any individual worker has accumulated 100 hours of work in contaminated trenches in any given year, in order to ensure worker protection.
- When possible, the local government or public utility should consider establishing a control area around exposed tailings. Only trained personnel should be allowed into the controlled area. Individuals entering the controlled area will limit the amount of time spent within the controlled area. Individuals will position their work as far from the contaminated areas as possible. Only necessary equipment or tools will be allowed into the controlled area. Uranium mill tailings contaminated areas will be fenced off from the public during non work hours. No unauthorized entry into the controlled areas is allowed by the public.
- No visible dust is allowed to leave the controlled area. Dust will be controlled through the use of water sprays. However, spraying should be limited to the

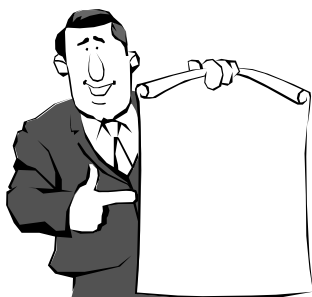
amount necessary to keep the excavation dust-free, but should not create runoff from the excavation.

- No eating, drinking, chewing, or smoking is allowed in the controlled area.
- All equipment and personnel in contact with tailings will be surveyed with a radiation meter. If contamination is present, they must undergo decontamination. Haul trucks and contaminated personnel will be frisked with a radiation meter to verify decontamination. Surface meter readings should be under 18 μ R/hr (microRem [Rem = roentgen equivalent man] per hour) or equivalent.
- Haul trucks will be covered with a tarp to prevent windblown transportation. . If the tailings are wet or have the potential of leaking out, a plastic sheet should be positioned in the tailgate to contain tailings.
- If a spill occurs, the spill procedures must be followed (see “Transport of Tailings”).
- Tailings deposits excavated from the top three feet of an excavation should not be replaced into the excavation. These tailings should be removed and transported to a controlled onsite stockpile or to the interim storage facility. Clean fill should replace tailings deposits for up to three feet from the ground surface. If this is not readily performable, a cap of 6 inches in non traffic areas and 18 inches in high traffic areas should be placed over the tailings at a minimum. This should be placed over stockpiled material as well and a tactifyer such as magnesium chloride should be applied to minimize weathering. This tactifyer should be applied to all temporary stockpiled tailings if stored over 30 days or if weather conditions indicate that tailings may be spread from the stockpile.

TRAINING

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment employees responsible for implementing the Uranium Mill Tailings Management Plan, and employees who may receive radiological exposures in the work place, will be provided with training and be proficient in the following areas:



40 Hour Hazardous Waste Training
8-hr Refresher Training

Radiological Worker Training
Radiological Refresher Training

The Department will develop and update the curriculum for training of local government and public utilities workers or private owners and agents. The curriculum will include:

- Basic Health Physics
- Radiation Exposure Limits and Monitoring
- Excavation and Transport Procedures
- Survey Meter Operation
- The ALARA Principle
- Decontamination Procedures

LOCAL GOVERNMENTS AND PUBLIC UTILITIES

It is recommended that local governments and public utilities workers who may potentially be exposed to uranium mill tailings will receive training in the following areas:

- Radiological Worker Training
- Radiological Refresher Training

The workers for these agencies will attend on-site briefings to review uranium mill tailings management procedures before beginning work in an area known to contain uranium mill tailings. The Colorado Department of Public Health and Environment or the local government/public utility supervisors will conduct the briefings.

EXCAVATION PROCEDURES

RADIATION SURVEY

A gamma radiation survey instrument will be accessible to excavation crews working in areas known to be contaminated with uranium mill tailings. The instrument will be provided on loan by the Colorado Department of Public Health and Environment and will be capable of detecting uranium mill tailings in the range of 0-1000 micro Roentgen per hour ($\mu\text{R/h}$).

A field operations check on the instrument will be performed before surveying for uranium tailings contamination.

Refer to Appendix D – Generic Survey Procedures for more detailed procedures.

IDENTIFYING CONTAMINATED MATERIAL

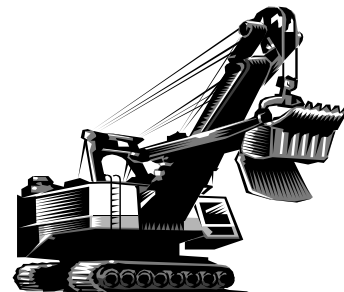
For purposes of this plan, residual uranium mill tailings will be identified based on a reading of 30 percent above the normal background gamma radiation. A reading of fourteen $\mu\text{R/h}$ is generally considered the average for western Colorado soils. As such, the background gamma plus 30 percent results in a value of 18 $\mu\text{R/h}$. Any reading of 18 $\mu\text{R/hr}$ will be considered contaminated with uranium tailings. In non-habitable areas (and non-habitable in the future), a reading of 20 $\mu\text{R/h}$ is allowable. Every area with contamination is to be evaluated and handled individually based on consultation with the Colorado Department of Public Health and Environment. For purposes of this Uranium Mill Tailings Management Plan, and in adherence to the ALARA principle, hot spots will be removed and area averaging is not allowed.

Uranium mill tailings contamination may be in surface deposits or buried, especially in utility trenches. Where applicable, the Department of Energy supplemental standards maps may be used to generally indicate potential areas of contamination. Prior to surface penetration, a check shall be made with a scintillometer. After a trench is excavated, the meter shall be lowered for spot checks along the length of the excavation. Any suspicious gray or purple sands should be particularly checked. Tailings are often mixed with soils and are indistinguishable and appear to be normal dirt.

EXCAVATION

CONTROLLED AREAS

If tailings are identified, a controlled area shall be established, extending 10 feet from the edge of the deposit. Once tailings are identified,



tailings excavation procedures and ALARA principles immediately become effective. The supervisor/property owner is responsible for enforcement of the procedures.

HAZARDOUS WASTES

Uranium mill tailings contaminated areas shall be inspected for asbestos, visible discoloration, odd smells, or for materials such as car batteries or transformers. Mixing of hazardous wastes with the tailings will probably cause the deposit to be considered a commingled waste. Commingled wastes, if above regulatory limits, and untreated, cannot be hauled to the Grand Junction Disposal Facility disposal site. Material hauled to the Grand Junction Disposal Facility must meet the Department of Energy's Waste Acceptance Criteria.

Co-mingled wastes are regulated with specific handling and storage requirements. The Colorado Department of Public Health and Environment shall be notified immediately upon suspicion of such wastes. These deposits shall not be excavated unless necessary and then shall be segregated and stored separately from the other non-commingled tailings and clean soils. The local government or public utility will be responsible for managing commingled wastes in accordance with applicable hazardous waste regulations.

AVOIDING OVER EXCAVATION

If uranium mill tailings need to be excavated, the amount of material disturbed or removed should be minimized. Over excavation causes extra handling costs and fills the limited permanent storage room available in the Grand Junction Disposal Facility disposal cell. Appropriately sized equipment should be used based on the size of the deposit to be excavated. If the tailings cannot be directly loaded onto transportation, stockpiled tailings should be placed onto concrete or plastic sheeting to delineate and separate from the clean soil below it.

Uncontaminated overburden shall be removed and segregated from uranium mill tailings below. Only uranium mill tailings contaminated materials shall be transported to the interim storage facility or Grand Junction Disposal Facility. Care shall be taken to avoid mixing contaminated soils with uncontaminated soils. The radiation meter shall be used to identify soils in question.

The uranium mill tailings contaminated areas considered for removal will be visibly marked for the machine operator. This is to segregate the contaminated material and avoid mixing. Spray paint, colored flags or fencing are appropriate to delineate the uranium mill tailings contaminated areas.

No trash, wood, tires or other non-contaminated solid waste shall be shipped to the interim storage facility or GJDF. Such materials may be decontaminated and disposed of as solid waste. Care shall be taken to segregate uncontaminated concrete from contaminated concrete (It has been our experience that uncontaminated concrete is the material that most

often is improperly brought to the interim storage facility). Contaminated concrete or asphalt shall be sized properly to allow compaction at Grand Junction Disposal Facility. No debris shall be larger than 3 feet in any dimension. No pipe shall be longer than 10 feet in length. All materials shall be sized in accordance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

Proper disposal of tailings is always the best means of dealing with tailings. It is the ultimate final termination of the contamination. However, in some cases, particularly in Title I communities outside of the Grand Junction area, transportation to the ISF or GJDF is just not feasible. In these situations, uranium mill tailings can be re-buried on site provided that the following conditions are met:

- 1) A discussion with CDPHE about disposal options prior to any excavation activities must be conducted.
- 2) Tailings may be returned to the original excavation, in a last out-first in order.
- 3) The tailings should be re-buried under a minimum of 6 inches of clean soil in low exposure/traffic areas and 18 inches in high exposure/traffic areas and no deeper than a foot above the vadose (ground-water capillary) zone. 18 inches of clean cover should be used in areas with high erosion potential.
- 4) Contaminated surface deposits must be re-buried beneath clean fill material as listed in 2).
- 5) A written record that indicates the approximate volume of material that was re-buried, the meter reading for the material, the approximate depth of burial and the burial location, shall be submitted to CDPHE. These records shall also be maintained in perpetuity by the property owner, provided to any subsequent owner and to any contractors performing work on the property.

STOCKPILING

Stockpiling of uranium mill tailings contaminated material should be avoided whenever possible. Stockpiling may cause concerns to property owners, and may present an exposure hazard. Stockpiling on the same property that the tailings came from is allowable, but not advisable. Tailings may not be removed from the original property except to be taken to a licensed disposal facility, the interim disposal facility at the City of Grand Junction's yard, or the Grand Junction Disposal Facility in Whitewater, CO. Stockpiled material should be fenced from public access, and must be covered or a tacktifier applied to prevent wind and water erosion. Stockpiles should not be left in place longer than 60 days. If it is necessary to leave them longer than that, or if inclement weather is emanate, they must be properly covered or sealed.

ASPHALT

When working with asphalt placed over uranium mill tailings contaminated soils, care shall be taken to not penetrate into the tailings and/or mix the tailings with the asphalt. If tailings are mixed with the asphalt, the asphalt should be inspected with a meter. If the

mixture shows a meter reading of 30 percent above the radiological background (a reading of 18 uR/hr or greater), it is considered contaminated.

Asphalt removed in chunks over uranium mill tailings contaminated soils should be inspected on the underside with the survey meter. If excavation into the bedding material is necessary, care must be taken to segregate contaminated and uncontaminated materials.

WATER MAIN BREAKS

If uranium mill tailings are washing away due to a water line break, sediment dams shall be established to halt the spread of contamination. Following repair of the break, a meter survey should be conducted downstream to insure that any contaminated materials spread by the break are identified and are cleaned up. Any material exceeding 30 percent above background (18 μ R/hr) should be returned to the excavation or taken to the interim storage facility.

DECONTAMINATION

All equipment used for excavation or hauling of tailings shall be inspected and decontaminated. Visible tailings shall be swept or sprayed away and placed in the ISF.

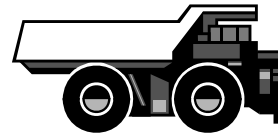
Workers in contact with tailings shall be decontaminated. Visible tailings shall be swept or washed away. These workers shall be frisked with the beta-gamma meter for verification of decontamination (See Appendix B). If clothing will not pass the frisk, the workers shall change into clean clothing. Contaminated clothing and contaminated decontamination materials shall be taken to the interim storage facility for further decontamination and frisking or disposal. The Colorado Department of Public Health and Environment will be available to assist in these operations.

CEASE WORK

Work shall cease when the project supervisor or the Colorado Department of Public Health and Environment determines that the procedures have not or cannot be followed. Examples include: high winds making it impossible to control dust, a truck that leaks tailings or non-cooperation of workers. Work may be resumed when the supervisor and the CDPHE determines that the procedures issue has been resolved and it is safe to resume work.

TRANSPORT OF TAILINGS

REGULATIONS



Transportation of radioactive material over public roads in Colorado is regulated under the Code of Federal Regulations (CFR) Title 49, Parts 171-178 and 390-397, and Part 17 of the Colorado Regulations, which mirror 49 CFR. Generally, uranium decay series material is low specific activity as defined by the International Atomic Energy Agency and U.S. Department of Transportation.

The Department of Transportation defines a concentration of radioactivity above which material like uranium mill tailings is considered radioactive for purposes of the transportation regulations. At present, the Department of Transportation defines any material with radioactivity greater than 70 Becquerel per gram (B/g) as radioactive for transport purposes. For uranium mill tailings, 70 B/gm total activity is calculated to be less than approximately 174 pCi/g radium-226. Therefore, if a truckload of tailings material averages overall below less than 174 pCi/g radium-226, it is not considered radioactive material for purposes of transportation under 49 CFR and Part 17 of the Regulations. From our experience in the Uranium Mill Tailings Remedial Action Program, tailings excavated from streets or other properties are usually mixed with clean soil and do not exceed 174 pCi/g radium-226.

HAULING

The ALARA principle will be followed during transportation of tailings. This will be insured by covering and not overfilling loads to prevent dust or spillage. If very wet or fine-grained material is to be loaded, a plastic sheet diaper will be placed in the rear of the truck bed in a manner to exclude leaking out the tailgate. Loads should not be piled any higher than the sidewall of the truck. The most direct route possible with no off-road stops will be used to transport tailings to the interim storage facility. All loads will be covered to ensure that no tailings are blown out during transport.

SPILL PROCEDURE

When transporting mill tailings, if a spill from the haul truck occurs, the supervisor and the Colorado Department of Public Health and Environment will be notified as soon as possible. The spill will be isolated and protected from further dispersal. Traffic cones and flagmen will be used as necessary for traffic safety. The truck should pull off the road if possible. If there has been an accident, the driver should call the state patrol or 911 as necessary. Drivers should also call their supervisor and the Colorado Department of Public Health and Environment in responding to the spill. Traffic safety has priority over isolating or recovering the spill

The spill will be swept up and put into a closed container appropriate to its volume and transported to the interim storage facility for disposal. The area is considered clean if no contamination is seen or detected. If the spill was onto a dirt road, the radiation survey meter will be used to verify the spill cleanup. If no readings above 18 $\mu\text{R/h}$ are noted on the gamma survey meter, the area is considered clean.

APPENDIX A

DEFINITIONS

Access Control: A designated entrance/exit point to a controlled area.

ALARA: Acronym for “As Low as Reasonably Achievable,” a basic concept of radiation protection that specifies that radioactive discharges from nuclear plants and radiation exposures to personnel be kept as far below regulatory limits as feasible.

Alpha Particle: A positively charged particle ejected spontaneously from the nucleus of some radioactive elements. It is identical to a helium nucleus and has a mass number of 4 and an electrostatic charge of +2. It has low penetrating power and short range. The most energetic alpha particle will generally fail to penetrate the skin. Alphas are hazardous when an alpha-emitting isotope is introduced into the body.

Beta Particle: A charged particle emitted from a nucleus during radioactive decay. A negatively charged beta is identical to an electron. A positively charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns. Beta emitters are harmful if they enter the body. A thin sheet of metal or plastic easily stops beta particles.

Grand Junction Disposal Facility (GJDF): The Uranium Mill Tailings Remedial Action Program disposal cell, operated by Department of Energy, located about 15 miles south of Grand Junction on U.S. Highway 50, will remain open until the year 2023 or until filled. This will be the only permanent (program) disposal cell available to uranium mill tailings disturbed by construction activities after 1998. This cell was previously known as the Cheney Disposal Cell and was renamed in 2012.

Contamination: Unwanted radioactive materials (uranium mill tailings) that are present on/in a particular object or area. It can also refer to other contaminants such as asbestos.

Controlled Area: Any area to which access is managed in order to protect individuals from exposure to radiation and/or radioactive material. Individuals who enter a controlled area are not expected to receive a total effective dose equivalent of more than 100 millirem in one year.

Decontamination: The reduction or removal of contaminating radioactive material from a structure, area, object or person.

Frisk: A radiological survey of personnel or equipment utilizing a portable radiation detector.

Gamma Ray: High-energy, short wavelength electromagnetic radiation (a packet of energy) emitted from the nucleus of an unstable atom. It is very penetrating and is best stopped by dense materials such as lead. They are similar to x-rays but are usually more energetic.

Interim Storage Facility: The facility located in Grand Junction available for temporary storage of uranium mill tailings disturbed during construction activities. The interim storage facility is located on the City of Grand Junction property at 333 West Avenue, Grand Junction, Co. and managed by the Colorado Department of Public Health and Environment.

Radiation: Particles (alpha, beta or neutrons), or photons (gamma) emitted from the nucleus of an unstable (radioactive) atom as a result of radioactive decay.

Radioactive: Exhibiting radioactivity or pertaining to radioactivity.

Radioactivity: The spontaneous emission of radiation, generally alpha or beta particles often accompanied by gamma rays, from the nucleus of an unstable atom.

Uranium Mill Tailings: Radioactive residues from the processing of uranium ore into yellowcake in a mill. Although the milling process recovers about 93 percent of the uranium, the residues, or tailings, contain several radioactive elements, including uranium, thorium, radium and polonium.

Yellowcake: A product of uranium milling process, yellowcake is a solid uranium oxide compound (U₃O₈) that takes its name from its color and texture. Yellowcake is the feed material for fuel enrichment and fuel pellet fabrication.

APPENDIX B

FRISKING AND DECONTAMINATION PROCEDURE

FRISKING

PURPOSE

This procedure establishes the requirements for decontamination frisking prior to exiting the controlled area of the interim storage facility. Frisking for contamination will limit exposure of the workers and the general public to radioactive material and prevent the spread of contamination beyond controlled areas.

APPLICABILITY

This procedure applies to all people entering and exiting the controlled area of the interim storage facility.

PRECAUTIONS

All personnel who enter a controlled area (the interim storage facility or an excavation into tailings) are expected to keep their exposures to radiation and radioactive materials as low as reasonably achievable (ALARA).

Personnel or equipment may not leave the interim storage facility with any detectable radioactive contamination.

FRISKING SURVEY METER

A portable monitor, such as the Ludlum Model 44-9, pancake GM beta-gamma detector, or equivalent, shall be used for frisking. The frisking instrument shall have a valid calibration and be functionally checked before using this procedure.

EQUIPMENT FOR FRISKING AND DECONTAMINATION

Frisking Meter	Broom
Sturdy Brush	Wash Tub
Mild Soap	Laundry Soap
Garden Hose	Frisking Log

FRISKING PROCEDURE

Personnel shall frisk using the techniques defined. Personal items such as flashlights, notebooks or hats shall be subject to the same frisking requirements as the person carrying them.

Verify the instrument is in service, set to the proper scale, and the audio output can be heard during frisking.

Hold the probe less than half an inch from the surface being surveyed.

Move the probe slowly over the surface, approximately two inches per second.

If the count rate increases during frisking, pause for 5 to 10 seconds over the area to provide adequate time for instrument response.

If the count rate increases beyond background, the area shall be decontaminated and frisked again.

PERSONNEL FRISKING ORDER

Frisk the hands before picking up the probe.

Frisk in the following order:

- Head (pause at the mouth and nose for five seconds)
- Neck
- Arms (pause at the elbows)
- Chest and abdomen
- Back, hips and seat of pants
- Legs (pause at the knees and cuffs)
- Shoes
- Shoe bottoms
- Personal items (hat, gloves)

DECONTAMINATION

PERSONNEL DECONTAMINATION

Skin contamination may be removed by washing with lukewarm water and mild soap. Personnel may flush ears/eyes with cool, clear water to decontaminate those areas. If flushing is not successful, qualified medical personnel shall direct additional decontamination efforts.

Clothing and shoes may be brushed clean. If clothing will not decontaminate with brushing, it shall be removed and exchanged with the supplied coveralls in the access shed. Contaminated shoes may be brushed and washed without removing and re-frisked.

EQUIPMENT AND TRUCK DECONTAMINATION

Prior to frisking a truck, the vehicle engine will be shut off, placed in 1st gear and have the wheels chocked. No person shall physically go beneath a piece of equipment to perform inspections or decontamination.

All visible contamination shall be swept or washed into the interim storage facility. Tailgate areas and tires will be frisked with the probe at two inches per second and with the probe half inch from the surface. If the instrument rate count registers above background, further brushing and washing will be performed until it is deemed acceptable.

EXITING THE INTERIM STORAGE FACILITY

Return the frisk probe to its holder. The probe shall be placed face up to allow the next person to monitor his/her hands before holding the probe.

After decontamination of equipment and personnel and successful frisking, personnel may leave the controlled area, sign out on the access/frisking log, secure the gate and shed and exit the area.

APPENDIX C

BUILDING PERMIT SURVEYS

BUILDING PERMIT SURVEY HISTORY

In 1971, the Colorado Department of Public Health and Environment, formerly the Colorado Department of Health, began a cooperative program with the Mesa County Planning Department to conduct radiation surveys at new construction sites. The radiation surveys were integrated into the building permit process, and it was therefore called the Building Permit Survey Program.

As discussed in the History section of the Uranium Mill Tailings Management Plan, radioactive tailings were used in Mesa County and other uranium mill towns for building materials and fill dirt. Many structures were modified or built over tailings. Therefore, potential health risks were being created due to the increased gamma radiation and radon exposure.

Surveys are performed by the Colorado Department of Public Health and Environment before a building permit is issued. The surveys include the footprint of the proposed building, plus 10 feet extra around the perimeter. After the survey, an inspection form is filled out indicating that no radioactive materials were found or with recommendations for removal, or other options, if tailings are found. The form is given to the owner (or contractor) with a copy entered into the Colorado Department of Public Health and Environment database. If tailings are found, a map is drawn indicating the areas of concern.

When tailings are removed from a building site, another form and map is filled out declaring the removal of the contamination, which allows the issuance of the building permit. Copies of the information are entered into the Colorado Department of Public Health and Environment database for reference and documentation.

The survey is considered valid for six months, after which another survey may be necessary if the structure hasn't been constructed. This is because, within six months, the site could have been re-contaminated.

The surveys include all structures that could possibly be converted into living spaces. During the oil shale boom, people were known to live in sheds or any space available. Thus, sheds and garages, as well as business sites and houses, are inspected. Areas such as patios, carports and porches are also inspected as these are often enclosed later as part of the living space.

Currently, the Colorado Department of Public Health and Environment surveys demolition

sites and building sites in Mesa County. Procedures now concentrate the surveys on properties or areas with a known history of tailings. Much of the construction activity currently in Mesa County is new subdivisions in former fields, where tailings are unlikely to be encountered.

PROCEDURES FOR THE REQUIREMENT OF A BUILDING PERMIT SURVEY

Upon receiving a request for a building permit survey, a record review will be performed by the Colorado Department of Public Health and Environment to ascertain the need for a field survey. The review will include the CDPHE gamma table, and, if necessary, the Department of Energy microfiche records for the location.

The following criteria will result in the execution of a field survey:

1. Records indicate the presence of historic tailings or ore. . Historic tailings properties will always be surveyed, even if remedial action took place. Remedial actions did not always find or completely remove tailings.
2. Tailings have been found on an adjacent property. Adjacent properties will be surveyed if it is in an area where extensive tailings were used.
3. For information: Information surveys are in areas where previous surveys were not performed. The inspector will perform surveys on several properties in the new area (subdivisions) and determine from visual observations which properties in the area may need surveys when they are requested, due to radiation readings, fill areas, geography, or previous structures.

If it is determined that a survey is not to be performed, the program assistant will fill out a Building Permit Records card, print out a form in duplicate, sign the form and give one copy to the requestor. The other copy is filed and entered into the database. The Building Permit Records form indicates, "No field survey is required based upon a record review of the vicinity of the building site. No tailings deposits were identified from available records that would affect the construction site."

In communities outside of Mesa County, the Colorado Department of Public Health and Environment will provide assistance to monitor construction and demolition sites with a history of tailings involvement, if requested. The Colorado Department of Public Health and Environment data and files may be used to determine if a site needs a radiation survey. The Department may perform site visits to conduct the surveys if the data base information is inconclusive.

APPENDIX D

GAMMA RADIATION SURVEY PROCEDURES

GAMMA RADIATION SURVEYS

OBJECTIVES OF GAMMA SURVEYS

The objective of a gamma survey is to determine if radioactive materials, especially uranium mill tailings, are present on individual properties, to acquire sufficient data to evaluate the gamma levels and health risks, and to document the location and conditions of radioactive materials. Uranium mill tailings are the primary radioactive materials being surveyed, due to their radium content and potential to cause elevated radon gas in structures. The gamma surveys may locate natural soils, rocks or ores that have elevated gamma radiation and have the potential to increase indoor radon levels. The gamma survey may also locate and identify other radioactive sources such as ore or petrified wood, which may not have a potential to increase radon, but increases health risks through gamma exposure.

BACKGROUND GAMMA RADIATION

Background radiation is the natural radioactivity of an area. Background radiation varies due to the influence of natural mineral deposits, building materials and elevation. The most common outside background levels in Mesa County are 10 to 14 micro roentgens per hour ($\mu\text{R}/\text{h}$). Fourteen $\mu\text{R}/\text{h}$ shall be considered background in Mesa County, Colorado. A meter reading 30 percent higher than the local background level (18 $\mu\text{R}/\text{h}$) is significant and requires investigation.

NON-TAILINGS GAMMA SOURCES

There are many different radioactive materials besides uranium mill tailings that may be encountered during a gamma survey. Luminous-dial compasses, clocks, aircraft instruments, propane tanks, petrified wood, dinosaur bones and ore samples may emit gamma radiation levels above 20 $\mu\text{R}/\text{h}$. Natural outcroppings of granite rocks may demonstrate elevated gamma radiation. These objects may act as point sources, as the gamma field drops off rapidly when the survey meter is moved away. Coal ash and shale may also cause meter readings above 20 $\mu\text{R}/\text{h}$, but seldom appear as point sources. Brick may cause readings of 22 $\mu\text{R}/\text{h}$ due to the materials used in their manufacture. Some granite countertops exhibit meter readings far in excess of 20 $\mu\text{R}/\text{h}$ as well.

INTERPRETATION OF READINGS

SHINE

Radiation detected that is from a source some distance away is called shine. Shine will make it more difficult to determine the levels of radiation from nearby objects. The meter readings are higher than if the shine radiation did not exist. An example of a shine source is a large pile of radioactive tailings or large radioactive ore pile. Shine fields are also created by strong local radioactive sources such as density gauges or metal weld x-ray devices.

To check for shine, the meter reading can be compared at ground level, waist level and overhead. If a shine field is present, the meter will detect about the same radiation levels at waist and surface levels.

Lead shielding can be used to help interpret meter readings in a shine field. A lead shield may be wrapped around the sides of the meter to block the shine.

A comparison of shielded meter readings and unshielded readings, called a differential, may help distinguish localized elevated gamma levels from shine. A sheet of lead is placed between the instrument and the suspected area, and a meter reading is taken. The shield is removed, and a second meter reading is taken. The difference between the shielded and unshielded reading is the differential. The differential should not be greater than six, which is about 30 percent, for background radiation areas around 14 $\mu\text{R}/\text{h}$. If the differential is greater than six, the area under the shielding may be contaminated with a radioactive source. This technique loses accuracy when higher gamma fields are encountered.

The Colorado Department of Public Health and Environment will provide assistance if a shine field is suspected and the meter readings are difficult to interpret.

GEOMETRY

A meter reading in a hole or trench may indicate higher radiation levels than a flat surface. The meter receives gamma radiation from many directions in a hole, while a surface reading mainly detects the area directly beneath it.

SHIELDING

Dense materials shield gamma radiation from detection. Examples are rock road base, asphalt, concrete and hard packed soils. The amount of shielding depends upon the thickness. Radiation surveys over asphalt or concrete need to be performed more slowly so that the technician can observe small fluctuations on the meter. While normal soils reading 14 $\mu\text{R}/\text{h}$ usually indicate no contamination, this reading on asphalt or concrete may indicate a shielded radioactive deposit.

STANDARD GAMMA SURVEY PROCEDURE

SURVEY INSTRUMENTS

The survey instruments used by the Colorado Department of Public Health and Environment and loaned to local governments, public utilities, and private parties are adequate to locate uranium mill tailings situated close to the ground surface. If a deposit is heavily shielded, the meter may not indicate any change from background radiation. The meters are calibrated yearly and should be given an operations check before use. Many of the instruments have been calibrated and electronically modified to give a fast response time. Instruments with an audio device are the easiest to use as one can notice the faster change in the sound (clicking speed), which is an indication of a radioactive source. The instruments are designed to give a meter reading in micro roentgen per hour. If the surveyor's meter shows 18 $\mu\text{R/h}$ on the scale, this is considered 30 percent above background of 14 $\mu\text{R/h}$ and that tailings contamination is present.

PERMISSION TO SURVEY

Permission to access private property must be obtained before a survey is undertaken. The owner or owner representative may give a verbal or written permission to enter a property. The surveyor should identify himself to residents on the property and state the purpose of the survey.

HEALTH AND SAFETY

Performing a gamma radiation survey is not entirely risk free. The major hazards are potential physical injuries due to falling or being trapped in a confined space. The surveyor should comply with Occupational Safety and Health Administration (OSHA)-confined space entry requirements. Prior to entering any crawlspace, the surveyor should notify a coworker of the location and intent to survey. Some crawlspaces are too tight to enter safely. If such areas must be checked for a radiation source, an extension pole attached to a meter with audio capability would allow limited probing into the tight areas.

No hole or trench deeper than 4 feet or with sides steeper than a 45-degree angle should be entered unless the sidewall stability conforms to OSHA standards. These areas, as well as vertical cliffs, can be surveyed by lowering the meter on a rope and listening to the audio or observing the meter face with binoculars.

Head injuries can be avoided by not watching the meter while walking. Tree limbs, air conditioners, pipes and other extending objects are commonly at head level around houses. Using meters with the audio capability and watching the path of the survey will avoid injury.

Dogs are potentially a risk when surveying. Always ask the residents if there are dogs present and to place them indoors or tie them up in an area not needed to be surveyed. Personnel should always be watching for dogs when entering a property.

Exposure to gamma radiation is a potential health risk to the surveyor. During the many years that the Colorado Department of Public Health and Environment has conducted gamma surveys, it is rare that the monitoring badges worn by surveyors record any exposures above background. It would be possible to receive limited gamma exposure if uranium ore samples were carried around in a vehicle. If ore is transported, it should be placed as far away from occupants as possible and removed from the vehicle and properly disposed of as soon as possible.

If the surveyor detects a radiation source above 1,000 micro roentgen per hour (one milliroentgen), and the source is not obviously ore or uranium mill tailings, the surveyor should immediately leave the area and notify the Colorado Department Of Public Health And Environment, Radiation Control Program. Such sources could be radium sources or instruments, such as moisture density gauges.

The surveyor is expected to adhere to the ALARA principle and keep all radiation exposures As Low As Reasonably Achievable.

GENERIC SURVEY PROCEDURES

All gamma surveys will use generic procedures that address situations commonly encountered. These are centered on the readiness of the survey meter; interpretation of findings and investigating shielded radiation sources.

The survey meter must be checked for operation before use. The meter battery level and meter scales can be compared with historical levels by using known radioactive sources. If the instrument is in the field, and no radioactive check source is available, the meter can be placed on the ground and comparisons made between the different scales and background level.

Before surveying, the area background must be determined. Background is the normal radiation level in an uncontaminated area. Radiological contamination may be assumed if the meter registers 30 percent above background. However, holes or trenches may register 30 percent above background and not be contaminated due to the geometry. Interpretation of meter readings in trenches and holes is difficult and usually requires experience and a judgment call. It is not unusual for a water meter pit to read 20 $\mu\text{R}/\text{h}$ on the survey meter and not be contaminated. If a water meter pit reads over 20 $\mu\text{R}/\text{h}$ on the survey meter, one should be suspicious of possible uranium tailings.

The survey should be conducted at a slow walk, using an established grid pattern. Specific spots may be checked by hesitating, placing the meter on the ground and noting the reading. The meter should be carried no more than one to four inches from the surface

when walking with no wide arcing swings. The meter is placed in fast response mode on the lower scale with the audio switch on.

When surveying areas with tall vegetation (weeds), the meter will have to be alternately lifted and lowered rather than maintaining a constant one to four inches from the surface.

Shielding will hide radioactive sources from detection. The survey may detect borderline elevated readings. These areas should be explored by removing some of the shielding. Dirt or gravel may be kicked aside or shoveled away. Asphalt and concrete may be checked from the edge where an inspection hole can be dug. Woodpiles and debris may be moved to find a spot to lower the meter to the ground. Water meter pits and manholes can be inspected by removing the cover and lowering the meter. Large manhole covers are heavy and may need a shovel or crowbar to pry it off and therefore may not be accessible. At no time will the Colorado Department Of Public Health And Environment conduct a survey where personnel safety may be compromised.

SPECIFIC SURVEY PROCEDURES

BUILDING PERMIT SURVEY (NEW STRUCTURE)

In Mesa County, a cooperative program exists between the Colorado Department of Public Health and Environment and the City/County Planning Department to screen proposed building sites for uranium mill tailings. The generic survey procedures apply. Three-foot survey grids extending an extra 10 feet beyond the site footprint are adequate to screen for radioactive materials.

The Colorado Department of Public Health and Environment requires that the builder stake out the site footprint. If the site is not staked or marked at the time of the survey, the requester may mark it out and reschedule the survey. The property must be clear of hindrances or restrictions so that a valid survey can be completed. Dirt/gravel piles must be removed as well as any obstructions for a survey. Colorado Department Of Public Health And Environment requires any proposed building site be officially addressed by the City/County Planning Department before any field gamma screening are preformed or Building Permit Survey forms are issued.

If no unusual gamma radiation above background is detected, the Building Permit Survey form is completed, signed and given to the builder for inclusion with paperwork submitted to the Planning Department for a building permit.

If elevated gamma radiation is detected, the surveyor will explore the area to determine the source. The elevated gamma area may be checked by digging out shovel scoops. This method often determines that the source of elevated gamma is a small ore rock or that the source is not extensive.

If an extensive gamma source is discovered that cannot be removed by a few shovel scoops, the Building Permit Survey form is filled out to reflect the finding, a map is drawn to locate and document the area and the builder notified.

The Colorado Department of Public Health and Environment presents options to owners to mitigate radiation sources discovered on building sites. The main concern is mitigation of potential radon sources inside the structure. The secondary concern is mitigation of gamma radiation exposure through the floors of the structure. The optimum solution is the complete removal of the source of radiation.

BUILDING PERMIT SURVEY (DEMOLITION)

Structures being demolished in Mesa County are controlled through the permit system of the County Planning Department. Structures planned for destruction should be surveyed to locate any potential uranium mill tailings contamination in the building materials.

The lower levels and all floors made from concrete should be scanned using 5-foot grids. The inspection should also include closets, bathrooms and kitchens.

Areas to survey include the following:

Lower Level Floors	Cinder Blocks
Foundations	Stucco
Brick and Mortar	Sidewalks
Driveways	Rock Walls/Fences
Sandboxes	Rock Gardens
Planters	Patios
Garages	Carports

If radioactive sources are discovered, the survey form is filled out, and the owner or contractor is notified. Options are discussed to separate radioactive contaminated materials from other debris. The radioactive materials can be located by the survey meter and marked with paint. Contaminated materials should be segregated and stockpiled or taken to the interim storage facility. Items transported to the interim storage facility shall comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

These procedures are in addition to the State of Colorado Demolition permit processes.

GAMMA RADIATION SURVEY FOR INFORMATION

The Colorado Department of Public Health and Environment has a vast database documents the radiological conditions on thousands of properties in western Colorado. However, many properties were never surveyed, and no information is available. Thus, the

Department will occasionally conduct a gamma survey on a property for information purposes.

Surveys on an entire property present a problem because of the size of the area. The grids for survey must be appropriate to the area. If the area is no larger than two acres, 10-foot grids are used. . For very large areas, grids as large as 50 feet may be used.

The larger the grid size, the greater the chance of overlooking a radiation source. In the case of very large properties, the areas one inspects, like a potential building site may be more important than walking the entire site on grids. Disturbed areas, likely dump areas, roads and gates should be inspected. Any structures should be checked using the techniques for demolition sites. Lawns, gardens, and septic systems should be checked. All concrete, metal debris, hoses, and fiberglass panels should be inspected.

If a linear pattern of elevated gamma readings is detected, it may indicate a buried utility line packed in uranium mill tailings. The Colorado Department of Public Health and Environment may assist in conducting large-area surveys, but the responsibility for a complete (non-building permit) survey on any property is that of the owner. A survey meter may be checked out (borrowed) from the Colorado Department of Public Health and Environment, or a consulting company/contractor may be hired by the property owner. However, Colorado Department of Public Health and Environment will conduct complete surveys on building sites.

STREETS, ALLEYS, AND UTILITY LINE CONSTRUCTION

Prior to construction involving streets, alleys or utility lines, the contractors should consult Department of Energy maps delineating supplemental standard areas. City workers or their contractors using instruments on loan from the Colorado Department of Public Health and Environment can survey the areas. Identified uranium mill tailings contaminated areas can be marked with paint. As trenches and excavations are opened, the meter can be lowered down to better determine if the subsurface material is contaminated. If the contamination is to be removed, it must be segregated from other materials and transported to the interim storage facility.

Surveys over concrete or asphalt should be conducted at a slow walk to give the meter time to respond. The meter must be in the fast response mode. Concrete and asphalt shields radioactive materials below, and meter changes may be only slightly higher than background when measured through them.

PRIVATE REMOVALS

Private removals are remedial actions performed by property owners or their contractors to clear an area, or entire property, of radioactive uranium mill tailings. The material may have been identified by the Building Permit Survey, by an information survey or street/utility line construction.

For private parties, the Colorado Department of Public Health and Environment will identify and delineate uranium mill tailings for removal. The identified contamination will be excavated by the owner and segregated from clean material by stockpiling on site or removal from the property to the interim storage facility with Colorado Department of Public Health and Environment approval. A meter may be checked out by the private party.

For private parties, the removals of uranium mill tailings will be monitored by the Colorado Department of Public Health and Environment to guide and document the excavation. The Department will perform excavation control, provide health and safety guidance and operate the interim storage facility. The Department will document the results of the removal.

DOCUMENTATION MAPS

In Mesa County, maps are generally required for the documentation of radioactive contamination discovered or removed during a Building Permit Survey, information survey or private removal. The Colorado Department of Public Health and Environment will map and document any uranium tailings discovered, disturbed or removed from the communities in western Colorado that were not already mapped., as appropriate.

The map will include the following information in the upper right corner:

Location Number (assigned by the Department)
Street Address, Date, and Name of Surveyor

The map will include a legend with an arrow indicating north. Permanent and semi-permanent reference points, such as structures, streets, driveways, streets, power poles or irrigation ditches, will be drawn on the map.

Shading with cross marking or other appropriate indicators should show areas of radiation contamination. The meter readings for the contamination should be written in the contaminated area. If the area is too small to write in, the meter reading should be indicated by an arrow drawn to the contaminated area.

If a private removal of radioactive contamination occurs, the documentation may include a map showing the conditions of the area after excavation. If the area is large, a range of readings will be shown. The gamma reading and an arrow pointing to the spot will identify areas still demonstrating elevated gamma readings.

