RESOLUTION NO. 167 - 25

A RESOLUTION APPROVING THE INTERGOVERNMENTAL AGREEMENT BY AND BETWEEN CITY OF COLORADO SPRINGS, ON BEHALF OF ITS ENTERPRISE THE COLORADO SPRINGS MUNICIPAL AIRPORT, AND THE PEAK METROPOLITAN DISTRICT NO. 2

WHEREAS, the City Council of the City of Colorado Springs, Colorado ("City Council") is authorized, pursuant to C.R.S. § 29-1-203, to enter into intergovernmental agreements with other governmental entities; and

WHEREAS, the City, by and through its enterprise, the Colorado Springs Municipal Airport (the "Airport"), is the fee owner of certain property located in the City of Colorado Springs and is developing thereon a phased mixed-use commercial development commonly known as Peak Innovation Park (the "Project"); and

WHEREAS, Peak Metropolitan District No. 2 (the "District") has the main purpose of operating and maintaining certain public improvements with the Project, and

WHEREAS, the proposed Maintenance Intergovernmental Agreement (the "IGA"), attached and made a part of this Resolution, provides the terms and conditions by which the District will maintain certain public improvements on behalf of the Airport.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF COLORADO SPRINGS:

Section 1. City Council hereby approves the IGA between Peak Metropolitan District No. 2 and the City, by and through its enterprise, the Colorado Springs Municipal Airport, that sets forth the terms and conditions by which the District will (i) accept responsibility of maintenance for certain existing public improvements; (ii) set forth the method for the District's acceptance of responsibility of maintenance for future public improvements; (iii) identify the scope of the maintenance services to be provided by the District; and (iv) grant the District a non-exclusive license for the District to access such public improvements.

Section 2. On behalf of the City, the Mayor is hereby authorized to execute the IGA.

Dated at Colorado Springs, Colorado this 10th day of November 2025.

Lynette Crow-Iverson, Council President

ATTEST:

Sarah B. Johnson, City Clerk

After recording return to:
McGeady Becher Cortese Williams
Attn: Megan Becher
450 E. 17th Avenue, Suite 400
Denver, Colorado 80203

MAINTENANCE INTERGOVERNMENTAL AGREEMENT

THIS **MAINTENANCE INTERGOVERNMENTAL AGREEMENT** (this "**Agreement**") is made and effective as of this 18th day of November, 2025 ("**Effective Date**"), between and among **PEAK METROPOLITAN DISTRICT NO. 2**, a quasi-municipal corporation and political subdivision of the State of Colorado (the "**District**"), **PEAK METROPOLITAN DISTRICT NO. 1**, a quasi-municipal corporation and political subdivision of the State of Colorado ("**District No. 1**"), **PEAK METROPOLITAN DISTRICT NO. 3**, a quasi-municipal corporation and political subdivision of the State of Colorado ("**District No. 3**" and, collectively with the District and District No. 1, the "**Districts**"), and **CITY OF COLORADO SPRINGS**, a home rule city (the "**City**") and Colorado Municipal Corporation, by and through its enterprise, the Colorado Springs Municipal Airport (the "**Airport**") (the City and the Airport shall be collectively referred to herein as "**COS**") (each a "**Party**" and, collectively, the "**Parties**").

RECITALS

A. COS owns certain real property located in El Paso County, Colorado, and is developing thereon a phased mixed-use business park commonly known as "Peak Innovation Park" (hereinafter referred to as the "**Project**" or "**Property**") and more particularly described on **Exhibit A** attached hereto and incorporated herein by this reference.

B. The Districts were organized pursuant to a Consolidated Service Plan approved by the City Council for the City on August 28, 2018, as amended by that First Amendment to the Consolidated Service Plan approved on February 12, 2019, and as amended by that Second Amendment to the Consolidated Service Plan approved on March 22, 2022 (as it may be further amended or restated from time to time, the "**Service Plan**"), for the purpose of providing certain public improvements and services to and for the benefit of properties within the service area of the District.

C. The Service Plan authorizes the Districts to, among other things, finance and construct certain public improvements, including but not limited to, water, drainage, stormwater, sanitation, street, safety protection, park and recreation, public transportation, and mosquito control improvements as more generally described in the Service Plan (the "**Public Improvements**").

D. The major purpose of District No. 1 and District No. 3 is to finance public improvements to serve the Project, which improvements will be conveyed to COS, or to another appropriate entity for ownership, and the main purpose of the District is to operate and maintain certain Improvements within the service area of the Districts ("**District Improvements**").

E. Pursuant to an Operations and Maintenance Mill Levy Limitation Agreement entered into between and among the Districts effective March 1, 2021 (as may be amended from time to time, the "**Operations Mill Levy IGA**"), the District will act as the "Maintenance District" responsible for managing and providing operation and maintenance of Public Improvements not otherwise accepted by other governing jurisdictions throughout the service area of all the Districts ("**Maintenance Services**") and that it will be necessary for the District to impose an operating mill levy to generate revenues for expenses related to the provision of such Maintenance Services.

F. Both District No. 1 and District No. 3 (collectively, the "**Financing Districts**") have entered into separate Facilities Acquisition and Payment Agreements dated June 22, 2021 and November 30, 2022, respectively (as both may be amended from time to time, the "**Developer FAPA**") with UFCS Airport, LLC, a Colorado limited liability company (including its successors or assigns, the "**District Developer**"), whereby the District Developer agreed, on behalf of District No. 1 and District No. 3, to construct certain of the Public Improvements and fund the associated Construction Costs (as such term is defined in the Developer FAPA) and, to the extent the requirements of the FAPA are met, the District agreed to reimburse the District Developer for the Construction Costs associated with the constructed Public Improvements in accordance with the terms therein.

G. District No. 3 previously entered into that certain Public Improvement Intergovernmental Agreement with COS, dated June July 18, 2023, as may be amended from time to time, to set forth their respective rights, obligations, and procedures with respect to the construction and finance of the Public Improvements within the boundaries of District No. 3 ("**MD 3 Public Improvement IGA**").

H. It is anticipated District No. 1 ("**District No. 1**") and COS may also enter into a Public Improvement Intergovernmental Agreement to set forth their respective rights, obligations, and procedures with respect to the construction and financing of the Public Improvements within the boundaries of District No. 1 ("**MD 1 Public Improvement IGA**" and together with the MD 3 Public Improvement IGA, the "**Public Improvement IGA**").

I. Pursuant to the Public Improvement IGA, District No. 1 and District No. 3 (the "**Financing Districts**"), either directly or with the efforts and cooperation of the District Developer and other Service Providers (as defined in the Public Improvement IGA), may finance and cause or reimburse for the construction and completion of certain Public Improvements for dedication or transfer/conveyance to the appropriate governmental entity.

J. Public Improvements may also be constructed by COS or other entities which may require maintenance within the Property.

K. The District, as the maintenance district, anticipates maintaining certain Public Improvements throughout the Property and pursuant to the terms of this Agreement, after completion and, to the extent applicable, after dedication or transfer/conveyance to the appropriate governmental entity.

L. The current list of the Public Improvements maintained by the District, organized by Construction contract and type of improvement, is set forth on **Exhibit B-1**, attached hereto

and incorporated herein by this reference (the "**Current District Maintained Improvements**"). The general area where the Current District Maintained Improvements are situated is shown in **Exhibit B-2,** attached hereto and incorporated herein by this reference.

M. The District Maintained Improvements will require the District to ensure adequate and appropriate maintenance (as more specifically described herein, the "**Maintenance Services**").

N. Further, for efficiency, the Districts have determined that it would be most efficient and cost-effective for the District to provide and be responsible for all Maintenance Services of the District Maintained Improvements, in accordance herewith.

O. The District requires a license on, over, upon, across and through the Property in order to permit the inspection, maintenance, repair, and replacement of the District Maintained Improvements.

P. COS desires to grant to the District a non-exclusive license to provide for the maintenance of the District Maintained Improvements consistent with the terms and conditions set forth herein.

Q. COS and the District are authorized by Article XIV, Section 18, of the Colorado Constitution and Section 29-1-203, of the Colorado Revised Statutes, as may be amended, to cooperate and contract with each other to provide any function, service or facility lawfully authorized to each.

R. The Parties now desire to set forth their respective rights, obligations and procedures with respect to the ongoing maintenance and repair of the District Maintained Improvements.

NOW THEREFORE, in consideration of the mutual promises and covenants herein contained, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

AGREEMENT

1. **Incorporation of Recitals**. The Parties hereby acknowledge and agree to the Recitals set forth above, which are incorporated herein by this reference.

2. **Purpose**. The purpose of this IGA is to: (i) identify the Current District Maintained Improvements that the District will accept responsibility for providing Maintenance Services for as of the Effective Date of this Agreement; (ii) set forth the method for the District's acceptance of the responsibility for additional District Maintained Improvements in the future ("**Additional District Maintained Improvements**" and, collectively with the Current District Maintained Improvements, the "**District Maintained Improvements**"); (iii) set forth the method for identifying the scope of Maintenance Services to be provided by the District for the District Maintained Improvements; and (iv) to grant and set forth the terms of a non-exclusive license for the District to access the District Maintained Improvements and provide the Maintenance Services.

3. **District Maintained Improvements.**

(a) No Public Improvements shall be deemed District Maintained Improvements unless (i) the improvements are, as of the Effective Date, listed on Exhibit B-1 as Current District Maintained Improvements, or (ii) the improvements have been accepted as Additional District Maintained Improvements in compliance with the process set forth in Section 3.(b) or 3.(c), below. The District agrees to accept responsibility for providing Maintenance Services for the Current District Maintained Improvements as of the Effective Date hereof.

(b) From time to time, the District will consider requests from (1) the Financing Districts, either directly or with the efforts and cooperation of the District Developer in accordance with the Public Improvement IGA, and / or (2) COS, either directly or with the efforts and cooperation of site developers or City enterprises, for the District to accept certain Public Improvements to be added as District Maintained Improvements to be maintained by the District pursuant to the terms hereof ("**Maintenance Request**"). Any Maintenance Request shall be in writing and shall include the information identified on the "**Acceptance Procedures**" set forth on **Exhibit C**, attached hereto and incorporated herein by this reference. The District will memorialize its final acceptance of the Public Improvements for provision of the Maintenance Services by providing COS with a "**Letter of Final Acceptance**" identifying the specific Public Improvements from the Maintenance Request that shall be deemed Additional District Maintained Improvements and the date upon which Maintenance Services will commence. Upon approval by the Board of Directors of the District and issuance of the Letter of Final Acceptance, on the date identified therein, the District shall be deemed to have accepted responsibility for providing Maintenance Services for the District Maintained Improvements identified in any Letter of Final Acceptance. To the extent any District Maintained Improvements are accepted by the District prior to the expiration of any warranty period, the Financing Districts and/or COS agree to cooperate with the District in enforcing, as appropriate and applicable, any repairs that fall under and are repairable under such warranties.

(c) In the event a Financing District executes an agreement with any party for the construction of Public Improvements ("**FD Construction Agreement**"), the Parties agree to timely submit a Maintenance Request for any Public Improvements under such FD Construction Agreement intended to become District Maintained Improvements, and to follow the Acceptance Procedures and negotiate in good faith regarding such Maintenance Request in accordance with the terms hereof.

(d) When the District accepts Additional District Maintained Improvements, Exhibit B-1 and Exhibit B-2, as applicable, shall be updated annually on January 31 by the District and COS to include such Public Improvements. Any updates of Exhibit B-1 or Exhibit B-2 pursuant to this subsection (d) shall not require additional amendments or approvals by the City of Colorado Springs City Council or Board of Directors for the District.

4. **District Obligation to Provide Maintenance Services**. The District shall provide the Maintenance Services in accordance with the standards, scope and criteria for maintenance as appropriate and as more specifically described in **Exhibit D** ("**Maintenance Scope**") and **Exhibit E** ("**Maintenance Standards**"), attached hereto and incorporated herein by this reference. From time to time, the District may engage a third party "Community Manager" as described in

and for the purpose of providing the Maintenance Services. The District shall notify the Airport Business Park Development Director ("**Airport Director**") of any proposed engagement and the Airport Director and the District shall use commercially reasonable efforts to mutually agree upon such Community Manager prior to engagement. The District agrees the Maintenance Services to be provided pursuant to this Agreement shall be performed by individuals or entities having all certifications, registrations or licenses as may be required by applicable local, state, and federal laws governing the particular field of services provided, and who possess the capacity, experience and skill to perform the same, and that in any contract with a service provider, the District shall require that the service provider have a duty to provide the services as would a reasonably prudent person in their same occupation or profession. This Agreement only addresses the District's obligations to provide Maintenance Services for District Maintained Improvements in accordance with the terms hereof and does not create an obligation of the District or any other party to repair (except as set forth in the Maintenance Standards) or replace any of the District Maintained Improvements.

5. **Maintenance of Stormwater Facilities**. Maintenance Services shall include compliance with the City's stormwater regulations, the City Drainage Control Manual, as currently written or as may be amended in the future, the City's CDPS Permit COS000004 for Stormwater Discharges Associated with Separate Storm Sewer Systems (also known as the "**MS4 Permit**"), and the City's relevant standard operating procedures, including but not limited to the one attached hereto as **Exhibit E** and **Exhibit F** and made a part hereof, as currently written and as may be amended in the future (collectively the "**Stormwater Regulations**").

6. **Grant of License**. Subject to the terms and conditions hereof, COS hereby grants, bargains, sells, and conveys to the District, its employees, agents, contractors, subcontractors, and successors and assigns a revocable, non-exclusive license (the "**License**") in, to, through, over, under, and across the Property for a term of twenty-five (25) years, in accordance with the Charter of the City of Colorado Springs § 10-60, in order to permit the inspection and maintenance, via provision of the Maintenance Services, of the District Maintained Improvements. Should the license be revoked or the term of the license lapse without a renewal, the District's Maintenance Obligations shall be suspended until and unless a new license is granted by COS. COS is authorized to grant future licenses to the District in anticipation of the termination of the License term under the same conditions set forth in this Agreement without requiring additional City Council approval. COS reserves the right to use and occupy the Property and the right to grant further licenses and easement interests to other grantees so long as such interests and uses do not materially or unreasonably interfere with the rights and obligations of the District, its employees, agents, contractors, subcontractors, and successors and assigns. When the underlying property of a Public Improvement is not within the Property and Airport is unable to secure access that benefits the District, access to District Maintained Improvements shall be secured by the District by separate instrument. If neither the District nor the airport is able to secure access as may be required by this Section, the District may decline to accept responsibility for maintenance of the applicable Public Improvement.

7. **Failure to Maintain**. In the event COS determines that the District is not performing the Maintenance Services in a manner consistent with the Maintenance Standards, COS may provide written notice to the District. The notice shall specify in reasonable detail the basis for COS's determination and shall allow the District thirty (30) days after receipt of the notice

to cure (the "**Cure Period**"); provided, however, if the nature of the breach is such that it cannot reasonably be cured within thirty (30) days, the Cure Period shall be deemed extended for a reasonable period of time not to exceed sixty (60) days in the aggregate, so long as the District has, prior to the end of the original Cure Period, (i) delivered written notice to COS setting forth the District's plan to remedy such breach, and (ii) commenced in good faith and with due diligence to cause such breach to be remedied within sixty (60) days. If the District does not cure (or cause the cure of) the breach within the Cure Period, then, COS shall be entitled to cause the necessary cure by providing written notice to the District of COS's election to cause the necessary maintenance and repairs (the "**Maintenance and Repair Notice**"). The undertaking of maintenance and repair by COS shall not constitute an assumption of the District's obligations under this Agreement, and the District shall remain responsible for the costs and ongoing provision of the Maintenance Services. If COS delivers a Maintenance and Repair Notice, it may undertake the necessary repairs and maintenance and shall be reimbursed for the costs thereof by the District. COS's sole reimbursement rights shall be pursuant the terms hereof for certain verified actual out-of-pocket third-party costs incurred by COS or the party causing the maintenance and repairs identified in a Maintenance and Repair Notice.

8. **Subjacent and Lateral Support**. The Parties and their respective successors and permitted assigns shall not take any action which impairs the lateral or subjacent support of the other Party's property, improvements, facilities and/or structures.

9. **Permits and Licenses**. The District will, at its sole cost, obtain all necessary permits, licenses, or other authorization required in performance of the maintenance. Except in the case of an emergency, the District will provide 48 hours written notice to COS prior to conducting any non-routine maintenance work, including, but not limited to, digging or disturbance of soils, or other actions likely to interfere with the use of the Property.

10. **Insurance**. While providing the Maintenance Services pursuant to this Agreement, the District shall procure and maintain, and shall require on of its service providers, contractors or agents who perform the Maintenance Services to procure and maintain the following insurance coverages:

(a) Liability Insurance Coverage.

(i) Workers' Compensation Insurance. A Workers' Compensation Insurance Policy in form and substance reasonably acceptable to the District and in an amount not less than the statutory benefits, including Employer's Liability Insurance with limits of liability of not less than $1,000,000.

(ii) Commercial General Liability Insurance. A Commercial General Liability Insurance Policy written on an occurrence basis, in form and substance reasonably acceptable to the District, which policy shall include, without limitation, the District as an additional insured, a waiver of subrogation endorsement in favor of the District, cross liability and severability of interest endorsements, endorsements providing that the coverage afforded by the insurance policy or policies is primary and non-contributing with any other insurance maintained by or available to the District, and appropriate language providing the following coverages: Premises and Operations Liability; Personal Injury Liability; Broad Form Property Damage

Liability; Contractual Liability supporting the Consultant's indemnification agreements in favor of the District; Completed Operations and Products Liability; and Independent Contractor's Protective Liability. The Commercial General Liability Insurance Policy must be written with a combined single limit of liability of not less than $1,000,000 for each occurrence of bodily injury and/or property damage and an annual aggregate of liability of not less than $2,000,000 for bodily injury and/or property damage, and an annual aggregate of liability of not less than $2,000,000 for Completed Operations and Products Liability.

(iii) Automobile Liability Insurance. An Automobile Liability Insurance Policy written on a per accident basis, in form and substance reasonably acceptable to the District. The Automobile Liability Insurance Policy must provide coverage for all owned, hired, rented and non owned automobiles, and must include uninsured motorist coverages. The Automobile Liability Insurance Policy must be written with a combined single limit of liability of not less than $1,000,000 for each accident for bodily injury and/or property damage.

(iv) Excess Liability Insurance. An Excess Liability Insurance Policy written in excess of the coverages provided by the insurance policies described in the preceding Subsections (a)(i) - (iii), in form and substance reasonably acceptable to the District, which policy will include the District as additional insured. The Excess Liability Insurance Policy must be written with a combined single limit of not less than $1,000,000 for each occurrence of bodily injury/or property damage and annual aggregate.

(b) The District and any provider of the Maintenance Services shall list COS as an additional insured on any such policies and shall, upon reasonable request of COS, request and provide certificates of insurance to COS.

11. **Title; Inurement**. COS covenants that it has full legal right and lawful authority to make the grant herein contained and further covenants that it will warrant and forever defend the License in the quiet and peaceable possession of the District and its successors and assigns. Each and every one of the benefits and burdens of this Agreement shall inure to and be binding upon the parties, their respective legal representatives, heirs, administrators, successors and assigns.

12. **Annual Appropriations**. The Parties understand and acknowledge that the District and COS are subject to Article X, Section 20 of the Colorado Constitution ("**TABOR**"). The Parties do not intend to violate the terms and requirements of TABOR by the execution of this Agreement. It is understood and agreed that this Agreement does not create a multi-fiscal year direct or indirect debt or obligation within the meaning of TABOR and therefore, notwithstanding anything in this Agreement to the contrary, any financial obligations of COS and the District contained herein that are payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted and otherwise made available on an annual basis. Financial obligations of the Parties payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted and otherwise made available. Upon failure to appropriate such funds, this Agreement may be terminated.

13. **Governmental Immunity**. The Parties intend that nothing herein shall be deemed or construed as a waiver by either Party of any rights, immunities, limitations, or protections

afforded to them under the Colorado Governmental Immunity Act (Section 24-10-101, C.R.S., et seq.) as now or hereafter amended or otherwise available at law or equity.

14. **Notices**. All notices, demands, requests or other communications to be sent by one Party to the other hereunder or required by law shall be in writing and shall be deemed to have been validly given or served by delivery of same in person to the addressee or by courier delivery via FedEx or other nationally recognized overnight air courier service, by electronically-confirmed email transmission, or by depositing same in the United States mail, postage prepaid, addressed as follows:

To District:	Peak Metropolitan District No. 2 c/o McGeady Becher P.C. 450 East 17th Avenue, Suite 400 Denver, CO 80203-1254 Phone: 303-592-4380 Email: legalnotices@specialdistrictlaw.com
To COS:	City of Colorado Springs c/o Business Park Development Director 30 S. Nevada Ave., Suite 604 Colorado Springs, Colorado 80903 Attn: Troy Stover E-mail: Troy.Stover@coloradosprings.gov
With a copy to:	Office of the City Attorney 30 South Nevada Avenue, Suite 501 Colorado Springs, Colorado 80901 Attn: Caitlin Moldenhauer E-mail: caitlin.moldenhauer@coloradosprings.gov

All notices, demands, requests or other communications shall be effective upon such personal delivery, one (1) business day after being deposited with FedEx or other nationally recognized overnight air courier service, on the date of transmission if sent by electronically-confirmed email transmission, or three (3) business days after deposit in the United States mail. By giving the other Party hereto at least ten (10) days' written notice thereof in accordance with the provisions hereof, each of the Parties shall have the right from time to time to change its address or contact information.

15. **Assignment**. Neither COS nor the District shall assign their rights or delegate their duties hereunder without the prior written consent of the other Party.

16. **Term**. This Agreement shall continue in full force and effect until all obligations hereunder are satisfied unless otherwise terminated by mutual written consent of the Parties.

17. **Relationship of the Parties**. Nothing contained in this Agreement will be construed or interpreted as making the Parties joint venturers or partners. By executing this

Agreement, no Party shall be deemed to assume any liability for intentional or negligent acts, errors, or omissions of the other Party or any officer or employee thereof. No agent, employee or volunteer of any Party shall be deemed an agent, employee or volunteer of the other Party under this Agreement. No Party shall have any authority to make any agreements or representations on the other's behalf.

18. **Parties Interested Herein**. Nothing expressed or implied in this Agreement is intended or shall be construed to confer upon, or to give to, any person other than the District and the COS any right, remedy, or claim under or by reason of this Agreement or any covenants, terms, conditions, or provisions thereof, and all the covenants, terms, conditions, and provisions in this Agreement by and on behalf of the District and the COS shall be for the sole and exclusive benefit of the District and the COS.

19. **Default/Remedies**. In the event of a breach or default of this Agreement by either Party, the non-defaulting Party shall be entitled to exercise all remedies available at law or in equity. In the event of any litigation, arbitration or other proceeding to enforce the terms, covenants or conditions hereof, the prevailing Party in such proceeding shall obtain as part of its judgment or award its reasonable attorneys' fees.

20. **Governing Law and Jurisdiction**. This Agreement shall be governed and construed under the laws of the State of Colorado. Venue for any legal action relating to this Agreement shall be exclusive to the State District Court in and for the County of El Paso, Colorado.

21. **Inurement**. Each of the terms, covenants and conditions hereof shall be binding upon and inure to the benefit of the Parties hereto and their respective permitted successors and assigns.

22. **Integration**. This Agreement constitutes the entire agreement between the Parties with respect to the matters addressed herein. All prior discussions and negotiations regarding the subject matter hereof are merged herein.

23. **Severability**. If any covenant, term, condition, or provision under this Agreement shall, for any reason, be held to be invalid or unenforceable, the invalidity or unenforceability of such covenant, term, condition, or provision shall not affect any other provision contained herein, the intention being that such provisions are severable.

24. **Counterparts**. This Agreement may be executed in one or more counterparts, each of which shall constitute an original and all of which shall constitute one and the same document.

25. **Paragraph Headings**. Paragraph headings are inserted for convenience of reference only.

26. **Amendment**. This Agreement may be amended from time to time by agreement between the Parties hereto; provided, however, that no amendment, modification, or alteration of the terms or provisions hereof shall be binding upon the District or COS unless the same is in writing and duly executed by the Parties hereto.

[SIGNATURE PAGE FOLLOWS]

[SIGNATURE PAGE OF MAINTENANCE INTERGOVERNMENTAL AGREEMENT]

IN WITNESS WHEREOF, the parties have executed this Maintenance Intergovernmental Agreement as of the date first set forth above.

CITY OF COLORADO SPRINGS, COLORADO, a home rule city and Colorado municipal corporation, by and through its enterprise, the Colorado Springs Municipal Airport

Blessing A. Mobolade, Mayor

Date: 11-18-2025

Attest:

City Clerk

By:

Troy Stover, Business Park Development Director

APPROVED AS TO FORM:

PEAK METROPOLITAN DISTRICT NO. 2, a quasi-municipal corporation and political subdivision of the State of Colorado

By: COUNTERSIGNED

Garrett Baum, President

Attest:

COUNTERSIGNED

Secretary

[SIGNATURE PAGE OF MAINTENANCE INTERGOVERNMENTAL AGREEMENT]

IN WITNESS WHEREOF, the parties have executed this Maintenance Intergovernmental Agreement as of the date first set forth above.

CITY OF COLORADO SPRINGS, COLORADO, a home rule city and Colorado municipal corporation, by and through its enterprise, the Colorado Springs Municipal Airport

COUNTERSIGNED

Blessing A. Mobolade, Mayor

Date: _____

Attest:

COUNTERSIGNED

City Clerk

By: COUNTERSIGNED

Troy Stover, Business Park Development Director

APPROVED AS TO FORM:

COUNTERSIGNED

PEAK METROPOLITAN DISTRICT NO. 2, a quasi-municipal corporation and political subdivision of the State of Colorado

By: _____

Garrett Baum, President

Attest:

Secretary

EXHIBIT A
PROPERTY / PROJECT


PEAK INNOVATION PARK
PEAK METROPOLITAN DISTRICT NO.2
OPERATIONS AND MAINTENANCE
As Of March 2025
LEGEND
Milton E. Proby Pky
S. Powers Blvd
Integration Loop
Peak Innovation Pky
Bud Bracker Blvd
Embraer Heights
Tech View
Logistics Point
Integration Loop
Grinnell Blvd
Integration Loop
S. Powers Blvd
Google Earth
Image Landsat / Copernicus

EXHIBIT B-1

CURRENT LIST OF PUBLIC IMPROVEMENTS BY CONTRACT AND TYPE OF IMPROVEMENT

Exhibit B-1 Peak Innovation Park - Maintenance IGA

Ownership and Maintenance of Public Improvements

Category	Inclusions	Ownership	Maintenance Responsibility
Street Improvements - Asphalt, Curb & Gutter, Splash Block, Stormwater Infrastructure (inlets, manholes, pipes), Median Nosing Concrete, Regulatory Signage & Striping (1)			
	Milton E Proby Pkwy (East of Powers Blvd)	COSA	COSA
	Powers Blvd	CDOT	CDOT
	Peak Innovation Pkwy	COSA	PMD2
	Integration Lp	COSA	PMD2
	Grinnell Blvd (North of Powers Blvd)	COSA	PMD2
	Summit Edge Vw	COSA	PMD2
	Aljor Pt	COSA	Adjacent Property Owners
	Enertia Pt	COSA	PMD2
	Embraer Hts	COSA	PMD2
	Bud Breckner Blvd	COSA	PMD2
	Old Drennan Rd (Bud Breckner Blvd to Milton E Proby Pkwy access road)	COSA	PMD2
	Tech Vw	COSA	PMD2
	Logistics Pt	COSA	PMD2
Street Lighting (2)			
	Milton E Proby Pkwy (East of Powers Blvd)	COSA	COSA
	Powers Blvd	CDOT	CDOT
	Peak Innovation Pkwy - old CSU standard Street Lights	CSU	CSU
	Peak Innovation Pkwy - new District Street Lights	COSA	PMD2
	Integration Lp	CSU	CSU
	Grinnell Blvd (North of Powers Blvd)	CSU	CSU
	Summit Edge Vw	COSA	PMD2
	Aljor Pt	COSA	Adjacent Property Owners
	Enertia Pt	COSA	PMD2
	Embraer Hts	CSU	CSU
	Bud Breckner Blvd	CSU	CSU
	Tech Vw	COSA	PMD2
	Logistics Pt	CSU	CSU
Traffic Signals (3)			
	Powers Blvd & Milton E Proby Pkwy	CDOT	CDOT
	Powers Blvd & Grinnell Blvd	CDOT	CDOT
	Milton E Proby Pkwy & Peak Innovation Pkwy	COCS	COCS
	Integration Lp & Grinnell Blvd	COCS	COCS
	Grinnell Blvd & Amazon Private Drives	COCS	COCS
Sidewalks/Landscaping/Irrigation/Site/Common Area Features (4,5)			
	Milton E Proby Pkwy (East of Powers Blvd) landscaping & irrigation	COSA	COSA
	Powers Blvd landscaping & irrigation	CDOT	CDOT
	Parkway Strips landscape and irrigation between curb and sidewalk and inside Medians within District Maintained Streets	COSA	PMD2
	Open Spaces within Initial Maintenance Area per Exhibit B-2 (6)	COSA	PMD2
	Airport Fence, Access Road, and any/all aviation equipment	COSA	COSA
Detention Ponds/Drainage (7)			
	Drainage swales, Ponds, and othe Permanent Stormwater Management Features within Initial Maintenance Area per Exhibit B-2	COSA	PMD2
Wet Utilities			
	Water Mains, Hydrants, PRVs, Air Vacs, and othe Appertunances	CSU	CSU
	Sanitary Sewer Mains, Force Mains, Lift Stations (8), and other Appertunances	CSU	CSU

Dry Utilities			
	Primary Electric Conduit, Cabling, Transformers, Switch Cabinets, Vaults, and other Appertunances not owner/maintained by a private developer	CSU	CSU
	Gas piping, valves, reg stations, and other Appertunances not owned/maintained by a private developer	CSU	CSU
	Telecommunications conduit, cabling, pedestals, and other Appertunances not owned/maintained by a private developer	Utility Provider	Utility Provider

Notes:

(1) Maintenance includes asphalt and concrete/curb & gutter removal and replacement/patching and repair, roadway striping, regulatory signage repair and replacement, snow removal Drive Aprons into private development sites by adjacent property owner

(2) Maintenance includes lamp and luminaire replacement, straightening and repainting of poles, electrical charges

(3) Maintenance includes lamp and luminaire replacement, straightening and repainting of poles, electrical charges, pole and mast arm mounted regulatory signage

(4) Maintenance includes concrete grinding, removal and replacement, snow removal

(5) Maintenance includes mowing, weeding, fertilization, pesticide application, plant material replacement, irrigation repairs, controller programming, electrical and irrigation water charges

(6) District will mow future development sites contiguous to open space tracts until sold or leased for development

(7) Maintenance includes repairs and replacements of drainage structures, removal of silt and debris

(8) Maintenance of Lift Stations includes landscaping, access roads, fencing, and drainage features serving the facility

Legend:

COSA	Colorado Springs Airport
PMD2	Peak Metropolitan District No. 2
COCS	City of Colorado Springs
CSU	Colorado Springs Utilities
CSDOT	Colorado Department of Transportation

EXHIBIT B-2

DEPICTION OF AREA WHERE DISTRICT MAINTAINED IMPROVEMENTS ARE SITUATED

PEAK INNOVATIO

PEAK METROPOLITAN DIST

OPERATIONS AND MAINTENA

EXHIBIT

AS OF MARCH 2025

EXHIBIT C

ACCEPTANCE PROCEDURES

Any Maintenance Request shall address the following requirements:

1. Any Public Improvements proposed to be Additional District Maintained Improvements, will only be considered for provision of Maintenance Services after installation and construction has been completed, after initial acceptance has been acknowledged in writing by any applicable governing jurisdiction with oversight of such Public Improvements, and such Public Improvements have, as applicable, been conveyed to and acquired by COS for perpetual ownership. Evidence of such initial acceptance and ownership, and assurance that there are no outstanding liens or statements of claim relative to the proposed Additional District Maintained Improvements must be provided in any Maintenance Request.

2. The District shall be entitled to conduct a site inspection of the Public Improvements, review the required documentation for conformance with construction standards and Maintenance Standards. The District shall notify COS of identified deficiencies, if any, which will need to be corrected prior to the District's acceptance for provision of Maintenance Services. Upon the correction of deficiencies, the District shall request a re-inspection and letter stating that all deficiencies identified were corrected in a reasonably satisfactory manner. In order to preclude additional items being added to the deficiency list, deficiencies shall be completed within ninety (90) calendar days of the date of the Initial Acceptance Letter.

3. Upon completion or correction of the deficiencies, the District will memorialize its final acceptance of the Public Improvements identified therein for provision of the Maintenance Services by providing COS with a Letter of Final Acceptance identifying the accepted Additional District Maintained Improvements.

EXHIBIT D

MAINTENANCE SERVICES SCOPE AND CRITERIA

EXHIBIT D

MAINTENANCE SERVICES SCOPE AND CRITERIA

Common Area Maintenance Category	Scope of Work or Activities	Standard or Specification
Turf Maintenance and Mowing – Non-Native Turf Areas	▪ Road frontages and rights-of-way ▪ Entries and Medians ▪ Parks ▪	▪ Weekly mowing ▪ Pesticide and herbicide application ▪ Disease treatment as required ▪ Damaged turf restoration and reseeding, re-sodding as required ▪ Winter watering as needed ▪ Aeration as required
Turf Maintenance and Mowing – Native Turf Areas	▪ Road frontages and rights-of-way ▪ Entries and Medians ▪ Parks ▪ Outlots & Drainageways	▪ Semi-annual mowing ▪ "Beauty Band" mowing along sidewalks and roadways: 10' at trails and 30' at undeveloped parcels abutting roadways. Native grass height not to exceed 18" in beauty band areas. ▪ Pesticide and herbicide application ▪ Disease treatment as required ▪ Damaged turf restoration and reseeding as required ▪ Noxious weed management
Maintenance and Mowing - Open Space	Areas defined on the land use plan as Open Space	▪ Mowing will need to occur mid-September to October ▪ Mowing should be done on a rotation pattern; Cut every other year ("half one year the other half the next") ▪ Mower height should be no lower than six inches to the ground ▪ Clean mowing equipment prior to mowing open space to prevent invasive species ▪ Noxious weed management
Tree and Shrub Maintenance	▪ Road Frontages and rights-of-way ▪ Entries and Medians ▪ Parks ▪ Outlots & Drainageways	▪ Planting and dead material replacement as needed ▪ Pruning as needed ▪ Pesticide and herbicide application ▪ Disease treatment as required ▪ Fertilization ▪ Winter watering as needed

Pest Control	▪ Entire Property (Excluding developed building sites)	▪ Inspect for and treat for pests: Rabbits, Voles, Snakes, Prairie Dogs ▪ Includes coordination and acquisition of permits as required
Irrigation System Maintenance	▪ All turf and grass areas ▪ All tree and shrub plantings ▪ All planting beds ▪ All parks ▪ Outlots & Drainageways	▪ System inspection, pressurization, and repairs in early spring ▪ System inspected, drained, and winterized late Fall-early Winter ▪ Constant inspection of controls, monitoring, and repair of system to ensure leaks and damages immediately identified and repaired within 24-hour period during irrigation season ▪ Repairs and replacements ▪ Central Control System monitoring and maintenance
Annual and Perennial Plantings and Planter Beds	▪ Road frontages and beds in rights-of-way ▪ Entries and medians ▪ Parks	▪ Acquisition and installation of annual plantings ▪ Late Winter/Spring bed preparation and soil amendments ▪ Planting schedule and spacing ▪ Mulching (bark and/or rock) ▪ Maintenance, weeding, weekly dead-heading ▪ Fertilization, disease control ▪ Annual plant removal and planter bed winterization ▪ Perennial plant replacement as required
Litter Control	▪ Road frontages and rights-of-way ▪ Entries and Medians ▪ Parks ▪ Outlots & Drainageways ▪ Undeveloped properties	▪ Weekly inspection and collection, year-round. ▪ All trash receptacles in Common Area (enclosures, parks, along all sidewalks and walkways, parks) empty and re-bag as needed. Frequency TBD ▪ Biweekly removal of Bulk Trash items throughout the District. Ex: tires, couches, mattresses, etc.
Signage	▪ Community and regulatory signs ▪ Road frontages and rights-of-way ▪ Entries and medians ▪ Parks	▪ Coordination with Community Manager ▪ Cleaning and straightening of regulatory signs ▪ Lighting maintenance as required ▪ Repainting as required

	▪ Outlots & Drainageways	▪ Vinyl text replacement as required ▪ Removal of non-complying signage within one week
Lighting Systems	▪ Community light poles and fixtures (non-CSU maintained), uplights at signs and retaining walls ▪ Pedestrian lighting ▪ Landscape lighting in Common Areas	▪ Weekly inspections and re-lamping within two weeks ▪ Repairs to circuit and line breaks, repair or replacement of damaged conduits and fixtures within one week ▪ Management and supervision of subcontractors for repairs and replacements
Holiday Lighting	▪ Select entries and medians ▪ Community Signage ▪ Selected beds and plantings	▪ Acquisition and storage of lighting ▪ Installed prior to November 1st of each year for lighting commencing November 1 and ending January 3rd Removal and storage by second week of January. Weekly inspection and maintenance to be in constant working condition during holiday lighting period
Utility Fixtures and Structures	▪ Transformers, switch cabinets, junction boxes, irrigation control boxes, telephone pull boxes within Common Area	▪ Coordination within utility companies to repair or remove damaged facilities or facilities not-in-service
Ponds & Storm Drainage	▪ Ponds and Drainageways	▪ Coordination with Community Manager ▪ Quarterly inspection and removal of trash and debris. ▪ Cleaning of trickle channels, inlet and outlet structures as needed, based on Quarterly Inspections ▪ Semi Annual weeding of pond areas to remove non-native plants ▪ Sediment and silt removed as needed to avoid siltation and standing water in drainage ways, ponds and adjacent low spots, based on Quarterly Inspections ▪ Follow City of Colorado Springs Stormwater Enterprise Operations and Maintenance Program for permanent control measures

		▪ Coordinate with Airport Environmental Specialist for submittal of Pond maintenance and inspection forms
Site Facilities and Amenities: Shelters	▪ Along Roadways ▪ Common Area ▪ Ponds and Drainageways	▪ Cleaned and power washed as needed to be kept clean at all times especially following periods of dust, rain or snow ▪ Swept and cleaned (benches, tables and floors) as needed, to be kept clean at all times ▪ Lighting and electrical systems to be in working order at all times ▪ Inspect weekly and repair as needed- manage and supervise subcontractor repairs and replacements ▪ Painting as needed ▪ Trash emptied ▪ Graffiti control as needed within two weeks of identification
Site Facilities and Structures: Concrete Sidewalks	▪ Along all Roadways ▪ Within all Parks, Outlots and Drainageways	▪ Kept clean and free of debris, dirt, snow, standing water and irrigation run-off at all times ▪ Inspected year-round, on a weekly basis ▪ Community Manager to be notified immediately of any needed repairs or maintenance ▪ Management and supervision of subcontractors for repairs and replacements to ensure no tripping hazards ▪ Management and supervision of subcontractors for installations required for drainage to eliminate standing water or irrigation run-off across walkways ▪ Failed or damaged sections to be Identified and Community Manager to be notified of required repairs and replacements
Site Facilities and Structures: Fences	▪ CDOT Fencing ▪ Fall Protection at Drainage Structures	▪ Maintained in a rust-free condition and in good repair with repairs within 2 weeks of any damage

	▪ Fencing at Retaining Walls within Common Area, Ponds and Drainageways	▪ Painted according to established schedule, no more than yearly
Site Facilities and Structures: Retaining Walls	▪ Common Areas ▪ Parks ▪ Drainageways	▪ Inspected regularly, Community Manager to be notified of any needed repairs ▪ Graffiti control as needed within two weeks of identification
Parking Lots, Private Drives within Common Areas	▪ Common Areas ▪ Parks ▪ Drainageways	▪ Swept, maintained in a clean and debris-free condition at all times, including cleanout of drains and inlets ▪ Crack sealing and patching as needed, Light fixtures in constant working order at all times, with inspection and management of subcontractor to Contractor for lighting repairs
Site Furnishings	▪ Benches ▪ Trash Receptacles ▪ Disk Golf Equipment ▪ Picnic Tables	▪ Maintained in constant state of cleanliness and repair, inspected weekly and cleaned, as required ▪ Community Manager to be immediately notified of any needed repairs and replacements
Snow Removal	▪ Parking Lots, Sidewalks and Drives within Common Area, Parks and Drainageways ▪ Roadways within the Project to be Identified	▪ During the day and/or night when accumulation meets standards and specifications as needed during winter season
General Oversight and Supervision of Contractors Engaged By Community Manager	▪ As determined for replacements and repairs by contractors engaged directly by Community Manager. May include: signage repairs and replacements, lighting fixture repairs and replacements, sidewalk repairs, retaining wall repairs, parking lot repairs	▪ Field inspection of work-in-progress and completed work, verification of work invoiced by contractor

Annual Budgets and Quarterly Updates		▪ Grounds Report at regular Board Meetings in writing or in person if requested by Board

EXHIBIT E

MAINTENANCE SERVICES STANDARDS

EXHIBIT E

MAINTENANCE STANDARDS

Furnish all labor, materials, equipment, and perform all operations necessary for ongoing maintenance of the project as specified herein, subject to the conditions of the contract and as required by the proposed design. Scope of this section includes, but is not limited to:

A. Provide complete landscape and irrigation maintenance along with litter control and snow removal of Common Areas and undeveloped building sites.
B. Keep all landscaped areas in a healthy and neat condition beginning in April, and ending in October. During the peak season (May through September), turf mowing shall be a minimum of once weekly unless more frequent mowing is required.
C. Include watering, fertilization, pruning, weeding, herbicide applications, bed cultivation, flower dead-heading, lighting maintenance, sidewalks and soft surface trails safe and clear of hazardous materials, mulching, mowing, edging, and litter removal in landscaped areas. Also include inspection, adjustment, and ongoing repairs of irrigation system to avoid loss of plant material.
D. Coordinate maintenance activities with the Community Manager and other contractors to assure a minimum amount of inconvenience to existing tenants and park operations.
E. Provide general clean-up to include the removal of trash and products of maintenance.
F. Provide reports of maintenance activities as requested by the Community Manager.

SCHEDULE

A. Landscape maintenance operations shall occur Monday through Friday during normal business hours, or as scheduled with the Community Manager.
B. Snow removal shall be on an as-needed basis.

ADDITIONAL WORK

A. Work beyond this scope, which becomes necessary during the contract period, will be authorized by a separate agreement.
B. Work requiring a separate proposal will include, but not be limited to the following:
    1. Irrigation system repairs other than normal system servicing as determined by Community Manager.
    2. Erosion repair.
    3. Field mowing (with shredder).
    4. Field mowing (with flail mower).
    5. Staking or guying trees.
    6. Additional pest control.
    7. Change lamps in landscape lights.
    8. Bulb planting.
    9. Additional mulch as needed to level or maintain shrub beds.
    10. Removal and replacement of dead plant materials not under installation warranty.
    11. Soil amendment and mulch replacement within planting beds.
    12. Weeding of landscaped areas to eliminate weeds and non-native plants.
    13. Fungicide and similar issues requiring special treatment.
C. The Community Manager is not bound by the specifications or contract to utilize the landscape maintenance contractor in the performance of additional work.

CONTRACTORS PERFORMANCE

A. The Contractor's workmen shall be neat in appearance, perform their work in a professional manner and keep noise to a minimum. The Contractor's presence shall be as low profile as possible to limit the impact on end users.
B. The Contractor shall provide proper identification at all times for landscape maintenance vehicles and labor force. Contractor's workman shall wear hats, and safety vests displaying the company name and/or logo and carry company photo identification at all times.
C. The purpose of this maintenance guideline is to provide the Contractor with a protocol that will assist in providing the Community Manager with an elevated level of service. Where the manual refers to "as-needed" or "as-required" the intent is for the contractor to perform the services necessary to maintain the property at the highest possible quality level. Nothing contained here shall be interpreted as relieving the contractor of his responsibility to perform the work in a professional manner and to the complete satisfaction of the Community Manager.
D. If disputes arise as to the quality of the services performed, the Community Manager shall make the final determination of Contractor's responsibilities.

DAMAGE, NEGLECT AND VANDALISM

A. The Contractor is responsible for repairing any damage that results from the maintenance operations. Turf, trees or plants that are damaged or killed due to the Contractor's operations, negligence or chemicals shall be replaced to Community Manager' satisfaction and at no cost to the District. If plant damage or death is caused by conditions beyond the Contractor's control, replacement shall be as directed by the Community Manager.
B. Contractor to locate and identify all existing public and private underground and overhead services and utilities within all contract limit work areas. If needed during maintenance operations, notify all utility providers and request on-site locational verification (including depths). Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during maintenance operations at Contractor's expense.
C. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities. Avoid erosion of soils and comply with **all** requirements of regulatory agencies.
D. Protect existing paving, and other services or facilities on site and adjacent to the site from damage caused by maintenance operations. Cost of repair and restoration of damaged items at Contractor's expense.
E. Protect and maintain public and private roadway, park and pedestrian lighting not otherwise maintained by others.
F. Trees girdled by line trimmers, mowers, or maintenance operations will be replaced by the contractor promptly and at the Contractors expense.
G. Irrigation facilities or structures that are damaged due to the Contractor's operations must be replaced by the Contractor promptly. Likewise, damage to the irrigation system by others shall be corrected immediately by the Contractor, subject to Community Manager's authorization.
H. Water damage resulting from Contractor's negligence shall be corrected at the Contractor's expense.
I. Chemical or mechanical damage caused by maintenance operations will be repaired at the Contractor's expense. Chemical manufacturer recommendations will supersede in event of discrepancy.

Damage to, or theft of, landscaping and irrigation installations not caused or allowed by the Contractor shall be corrected by the Contractor upon receipt of written authorization from the Community Manager.

PERIODIC REVIEWS

A. The Community Manager will make random inspections to determine the quality of service performed. The Community Manager will make the final determination of quality and satisfactory grounds maintenance under this contract.
B. If at any time in the Community Manager's judgment the quality is deficient, immediate action shall be taken by Contractor to correct the deficiency at no additional charge to the Community Manager.

SOIL ANALYSIS

A. Contractor shall collect representative soil samples of selected areas as directed by the Community Manager in mid-June and send them to an approved soil testing laboratory. The laboratory shall identify deficiencies and recommend trace element applications. These are to be logged and emailed to the Community Manager.

EMERGENCIES

A. Contractor shall answer emergency or complaint calls within twelve (12) hours and corrective action shall commence within one (1) hour.
B. Contractor shall answer emergency calls regarding the landscape irrigation system failure or need of repair, and take corrective action within 24 hours. Such work, unless caused due to neglect on the part of Contractor, shall be considered "Extra Services".
C. Direct contact numbers are required for emergency situations, call answering services are not adequate and unacceptable.

SUBMITTALS

A. Schedule of maintenance Operation/Monthly Status Report: In accordance with good maintenance standards and practices, including those specific practices set forth below and all applicable codes, laws and regulation, perform any and all work necessary to promote and maintain the healthy growth and attractive appearance of plant materials, walkways, structures, and lighting. Contractor shall provide a Schedule of Maintenance Operations and a monthly status report. The report is due to the Community Manager on the first working day of each month. Report shall include, but not be limited to, the following:

1. Name of maintenance foreman or person filing report.
2. Period covered by report and other noteworthy or key dates.
3. All work performed and completed to date and projected work for the next month.
4. Synopsis of weather conditions for the month noting extremes in wind, rain, temperatures, etc.
5. Application of all agricultural chemicals and fertilizers used on site including type, rates, purpose for applications, and results of application.
6. List of all maintenance equipment used on site.
7. Condition of plant material specifically noting physical abnormalities related to temperature, moisture, insects, disease, poor drainage, death and replacement, etc.
8. Include any and all reports of recommendations by outside or consulting agencies.
9. Report any and all vandalism including graffiti.

PROJECT CONDITIONS

A. Site Visit:
   1. At monthly intervals during the growing season, visit and walk the site with the Community Manager to clarify scope of work and understand existing project/site conditions.

B. Documentation of conditions:
    1. Document general condition of existing trees, shrubs, vines, groundcovers, and lawn, recording all plant materials which are damaged or dying, if any.
    2. Inspect the condition of all sidewalks, soft surface trails, retaining walls, amenities, site furnishings, etc., and record those items in need of repair or replacement.
C. Irrigation system:
    1. Document condition of existing irrigation systems, making sure that faulty electrical controllers, broken or inoperable sprinkler heads or emitters are reported. Logs for large breaks or leakage regarding irrigation water are to be kept and submitted to the Community Manager for reporting to the utility company.

IRRIGATION SYSTEM

A. All material used in the repair of the irrigation system shall be equal to materials used in the original installation, new, and in perfect condition and in compliance with irrigation water usage guidelines established by the City and utility company.
B. All replacement irrigation heads will be the same model from the same manufacturer as those being replaced.

MATERIALS

Materials listed under this section are recommended for use but this does not prohibit or restrict the Contractor from providing other approved materials not listed (subject to Community Manager review and approval) in order to complete the work herein. All materials shall be new and in perfect condition at time of use and/or installation.

A. General: All materials and equipment, unless otherwise indicated, shall be provided by the Contractor.
B. Water: Clean, fresh.
C. Lawn Fertilizers:
    1. Dry, granular, or liquid material with a ratio of 4 nitrogen: 1 phosphorus: 3 potassium with 70-75% sulfur coated urea (SCU) as the source of nitrogen shall be applied for the first two (2) applications. Ammonium sulfate, NH4SO4, (21-0-0) shall be applied as late season fertilization or product recommended by a state qualified supervisor. Product shall be and dispensed as prescribed by the manufacturer.
    2. Weed-n-Feed post-emergent/fertilizer materials shall not be accepted.
D. Pesticides to include herbicides and insecticides:
    1. Obtain best quality materials with original manufactures' containers, properly labeled with guaranteed analysis and apply at label rates and follow label instructions.
    2. Use non-staining materials.
    3. Turf grass:
        a. Herbicides – pre-emergent:
            i. A dry, granular material must be applied before the soil temperature reaches 60 degrees F.
            ii. Granular material may be used in conjunction with early application of fertilizer providing that the fertilizer material matches the recommendations listed in this document.
            iii. Material recommendations: Materials include pendimethalin, Dacthal, and Ronstar for control of many annual grasses, spurge, and other broadleaf weeds; and Balan, Betasan, or Bensulide for crabgrass control.
        a. Herbicides – Post-emergent:
            i. Weed-n-Feed post –emergent/fertilizer materials shall not be accepted or applied

ii. Liquid formulations should be applied when environmental conditions are favorable for proper application – air temperature below 85 degrees F, no precipitation or irrigation expected for 24 hours and wind speed less than 5 mph.
iii. Acceptable control has been achieved using any of the following products: Trimec SR; Weedgone DPCR; Turflon DR; and three way mixes of 2,4-D, MCPP, and Banvel. The ester forms should be used only in spring and fall, when drift can be limited or reduced. The amine form is suitable for summer use.

1. Insecticides:
   a. Acceptable materials will vary with the insect causing the problem and may include diazinon, Ofanol, Sevin, Dursban, Permethrin, malathion, insecticidal soap and Turcam.
2. Fungicides:
   a. Will vary with the disease causing the problem.
3. Grass Seed for Reseeding:
   a. Match mix for the project
4. Shrub and Tree Liquid Fertilizer: High-pressure injection fertilization.
   a. Each injection site shall receive 6 oz of liquid fertilizer. Liquid fertilizer shall be 15-05-1 of a NPK solution.
5. Sod for Re-sodding: Match mix for the project.
6. Mulch shall match the rock and bark mix for the project.

MACHINERY

Machinery requirement listed under this section are not intended to be restrictions of specific manufacturers or models unless so stated. Specific mention or manufacturers is intended as a guide to illustrate the final product of maintenance operation desired.

A. Mowers shall be commercial grade rotary type, in good working order, finely tuned to protect the lawn from excessive exhaust fumes. Blades shall be sharp to reduce shredding of the cut grass blades. Grass catchers not required, however, mulching of grass cuttings is strongly encouraged.
B. Lawn Edger shall be a rigid blade type trimmer that will produce a fine clean edge where lawn meets walkways, pavements, or curbs. Curbs and walks shall not be trimmed with a monofilament line trimmer type.
C. Pruning tools shall be maintained in good working order, cutting edges shall be sharp. Disinfect all tools when used for removal of diseased limbs with a twenty (20%) percent solution of bleach and water.

PROTECTION OF PLANT MATERIALS

In general, provide maintenance operations of landscape materials on a day-to day basis, or during undisturbed environmental conditions. There will be occasions where weather, construction activities, renovation of existing site improvements or revisions in site design will impact established plantings. The following guidelines for the protection of plant materials should be part of the maintenance crew's operational procedures:

A. Chemical pollutants:
   a. Do not permit chemical pollutants to contaminate planting areas at any time. This includes paints and thinners, caustics and solvents, detergent solutions, salts, petroleum products and all pesticides or herbicides not specifically being applied to the plant materials.

B. Traffic control:
   a. Do not drive or park maintenance vehicles under the drip line of any trees or on any lawn or ground cover areas at any time.
   b. Provide adequate protective barriers around all landscaped areas during the operation of maintenance or construction equipment. Do not operate heavy equipment beneath the drip line of any trees.
   c. Take all necessary safety precautions to protect maintenance crew and roadway users from hazards.

C. Alteration of Finish Grades:
   a. Do not permit construction to raise the finish grades in established landscaped areas.
   b. Do not permit machine excavation within the drip line of any existing trees. If excavation must intrude into this zone, only hand excavation should be permitted. Wherever possible "jet" pipes through root zone areas. Carefully re-compact soil, eliminating all air pockets. Obtain permission of landscape architect or arborist when roots greater than 3" in diameter or roots with a diameter greater than 50% of the diameter of the main trunk must be cut.
   c. Do not permit soil, rock gravel, lumber, products on pallets or any other materials to be stock piled beneath the drip line of any trees or shrubs without mitigating measure approved by the landscape architect, arborist or Community Manager.
   d. Do not permit concrete or stone paving to be laid within the drip line of any existing trees. Exception paving may extend to no more than one quarter (1/4) of the drip line area if the corresponding thinning of the crown is performed simultaneously with the completion of the paving work.
   e. Exceptions to these guidelines may be unavoidable and judged on a case-by-case basis by the landscape architect or arborist.

D. Protection Against Disease/Insects:
   a. Remove by corrective pruning all plant materials damaged by fire, weather, or mechanical means immediately after the damage has been identified.
   b. Transport all diseased or infested plant materials completely off the site immediately after their removal. Do not permit pruned materials from diseased plantings to be stockpiled anywhere on site at any time.
   c. Inspect all new plant materials for signs of insect infestation or disease upon delivery to the site. If possible, quarantine any new materials for 3 weeks prior to installation.
   d. All plant parts, soil, debris, etc. removed from the site shall be disposed of at a legitimate dump site.

E. Protection of trees during pruning:
   a. Do not permit climbing of trees whose limbs are not sturdy enough to support a person's weight without bending.
   b. Inspect apparently stout limbs for rot, which may cause the limb to break under a person's weight.
   c. Do not permit anchoring ropes, chains, or pulleys to be permanently attached to trees. Do not permit use of "spurs" or cleated boots while climbing trees.
   d. Follow the accepted 3-step pruning technique for removal of all large branches, to prevent tear damage to the remaining branches or trunk.

F. Protection during spraying:
   a. Immediately wash off all sprayer drippings and materials accidentally spilled on plants.

G. Erosion Prevention:
   The two common forms of erosion are sheet erosion and gullying. Sheet erosion is gradual; gullying may be sudden and dramatic. Bring observed problems to the attention of the Community Manager.

a. Prevent erosion through the following:
   i. Sheet Erosion: Be aware of gradual changes in the color or texture of soil. Disk and mulch areas subject to sheet erosion. Install contour furrows or interceptor ditches where required on long slopes.
   ii. Gully Erosion: Be aware of the formation of "riffs" in the natural depressions of a slope or a deeper cutting in swales. Control of gullying varies, from dissipation of flow through use of gravel or other surface treatment, to construction of check dams or diversion ditches.
   iii. Remove all downstream accumulations of soil transported by erosion, to prevent damage to roots of downstream plant materials.

MAINTENANCE OF MANICURED TURF

A. Scheduling:
   1. Perform all turf maintenance during hours mutually agreed upon between Community Manager and Contractor.
   2. Work force shall be present at the project site at least three days per week and as often as necessary to perform specified maintenance in accordance with the approved maintenance schedule.

B. Replacements:
   1. Immediately treat or replace sod or seed which become damaged or injured as a result of Contractor's operations or negligence, as directed by Community Manager.

C. Irrigation:
   1. Water lawns at such frequency as weather conditions require, to replenish soil moisture to 4 inches below root zone, following the schedule listed below:
      a. During peak growing season – July to August:
         i. Bluegrass turf 175 to 20 inches water applied per week.
         ii. All other turf on site – 1 to 125 inches water applied per week.
      b. March, April, and October:
         i. Water as needed, applying approximately 05 inch per week.
      c. May, June, September:
         i. Apply approximately 1 to 15 inches of water per week.

D. System start-up and shut down:
   1. Prime irrigation system in late March.
   2. Winterize system in late October.

E. Irrigation scheduling recommendations:
   1. Schedule irrigation to be applied in shorter, multiple irrigation cycles. Do not apply all irrigation water in one long cycle.
   2. Schedule irrigation between 12 midnight and 6 am.
   3. After each mowing, check alignment of all irrigation heads.

F. Adjust irrigation schedule at least three (3) times during summer to adjust to changing heat and weather conditions.

G. Mowing:
   1. Frequency of mowing cycles:
      a. Every two weeks in April and October.
      b. Weekly, May through end of September.
      c. Minimum mowing season as listed above is 26 weeks.
   2. Height of cut:
      a. Manicured Turf: Two and one-half to three (2.5 – 3) inches.
   3. Clippings are to be mulched and left on site. When excessive clippings are produced, such as after a rainy period or in early spring, rake or vacuum the clippings.
   4. Mowing direction shall be changed every other mowing.

5. Mower blades shall be sharpened after each mowing.
6. All grass clippings shall be removed from all sidewalks, streets, etc. at the time of mowing.

H. String or line trimming:
1. For all turf areas inaccessible to mowers as determined by the Community Manager, a line trimmer shall be used to maintain the turf at approximately the same height as the mowed turf.
2. Height of cut will never be less than one (1) inch. Scalping of the turf is not acceptable.
3. Areas requiring line trimming shall be cut every two weeks (Levels B and C). During spring and fall, when grass growth is rapid, the frequency of trimming shall be weekly.
4. Line trimmers shall not be used around the base of trees or shrubs.
5. Line trimmers shall not be used for curb or walk edging.

I. Fertilization Schedule:
1. Three (3) applications per season based on the following program:

All turf areas:

Approximate Date	Rate of actual nitrogen per 1000 sq ft
May 15-20	10 lbs.
July 20-25	10 lbs.
October 1-10	20 lbs.
TOTAL NITROGEN PER SEASON	40 LBS

2. Fertilizer applications shall be 10 weeks apart.
3. Iron is not included in these fertilizers, but can be included as part of a premixed fertilizer material.

J. Aeration
1. Aerate two (2) times per growing season, depending on the turf area.
2. Recommended frequency:

All Other Turf Areas
May 1
October 1

3. Last aeration to coincide with late season fertilization.
4. Use a hollow core aeration machine that removes plugs that are between 1/2 inch and 3/4 inch in diameter, at least 3" deep, and on 6–8-inch centers. Several passes across the turf at different angles to the last pass is recommended.
5. Areas that have been aerated shall not be top dressed.

K. Weed Control:
1. Pre-emergent Control:
   a. Check turf at end of each season to determine whether a pre-emergent herbicide is needed for the following year.
   b. Full rate applications shall be made in mid-March, before soil temperatures reach 60-degree F, and 6-8 weeks later in early to mid May, at manufacturer's recommended rates.
   c. Water material in after application.
   d. No seeding shall occur for 6 weeks after this application.
   e. Coordinate application of herbicides with thatch control and reseeding schedule.

2. Post-emergent Control:
    a. Two blanket applications per season with spot treatment as needed to control weeds at manufacturers recommended rates.
    b. Recommended application periods: late June and early October.
    c. Liquid formulations shall be applied when environmental conditions are favorable for proper application – air temperature below 85 degrees F, no precipitation for 24 hours and wind speed less than 5 mph.
    d. Use of Weed-n-Feed post emergent/fertilizer materials shall not be acceptable.

L. Disease Control:
1. Identify active disease.
2. Immediately notify the Community Manager and submit a written proposal for treatment. Treat diseased turf as needed with approved insecticides at label rates.
3. Pesticide applications will be made by a licensed, skilled staff member and shall follow all federal, state and city pesticide application regulations.

M. Insect control:
1. Properly identify the insect before any treatment is applied.
2. Immediately notify the Community Manager and submit a written proposal for treatment. Treat insect infected turf as needed with approved insecticides at label rates.
3. Pesticide applications will be made by a licensed, skilled staff member and shall follow all federal, state and city pesticide application regulations.

N. Seeding, sodding or renovation of turf areas:
1. Turf renovation can be attempted at any time of year, with the success more dependent on time of year than method.
    a. Sodding can be accomplished any time sod can be cut from the field and water applied. The optimum time to install sod is in the late summer and early fall when temperatures are cooler, and when turf stress and weed germination are less.
    b. Seeding is the preferred method of establishing grass. For best chances of success, seed between about April 1 and August 31. Fall irrigation for fall seeded turf areas is critical for the sensitive seeding.
2. For reseeding or re-sodding, follow methods described in installation specifications.

O. Finishing:
1. All turf areas shall be 'finished' each week by cleaning up and removing all paper, trash, twigs, and other undesirable materials from turf areas.

TREE MAINTENANCE

A. All suckers shall be continually removed from trees. Tree Rings will be cut and sprayed in the turf to protect the tree trunks from cutting of bark and cambium layer.

B. Annual tree pruning and/or shaping as needed. Always prune out dead wood. Refer to schedule. CONTACT COMMUNITY MANAGER PRIOR TO COMMENCING ANY PRUNING OR SHAPING WORK.

C. Pruning:
1. General:
    a. Prune trees only to maintain growth with space limitations, maintain a natural appearance, and balance the crown and roots. Do not prune main leader on trees at any time.
    b. Do not clip shrubs into balled or boxed forms unless specifically called for in the design. Only shrubs designated as "hs" are to be sheared. Periodically pinch back "wild" growth on shrubs.
    c. Major pruning on trees shall be done only under direct supervision of the landscape architect or arborist, only with written authorization after discussions has taken place.

2. Training Trees: Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached. Space vertical branches from 18 to 48 inches apart with a radial orientation so as not to overlay on another. Maintain a central leader only for those trees that naturally grow with a central leader. Prune trees to eliminate diseased or damaged growth, weak, narrow V-shaped branch forks, and too-dense crowns. Allow all trees to achieve their mature size.
3. "Raising Up": Do not strip lower branches of newly installed trees. Retain lower branches in a pinched back condition with as much foliage as possible to promote caliper trunk growth (tapered trunk). Gradually begin removing lower branches flush with the trunk only after the tree is able to stand erect without staking or other support. Only where necessary, remove lower branches to provide adequate clearance for pedestrian or maintenance vehicles.
4. Pruning Period: Do primary pruning of deciduous trees during the dormant season. Prune damaged trees or those that constitute health of safety hazards at any time of each year as required.
5. Immediately dispose of all pruning and trimming debris from trees and shrubs off site.

D. Tree Staking:
1. Inspect stakes at least every three (3) weeks and after high winds to prevent girdling of trunks or branches, and to prevent rubbing that causes bark wounds.
2. Remove existing stakes when trees attain a trunk caliper of four (4) inches or when trees are strong enough to sustain an upright position after periods of high winds.
3. Conform to the recommended procedures of staking as outlined in the Construction Documents.

E. Thinning: Periodic thinning of trees and shrubs may be required to prevent overcrowding. Remove all above ground portions of the plant, plus the trunk to a below grade depth of 18" at the direction of the Community Manager.

F. Fertilize all trees and shrubs during October. Trees identified for high pressure injection fertilization should be done so for 150-250 psi at a minimum depth of 4 inches and a maximum depth of 12 inches. Fertilizations shall be made in a grid pattern of 1-to-25-foot spacing's based on plant size and location. Each injection site will receive 6 oz of liquid fertilizer so that the total applied rate of 75 gallons/1000 sq ft is achieved.
1. A liquid fertilizer is required that provides15#N/,5# P2D, 1# KCL/1000 sq ft.
2. Material shall be totally soluble liquid with no undissolved solids and no suspensions.

G. Mulch trees as directed by the Community Manager.

H. Spray all trees three times per year to control foliage-feeding insect upon approval from the Community Manager. It may be necessary to spray trees more than three times per year due to insect infestation.

I. Tree pruning will be performed with experienced tree pruning personnel only. In general, thin out and remove any dead wood and shape to maintain symmetry. DO NOT SHEAR. DO NOT USE TREE PAINT ON WOUNDS.

J. For new tree plantings maintain 4" saucer around each tree throughout its first year after installation. Maintain a minimum 2" depth of mulch within saucer. Saucers to be consistent in form and diameter.

K. Maintain an area free of grass and weeds at the base of all trees (except areas of annual color) at a diameter of three (3) feet. Utilize a combination of hand cultivation, hand trimming, glyphosate, pre-emergent herbicides. Contractor shall be responsible for proper herbicide application. DO NOT USE LINE TRIMMERS TO REMOVE GRASS AT THE BASE OF THE TREES.

L. Tree pruning of trees 15' or higher require a proposal be submitted to the Community Manager.

GROUNDCOVER, SHRUB AND ANNUAL BED MAINTENANCE

A. Groundcover: Fertilize four times annually in April, June, August, and September at a rate of 4 pounds per 1000 square feet (as per lawn fertilizer).
B. Annuals: Fertilize all flowers per manufacturer's recommendation. Fertilize on June 1 and August 1. Additional fertilizations may be required after hail damage at Community Managers request.
C. Spray or dust for disease or insect control as a preventative or corrective measure.
D. Prune shrubs selectively so their growth warrants to remain in bounds and to eventually form a solid mass. DO NOT SHEAR. Remove dead wood and branches that overhang curb and walks.
E. Remove weeds and foreign grasses from bed areas weekly. Cultivate beds once every two weeks during growing season.
F. Inspect all plant material, including flowers, weekly for other pests. Immediately notify Community Manager of infestations and submit a written proposal for treatment.
G. Pinch all blooms after expiration, and prune dead or damaged foliage. Remove dead flower stems from Daylily's 10 days after bloom is spent
H. Maintain the appearance of the steel edging with necessary adjustments and or leveling of adjacent lawns and planting beds.
I. Maintain flower beds and shrub beds free of grass and weeds. Utilize a combination of hand trimming, hand cultivation, pre- and post-emergent herbicides. Contractor shall be responsible for proper applications of all herbicides and shall replace damaged flowers due to improper herbicide applications.
J. Inspect and remove weeds from flower beds and shrub beds every 2 weeks during the growing season.
K. Inspect and treat for common rodent damage by voles, prairie dogs and rabbits. Coordinate with regulatory agencies for applicable extermination or relocation permits.

IRRIGATION

A. GENERAL SYSTEM MAINTENANCE
    1. FIRST WEEK OF CONTRACT
        a. Standard Spray – While in operation, inspect each type of head for nozzle clogging and proper pattern. Adjust valve as required to obtain optimum operating pressure for head-to-head coverage.
        b. Drip Line – While in operation, inspect valve for proper operating pressure, and clean strainer of all dirt, etc. Flush lines at end cap. Inspect each drip line to insure proper water distribution. Inspect moisture level on both sides of root ball with soil probe.
        c. Controller – Set time clock for 2-1/2 minutes for each station and observe the operation of each valve to insure proper function. Return timing of each station to appropriate watering cycle. Adjust timing if flooding occurs or if soil appears dry.
        d. Inspect all valve boxes throughout the project. Adjust, if necessary, to align with surrounding grades. Removed debris and add gravel to bottom if necessary. Replace damaged lids.
    2. BI-MONTHLY DURING GROWING SEASON
        a. Standard Spray – Periodically check all lawn areas for uniform growth and color appearance. Operate valve and observe radius of throw weekly. Replace or adjust head as required to provide head-to-head coverage.
        b. Drip Line – Flush lines at end cap and inspect moisture level at tree root ball once per month during growing season. Replace faulty or damaged drip lines and emitters.
        c. Controller – Inspect controller for power interruption. Reset clock if required. Adjust station timing to increase or decrease watering schedule as required.

3. BI-ANNUALLY OR AS REQUIRED
    a. Standard Spray – Inspect all heads for performance. Replace all damaged or faulty equipment.
    b. Drip Line – Flush lines at end cap and inspect moisture level at tree root ball. Replace faulty or damaged drip lines.
    c. Controller – Clean switch contacts as recommended by manufacturer and replace weather stripping on the door if necessary to maintain watertight cabinet.
    d. Cleaning and Monitoring the System;
        i. Continually monitor the irrigation systems to verify they are functioning properly as designed. Make program adjustments required by changing field conditions.
        ii. Prevent spraying on cars, roadways, signs, walls, or sidewalks. Balance the throttle control on the remote-control valves and the adjustment screws on the sprinkler heard. Do not allow water to atomize and drift.
4. FAILURES IN SYSTEM
    a. Repair all damage to system caused by Contractor's operations. Perform all repairs within one (1) watering period.
    b. Report promptly to the Community Manager all damage.
    c. Twice a month, use a probe or other acceptable tool to check the root ball moisture of representative plant types and planting conditions as well as the surrounding soil moisture levels.
    d. Immediately notify Community Manager of other damage or equipment malfunctions and submit a written proposal for its repair.
    e. Do not switch controller to "off" at any time, except as required for testing and for maintenance operation.
    f. The Contractor shall provide complete irrigation sprinkler system servicing which shall be performed as required to maintain irrigation equipment in correct operating condition.
    g. In spring, Contractor shall check all systems for proper operation. Lateral lines shall be flushed out after removing the last sprinkler head or two at each end of the lateral. All heads are to be adjusted as necessary for unimpeded coverage.
    h. Contractor shall be responsible for ensuring that irrigation system is properly protected from freeze conditions during the winter. Contractor shall make all repairs resulting from freeze damage.
    i. System start-up and shut-down:
        i. Prime irrigation system in late March.
        ii. Winterize system in late October.

PEST / RODENT CONTROL

A. USE OF HERBICIDES, INSECTICIDES, STERILANTS, POISON AND ANIMAL TRAPS:
    1. The Contractor assumes all liability for damage and/or injury resulting from accident or misuse of these products and/or equipment. The Community Manager retains the right to prohibit the use of any herbicide, insecticide, sterilant, poison, or animal trap that he may judge to be undesirable for any reason.
    2. Products leaving an undesirable residue or odor (i.e. weed oil) shall not be used.
    3. The Community Manager shall be notified prior to application and advised of any danger associated with the use of these products (i.e., to avoid personal contact with sprayed areas, etc.).
B. Rodent trapping, requiring permitting by regulatory agencies shall be coordinated by Contractor and Contractor shall strictly adhere to the procedures outlined in the permit.

GENERAL SITE AND FACILITIES

The Contractor is required to maintain the project in a safe, clean, and neat manner. Specific tasks include but are not limited to the following:

A. Litter Removal
   1. Remove all litter and debris daily from the project area, including the mulched areas and undeveloped land.
   2. Remove vegetative litter such as leaves, flowers, or fruit when it covers more than 25% of the ground surface with the drip line of a tree.
   3. Remove trash from receptacles bi-weekly and replace plastic liners.

B. Mulch Surfaces
   1. Maintain rock and bark mulch in a neat, uniform appearance by spreading, raking or other means.
   2. Maintain a uniform depth of 3" mulch throughout the project area. Replacements shall be evaluated as part of spring clean-up and recommendations for replacements will be evaluated by the Community Manager.
   3. Maintain a neat border without overspill between the mulch and all paved surfaces, turf areas, unpaved access roads, sidewalks, etc.

C. Sidewalks
   1. Provide monthly inspections and cleaning. Report needed repairs to Community Manager.
   2. Broom and sweep walkways a minimum of once a week. Keep paved surfaces clean of grass clippings and gravel at all times.
   3. Snow Removal:
      a. All areas to be cleared by power snow removal equipment with snowfalls greater than 2" in depth with 24 hours of cessation of snowfall.

D. Bus Shelters (unless maintenance provided by Transit District)
   1. Bus shelters are to receive (2) power-washings per month and on an as-needed basis.
   2. Windows in bus shelters are to be cleaned following each power-wash.
   3. Shelters will be inspected monthly for damage and recommendations for repair and replacements will be given in the monthly report with an attached proposal for the additional work.

E. Signage
   1. Signs are to receive (1) cleaning per month and on an as-needed basis. Do not use power sprayer to remove debris or bird droppings from sign face. Do not scrub, use soft cloth only. Contractor shall be responsible for repainting signs if paint begins to chip due to abrasive cleaning, power spraying or negligence.
   2. Signs shall be inspected monthly for damage and recommendations for repair and replacements will be given in the monthly report.

F. Site Furnishings
   1. Clean and inspect benches, trash receptacles, bike racks, picnic tables and handrails two times a month. Report damages or deficiencies to Community Manager immediately.

G. Park Facilities
   1. Broom sweep and wash walkways a minimum of once a week. Keep paved surfaces clean of grass clippings and gravel at all times.

ACCEPTANCE

A. Acceptance:
   1. Work will be accepted by the Community Manager upon satisfactory completion of all work, including maintenance period, but exclusive of replacement of any materials under the Warranty period.

B. Corrective Work:
   1. Work requiring corrective action or replacement shall be performed within five (5) calendar days after approval from Community Manager.
   2. Perform corrective work and material replacement in accordance with the Drawings and Specifications, and shall be made by the contractor as a cost basis as agreed by the Community Manager.

EXHIBIT F

Operation and Maintenance Plan for Pond 705 Downstream Tributary

CMS
ENVIRONMENTAL
SOLUTIONS

Operation and Maintenance Plan

Prepared for:

Peak Metropolitan District No. 2

Prepared by:
CMS Environmental Solutions, LLC
5231 South Quebec Street
Greenwood Village, CO 80111
(303) 593-2107

Project:

Peak Innovation Park Pond 705 Downstream Tributary

Location:

Southeast of Peak Innovation Pkwy & South Powers Blvd, El Paso County, CO 80925

October 2025

Table of Contents

1 COMPLIANCE WITH STORMWATER FACILITY OPERATIONS & MAINTENANCE REQUIREMENTS

Owners/developers and/or managers of property are required to ensure that all stormwater facilities within the project area are properly maintained and functioning in accordance with City of Colorado Springs and MHFD regulations. Additional information can be obtained by contacting the City of Colorado Springs SWENT Department.

Table 1. Contact Information & Responsible Parties

Owner:	Operator/Maintenance:	Additional Contacts:
City of Colorado Springs 30 South Nevada Avenue, Suite 604 Colorado Springs, CO 80903	Peak Metropolitan District No. 2 450 E. 17th Avenue, Suite 400 Denver, Colorado 80203-1214 Phone: 303-592-4380	Zachary J. Knight Director of Construction Urban Frontier, LLC 1515 Market St., Ste 200 Denver, CO 80202 Phone: (805) 714-9660 Email: zjk@urbanfrontier.com

Note: Maintenance shall ultimately be the responsibility of the Owner with operations delegated to the Operator/Maintenance team after final acceptance from construction has been obtained. Maintenance Operations will continue throughout the life of the drainageway to ensure it is operating as designed and does not become compromised.

2 LOCATION AND DESCRIPTION OF STORMWATER FACILITY

This plan addresses the operation and maintenance of the Big Johnson Channel that discharges from Peak Innovation Park Pond 700 and Pond 705 that flows from north to south. The tributary drains to Big Johnson Reservoir and the Peak Innovation Park drainage area to the tributary is approximately 450 Acres with the total drainage area being ~582 Acres. This project is southeast of Peak Innovation Pkwy S Powers Blvd in El Paso County. All stormwater on-site is conveyed via surface flows from Peak Innovation Park Pond 700 and Pond 705 through exiting box culvert to the channel. This report outlines maintenance needs for channel improvements to restore design flood flow capacity, address erosion, and protect city infrastructure and nearby properties.

Inspection or maintenance personnel may utilize the stormwater management channel site plan located in Appendix C.

3 ACCESS AND EASEMENTS

All stormwater management facilities located onsite have a designated maintenance trail beginning at Drop Structure 1 south of S Powers Blvd and will extend south to Drop Structure 4. Crossing the channel will be possible at Drop Structure 2 and trail will extend along eastern embankment. Easement widths must be provided in accordance with Table 4.1 below and should be based on maintenance access needs and overflow widths, if any. Drainage easements must be shown on all plats, the drainage plan, and the storm drain construction plan and state that City of Colorado Springs has the right of access on the easements, which must be kept clear of obstructions restricting flow or maintenance access.

Table 2. Required Maintenance Easements for Drainage Facilities

Facility Type	Minimum Easement Width
Pipe less than 36-inch diameter	20 feet
Pipe of 36-inch diameter or larger	25 feet
Open Channels and Swales	Q100 less than 20 cfs: 20 feet Q100 less than 100 cfs: 25 feet Q100 greater than 100 cfs: See MHFD Manual
Detention Basins/ Retention Ponds	Width as required to contain storage, freeboard and associated facilities plus no less than 10 feet at appropriate locations for maintenance access. When multiple lots are involved, a dedicated tract of land is required.

Refer to channel stabilization plan or drainage report for Q100 flow of 425 cfs and an easement width of 160 feet.

4 INSPECTING STORMWATER MANAGEMENT FACILITIES

4.1 Inspection Procedure

The operator, on behalf of the owner, will be required to produce written inspection reports due to erodible sediment per the SWENT guidelines but additional inspections are recommended due the erosion potential in the channel. The following inspections are recommended for the project site:

- Written inspection reports shall be completed quarterly for one year or until vegetation has been fully established in the channel bed, whichever is longer.
- After one year or establishment of vegetation, a written inspection report shall be completed bi-annually.
- A visual inspection shall be completed after the first >2-year, 24-hour storm event. Visual inspections shall be completed for all >5-year, 24-hour storm events thereafter.

The qualified person(s) responsible for conducting the inspections shall complete the Maintenance and Inspection Form located in Appendix C. The system will be periodically inspected for debris, trash, and sediment per SWENT regulations. Table 3 lists common maintenance criteria that will need to be inspected for:

Table 3. Typical Inspection & Maintenance Requirements Matrix

Inspection Item / EDB Component	Erosion	Illicit Discharge	Overgrown Vegetation	Sediment Accumulation	Standing Water	Structural Condition	Trash & Debris Accumulation
Inflow Point	X		X	X		X	X
Forebay	X	X		X	X	X	X
Trickle Channel	X	X		X		X	X
Basin Bottom	X	X	X	X	X		X
Micropool		X	X	X	X	X	X
Outlet Structure		X		X	X	X	X
Emergency Spillway	X		X			X	X
Basin Rim	X		X			X	X
Embankments	X		X			X	X
Access Road	X		X			X	

[1]Referenced from SWENT Stormwater Permanent Control Measure Standard Inspection and Maintenance Plan Procedures for EDBs

4.1.1 Inflow Points

Inflow points are the locations where stormwater enters the facility. An inflow point is commonly a storm sewer pipe with a flared end section or headwall. Energy dissipation is typically located immediately downstream of the inflow point into the EDB to protect from erosion. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native *vegetation and impact adjacent open spaces/land.*
c. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance
d. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.2 Forebays

A forebay is an EDB component immediately downstream of the inflow point. The purpose of the forebay is to settle out coarse sediment priority to reaching the main body of the facility. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Illicit Discharge* - Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.
c. *Sediment Accumulation* - To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.
d. *Standing Water* - Improperly draining structures can lead to mosquito and/or algae growth. Routine maintenance is required to prevent standing water.
e. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
f. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.3 Trickle Channel

The trickle channel conveys stormwater from the forebay to the micropool of the EDB. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Illicit Discharge* - Indicators of illicit discharges include sheens, odors, discolored soil, and

dead vegetation.

c. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.
d. *Sediment Accumulation* - To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.
e. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
f. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.4 Basin Bottom

The basin bottom component is located in front of the outlet works structure. This component assists in keeping the majority of the basin bottom dry resulting in easier maintenance operations and enhances the facilities pollutant removal capabilities. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Illicit Discharge* - Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.
c. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.
d. *Sediment Accumulation* - To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.
e. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
f. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.5 Micro Pool

The micropool is a walled component directly in front of the outlet structure. At a minimum, the micropool is 2.5' deep and is designed to hold water. Typical maintenance items that will need to be inspected for:

g. *Illicit Discharge* - Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.
h. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees,

dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

i. *Sediment Accumulation* - To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.
j. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
k. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.6 Outlet Structure

The Outlet Structure drains the EDB as engineered in specified quantities over limited time. This is accomplished by the installation of steel orifice plates anchored and sealed within the component to control the stormwater release rates. Trash racks are installed in front of the orifice plates to prevent clogging. Typical maintenance items that will need to be inspected for:

a. *Illicit Discharge* - Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.
b. *Sediment Accumulation* - To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.
c. *Standing Water* - Improperly draining structures can lead to mosquito and/or algae growth. Routine maintenance is required to prevent standing water.
d. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
e. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.7 Emergency Spillway

An Emergency Spillway is designed to serve as the overflow if the capacity of the pond is exceeded during an event. Proper function of the emergency spillway is essential to ensure flooding does not negatively impact adjacent properties. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.
c. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
d. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.8 Basin Rim

The basin rim component includes the top of the embankment, maintenance bench and spillway. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.
c. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
d. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.9 Embankment

The embankments provide the majority of the stormwater detention volume, are higher than the micropool, and typically stay dry except during storm events. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.
c. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.
d. *Trash and Debris Accumulation* - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

4.1.10 Access Roads

Access roads provide access to the major components of the EDB to include the forebay(s), Micropool, and Outlet Structure. Typical maintenance items that will need to be inspected for:

a. *Erosion* - Erosion will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
b. *Mowing, Weed Control and Overgrown Vegetation* - Undesirable vegetation can significantly affect the performance of the facility. This type of vegetation includes trees, dense areas of shrubs, and vegetation not specified on the plan that could negatively impact the performance of the facility. If woody vegetation is not routinely mowed/removed, the

growth can cause debris/sediment to accumulate, and/or roots can cause damage to the structural components of the facility. In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

c. *Structural Damage* - Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.

5 MAINTAINING STORMWATER MANAGEMENT FACILITIES

5.1 Equipment

Appropriate equipment and tools will be taken to the field to ensure proper maintenance of the stormwater facility. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on a stormwater facility:

1.) Loppers/Tree Trimming Tools
2.) Mowing Tractors
3.) Trimmers (extra string)
4.) Shovels
5.) Rakes
6.) All Surface Vehicle (ASVs)
7.) Skid Steer
8.) Backhoe
9.) Track Hoe/Long Reach Excavator
10.) Dump Truck
11.) Jet-Vac Machine
12.) Engineers Level (laser)
13.) Riprap (Minimum - Type M)
14.) Filter Fabric
15.) Erosion Control Blanket(s)
16.) Seed Mix (Native)
17.) Illicit Discharge Cleanup Kits
18.) Trash Bags
19.) Tools (wrenches, screw drivers, hammers, etc.)
20.) Chain Saw
21.) Confined Space Entry Equipment
22.) Approved Stormwater Facility Operation and Maintenance Manual

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

5.2 Safety

Always prioritize safety during inspection procedures. Anticipate and avoid potential hazards. Never enter confined spaces, such as outlet structures or manholes, without proper training and equipment. Always have at least one additional person present when entering a confined space. If you encounter a highly toxic or flammable substance, leave the area immediately and call the CSFD or 911. If you have any questions about a substance, evacuate the area and contact the City. Additionally, do not open sealed containers to check their contents.

5.3 Maintenance Procedure

All drainage facilities must be designed with adequate maintenance access and in a manner that facilitates maintenance. Maintenance access also includes providing storage and staging areas for sediment and debris removal during maintenance activities. Maintenance personnel must be qualified to properly maintain the channels. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

5.4 Maintenance Categories and Activities

City of Colorado Springs requires all regional facilities be eligible for maintenance. For long-term stability it is recommended that yearly visual inspection downstream of the improvements (~200-300 ft). If any degradation/head cutting is encountered this should be discussed with the City of Colorado Springs and a maintenance plan be developed and implemented. From visual inspection if maintenance is required it can be split into these 3 categories:

1. Routine Maintenance:

The majority of this work consists of regularly scheduled mowing and trash and debris pickups during the growing season. This includes items like the removal of debris/material that may be clogging the drainage swale. It also includes activities like weed control and mosquito treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with the City; however, all work shall be document on the inspection and maintenance forms.

2. Restorative Maintenance:

This work consists of a variety of isolated or small-scale maintenance or operational problems. Most of this work can be completed by a small crew, tools, and small equipment. This includes concrete repair and riprap repair/replacement and landscaping problems or vegetating sparse areas. These items can be completed without any prior correspondence with the City; however, all work shall be document on the inspection and maintenance forms.

3. Rehabilitation:

This work consists of larger maintenance/operational problems and failures within the drainage swale. All this work requires consultation with the City to ensure proper maintenance is performed. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants. These items require correspondence with the City in addition to be documented on inspection and maintenance forms.

Maintenance Activities are summarized in the table below, and further described in the following sections.

Table 4. Maintenance Activity Matrix

Maintenance Activity / EDB Component	Erosion Repair	Mowing/ Weed Control	Sediment Accumulation Removal	Mosquito and Algae Treatment	Structural Damage Repairs	Trash & Debris Removal
Inflow Point	X	X	X		X	X
Forebay	X		X	X	X	X
Trickle Channel	X		X		X	X
Basin Bottom	X	X	X	X		X
Micropool		X	X	X	X	X
Outlet Structure			X	X	X	X
Emergency Spillway	X	X			X	X
Basin Rim	X	X			X	X
Embankments	X	X			X	X
Access Road	X	X			X	

1Referenced from SWENT Stormwater Permanent Control Measure Standard Inspection and Maintenance Plan Procedures for EDBs

5.4.1 Erosion Repair

a. The repair of eroded areas is necessary to ensure the proper function of the EDB, minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor rills to major gullies. Major erosion repairs may require consultation with an engineer. Erosion repairs can be routine maintenance, restoration and/or rehabilitation.
    i. Recommended frequency - As needed, based on inspections.

5.4.2 Mowing/ Weed Control

a. Mowing, tree thinning and dense vegetation removal is necessary to limit vegetation overgrowth, ensure functionality and to improve the overall appearance of the EDB. Native vegetation should be mowed to a height of 4"-6". Grass clippings should be collected and disposed of outside of the EDB to prevent clogging
    i. Recommended frequency - Twice annually or as needed.
b. Noxious weeds and other unwanted vegetation must be treated as needed throughout the EDB. This activity can be performed through mechanical means (mowing/pulling) or with herbicide. Consultation with a weed inspector is highly recommended prior to the use of herbicide. Weed control is routine maintenance.
    i. Recommended frequency - As needed, based on inspections.

5.4.3 Sediment Removal

a. Sediment removal is necessary to maintain the original design volume of the PCM and to ensure proper functionality of the infrastructure. Routine sediment removal from the forebay, inflow(s), trickle channel and micropool can significantly reduce the frequency of major sediment removal activities (dredging) in the main body of the EDB. Major (restoration/rehabilitation) sediment removal activities may require surveying and consultation with an engineer to ensure design volumes/grades are achieved.

   Stormwater sediment removed from PCMs do not meet the State's definition of hazardous waste; however, sediment may be contaminated with a wide array of organic and inorganic pollutants. All removed sediment must be disposed of in accordance with State laws concerning regulated wastes. Sediment removal can be routine maintenance, restoration and/or rehabilitation.

   i. Recommended frequency - Once annually or as needed, based on inspections.

5.4.4 Mosquito/Algae Treatment

a. Improperly draining structures can lead to mosquito and/or algae growth. Treatment of standing water may be necessary to control mosquitoes and undesirable aquatic vegetation that can create nuisances. Only EPA approved chemicals/materials can be used in areas that are warranted. Mosquito and algae treatment is routine maintenance.

   i. Recommended frequency - As needed, based on inspections.

5.4.5 Structural Repair

a. Structural repairs to EDB components may require input from an engineer. Minor displacement of rip-rap and minor concrete repairs can be performed routinely. Major structural damage could impact the functionality of the infrastructure. Structural repairs can be routine maintenance, restoration and/or rehabilitation

   i. Recommended frequency - As needed, based on inspections.

5.4.6 Trash/Debris Removal

a. Trash and debris must be removed to minimize outlet clogging and to improve aesthetics. Debris can clog the trash rack and the orifice plate. This activity should be performed prior to mowing operations.

   i. Recommended frequency - twice annually or as needed.

Reference:

This O&M is adapted from City of Colorado Springs, Colorado.
STANDARD OPERATING PROCEDURES PUBLIC PERMANENT CONTROL MEASURE (PCM) INSPECTION, TRACKING, AND MAINTENANCE PROGRAM, 2021

This O&M is adapted from City of Colorado Springs, Colorado.
STORMWATER PERMANENT CONTROL MEASURE STANDARD INSPECTION AND MAINTENANCE PLAN PROCEDURES/FORMS FOR: EXTENDED DETENTION BASINS (EDBS), 2024

Appendix A - Channel Stabilization Plan


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EX C

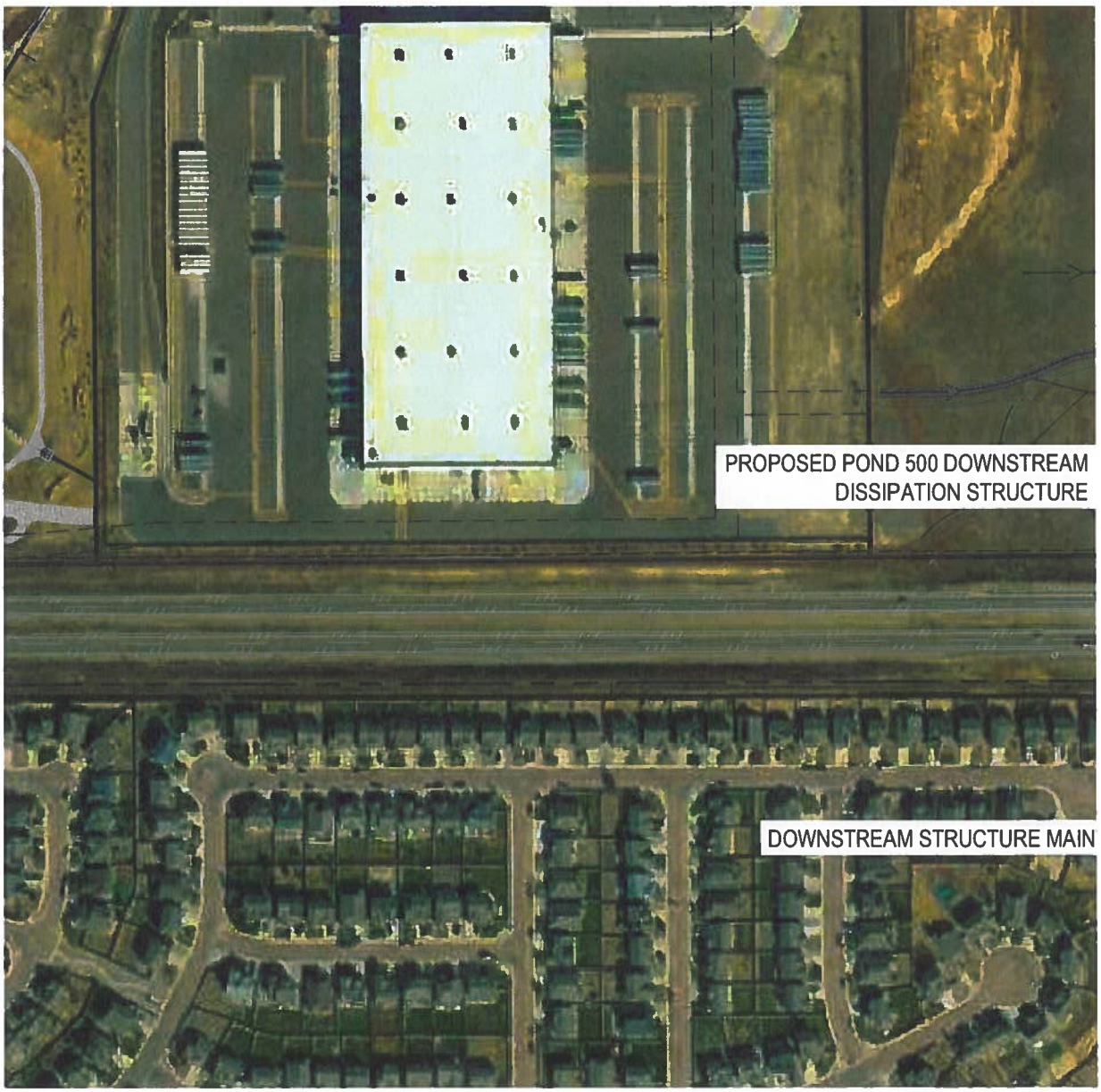
LEGEND

EX. COS PARKS PEDESTRIAN TRAIL

EX. COS PARKS MAINTENANCE TRAIL

EX . CYGNET MAINTENANCE TRAIL
(PROPOSED CONSTRUCTION ACCESS)

PROPOSED CHANNEL MAINTENANCE TRAIL

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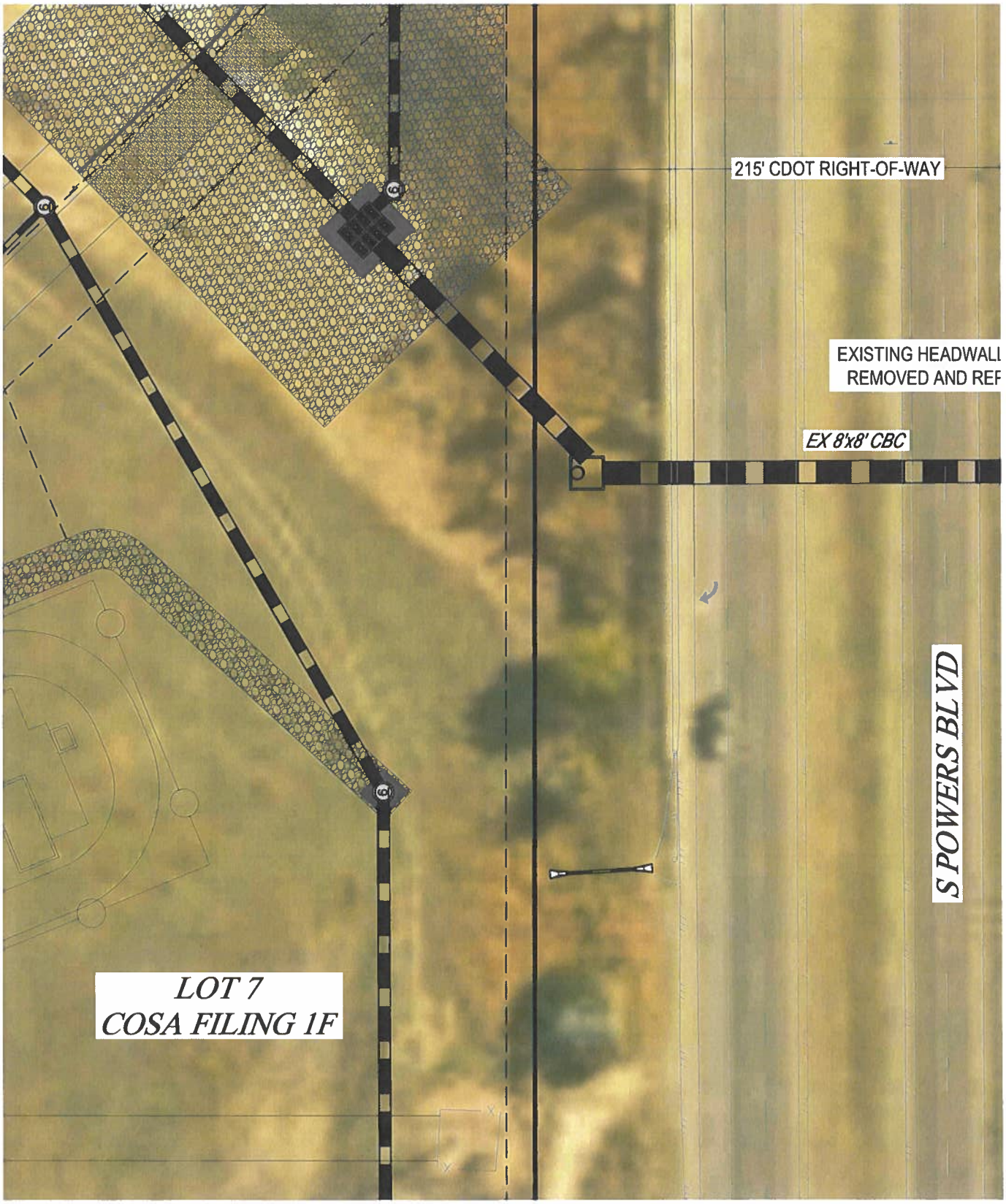
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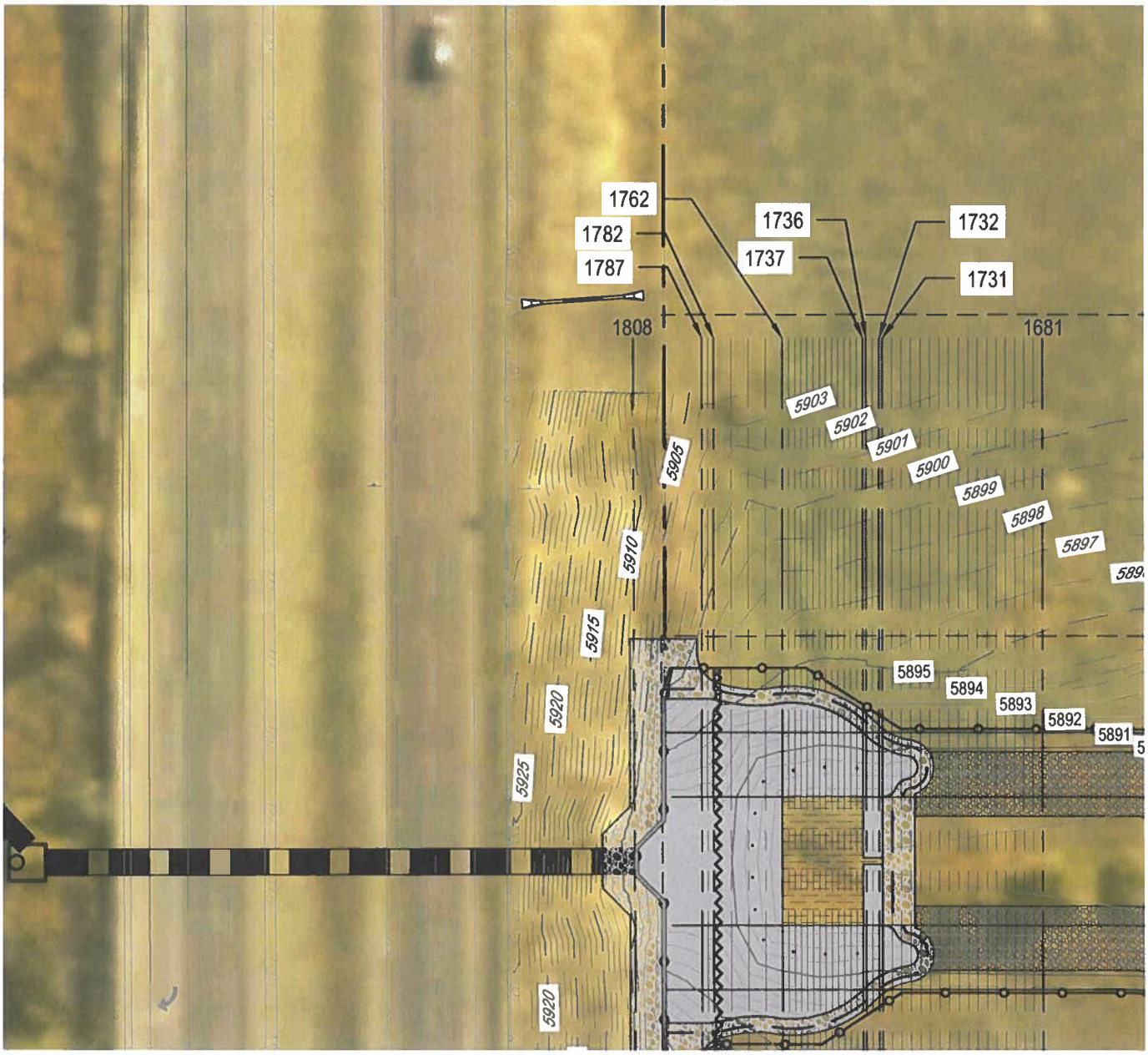
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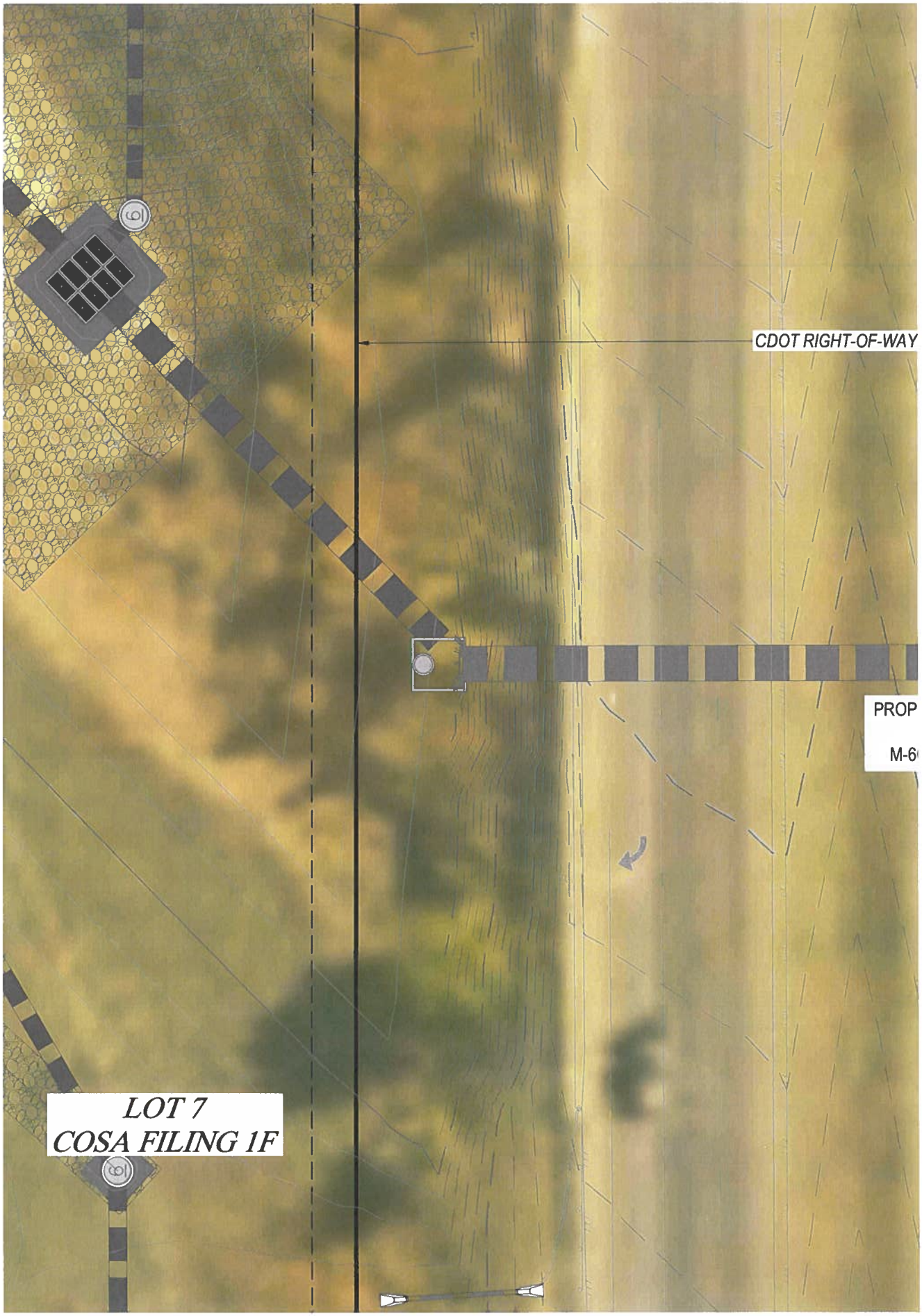
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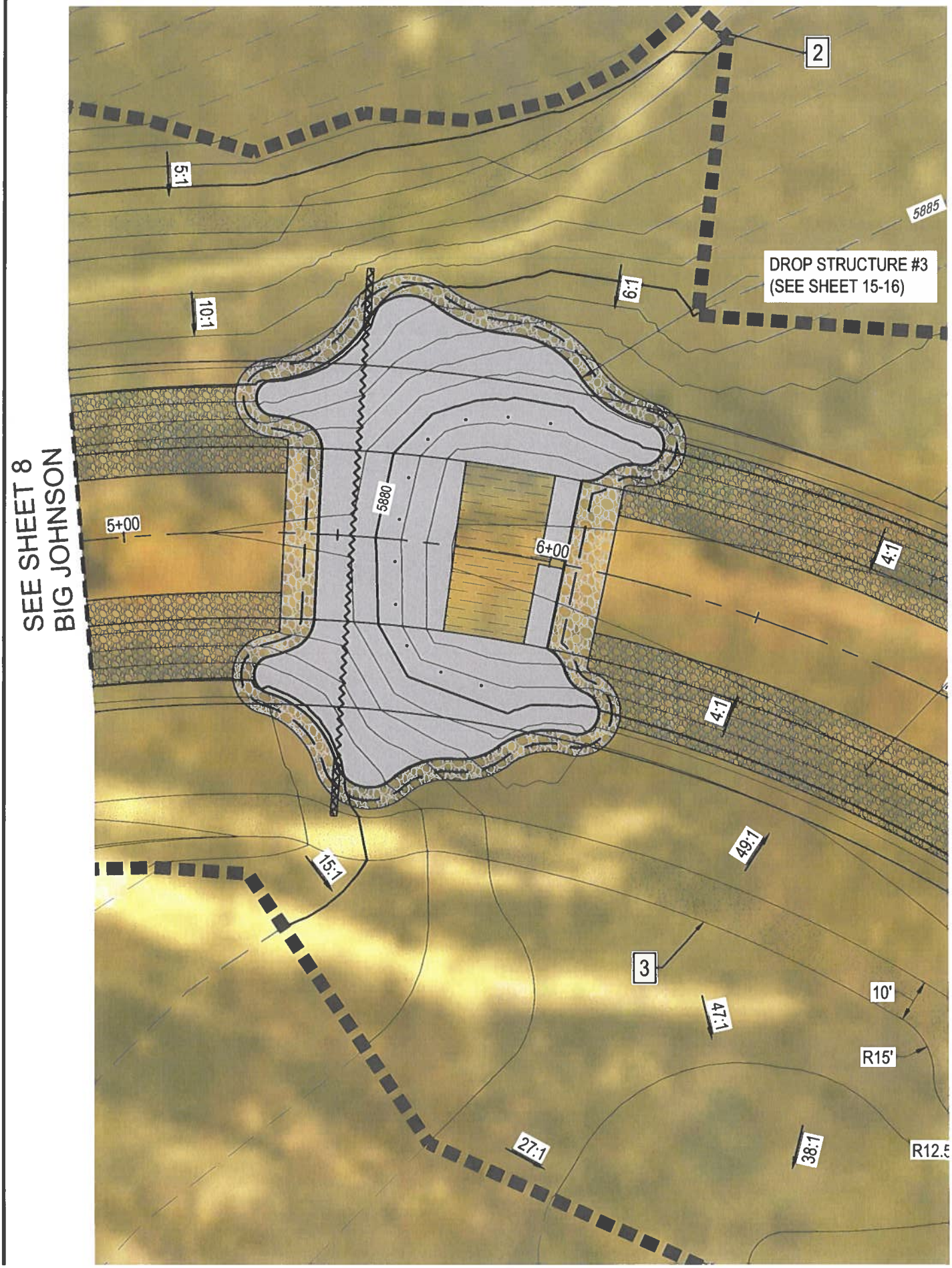
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R12.5

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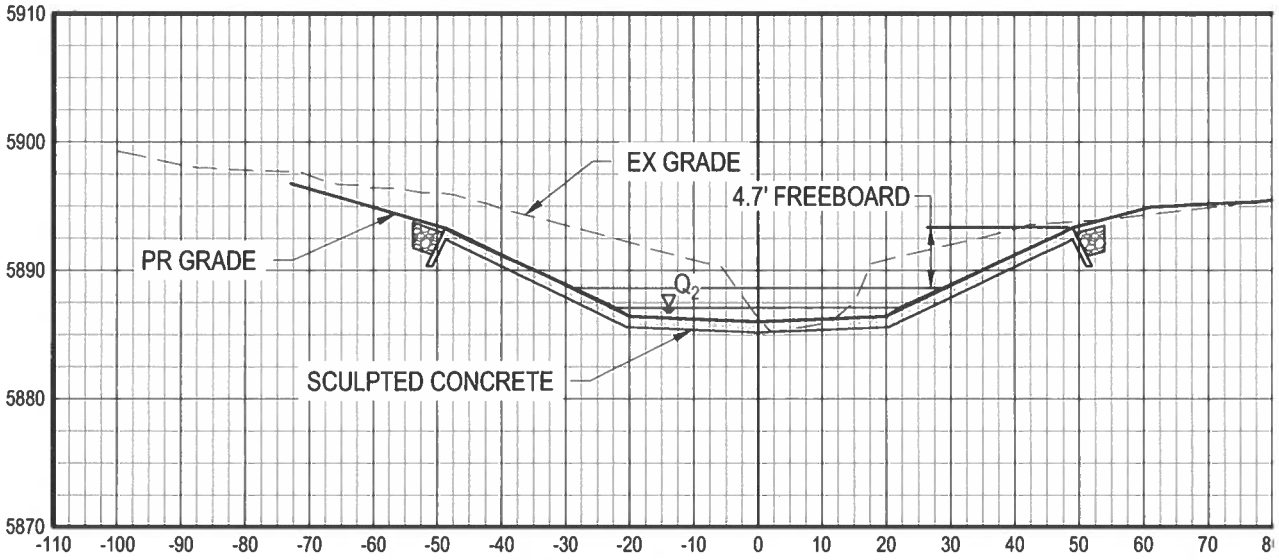

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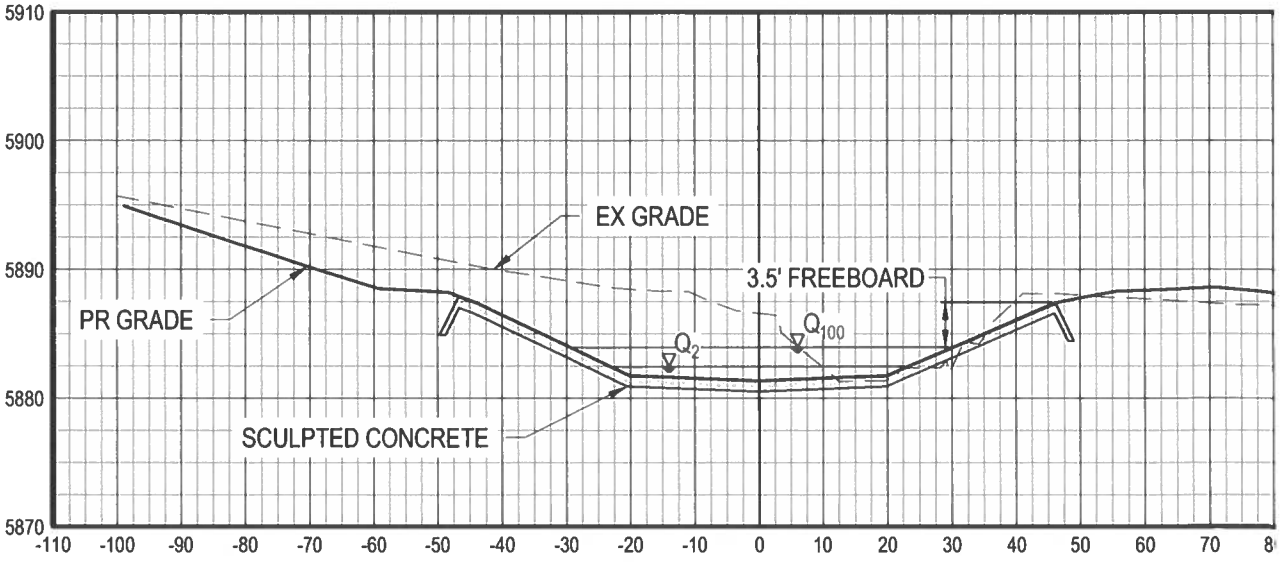

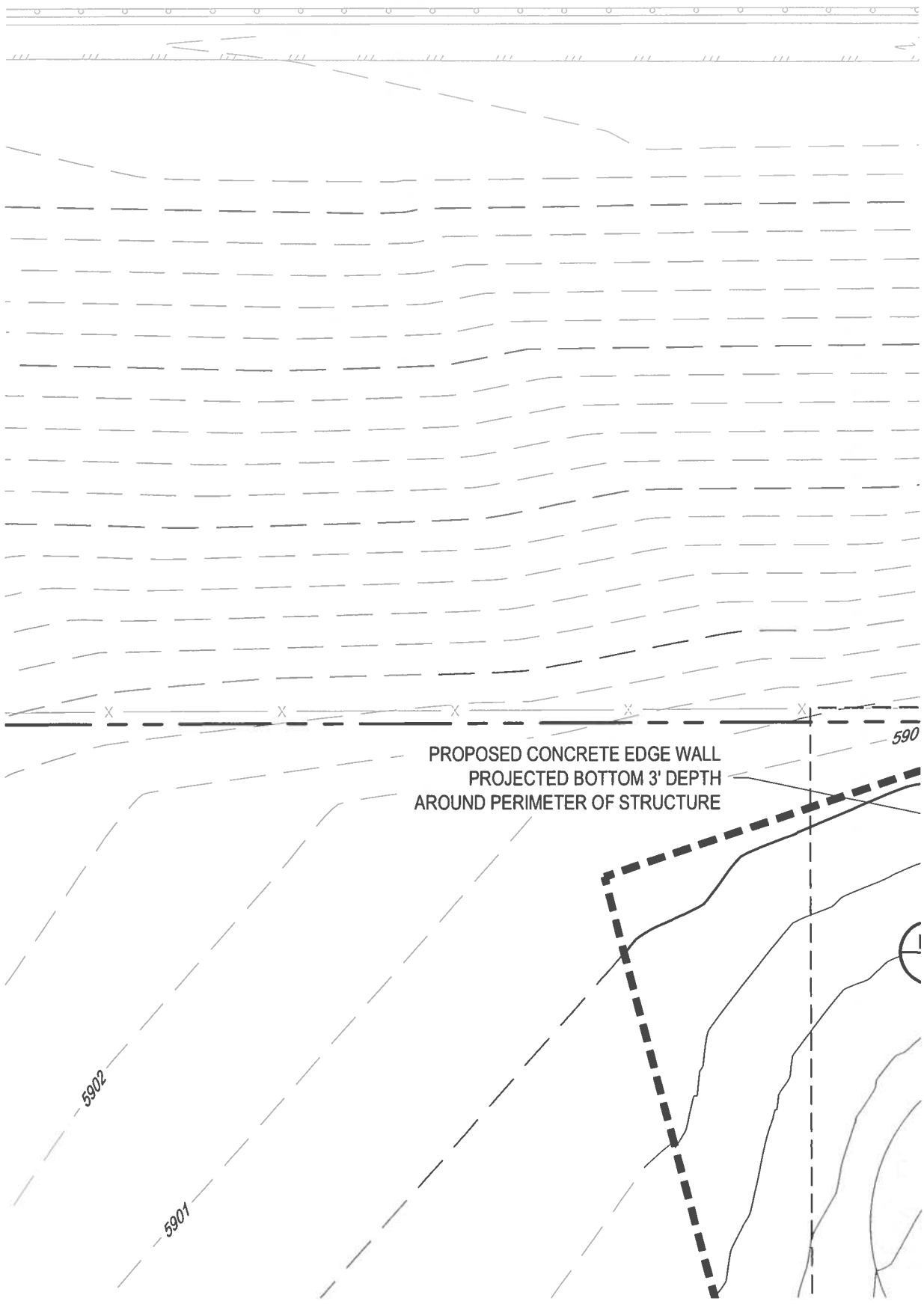
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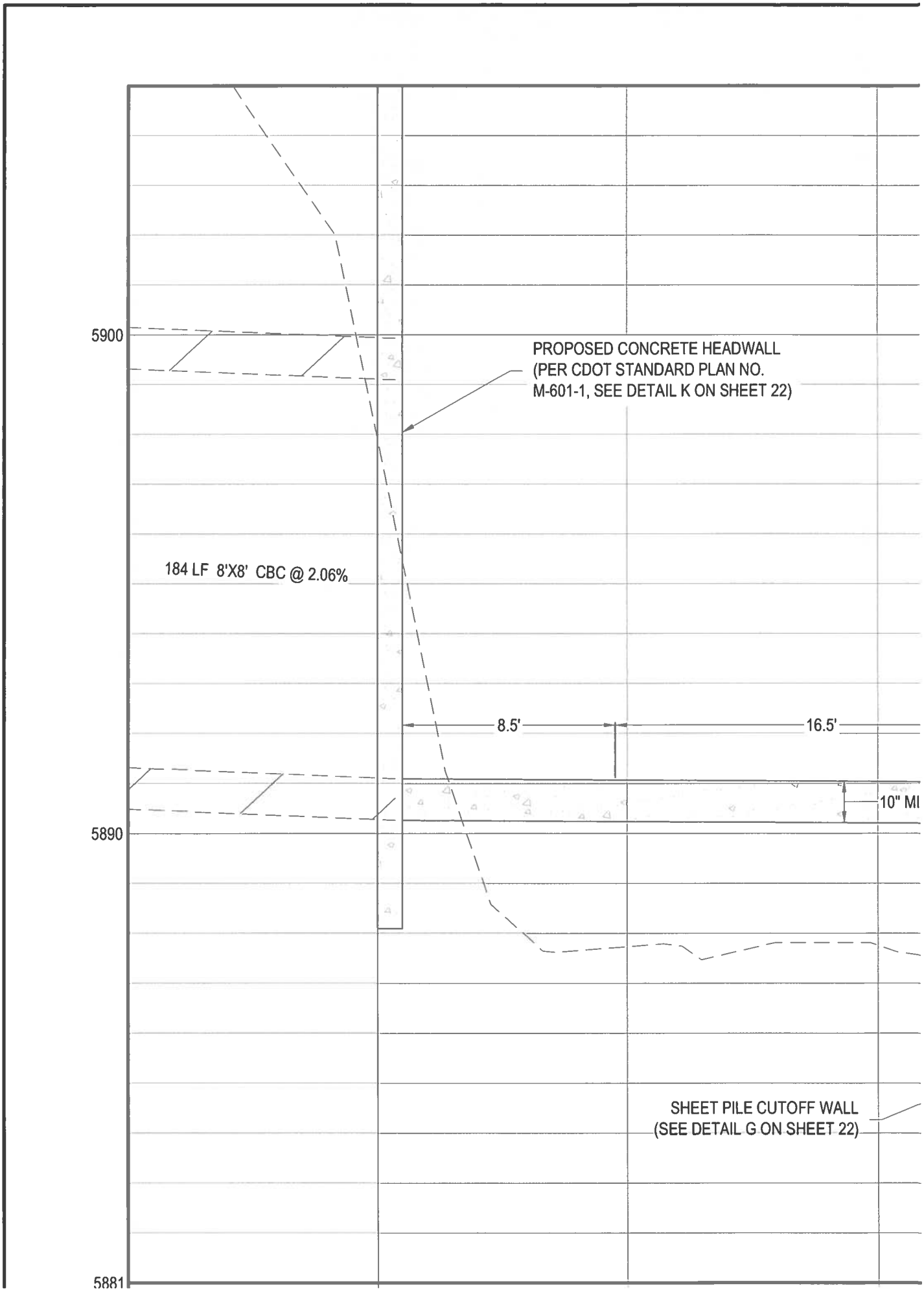
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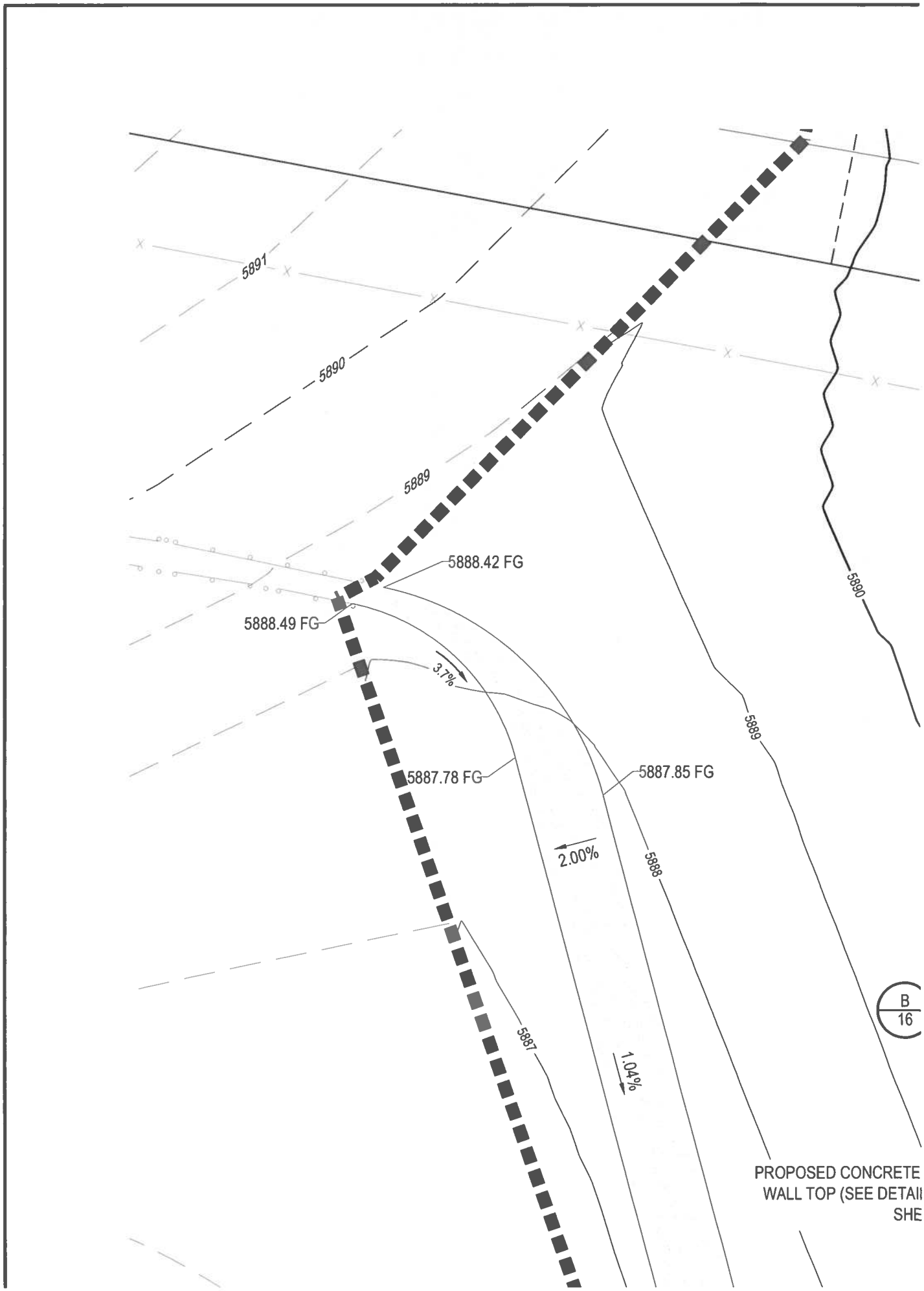
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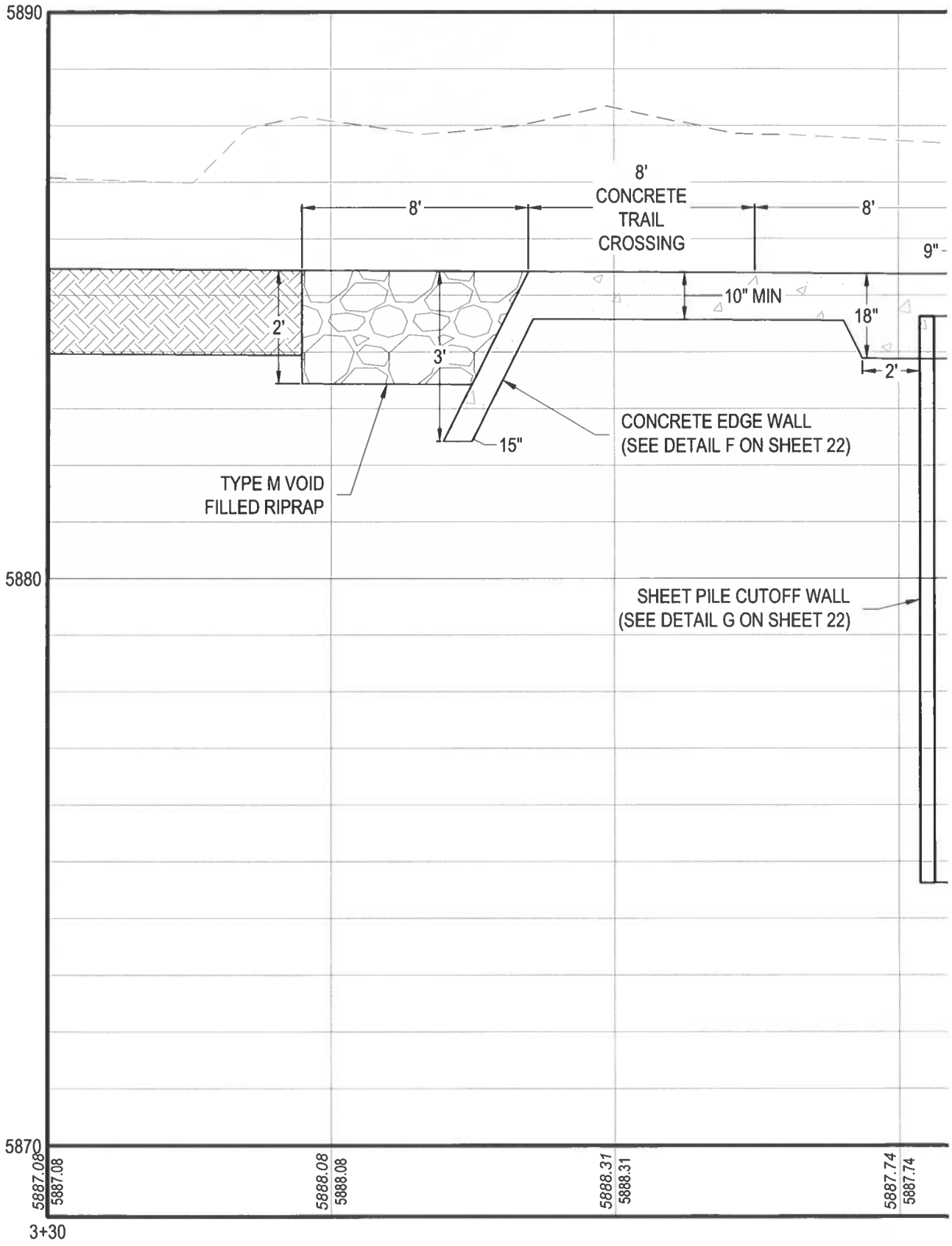
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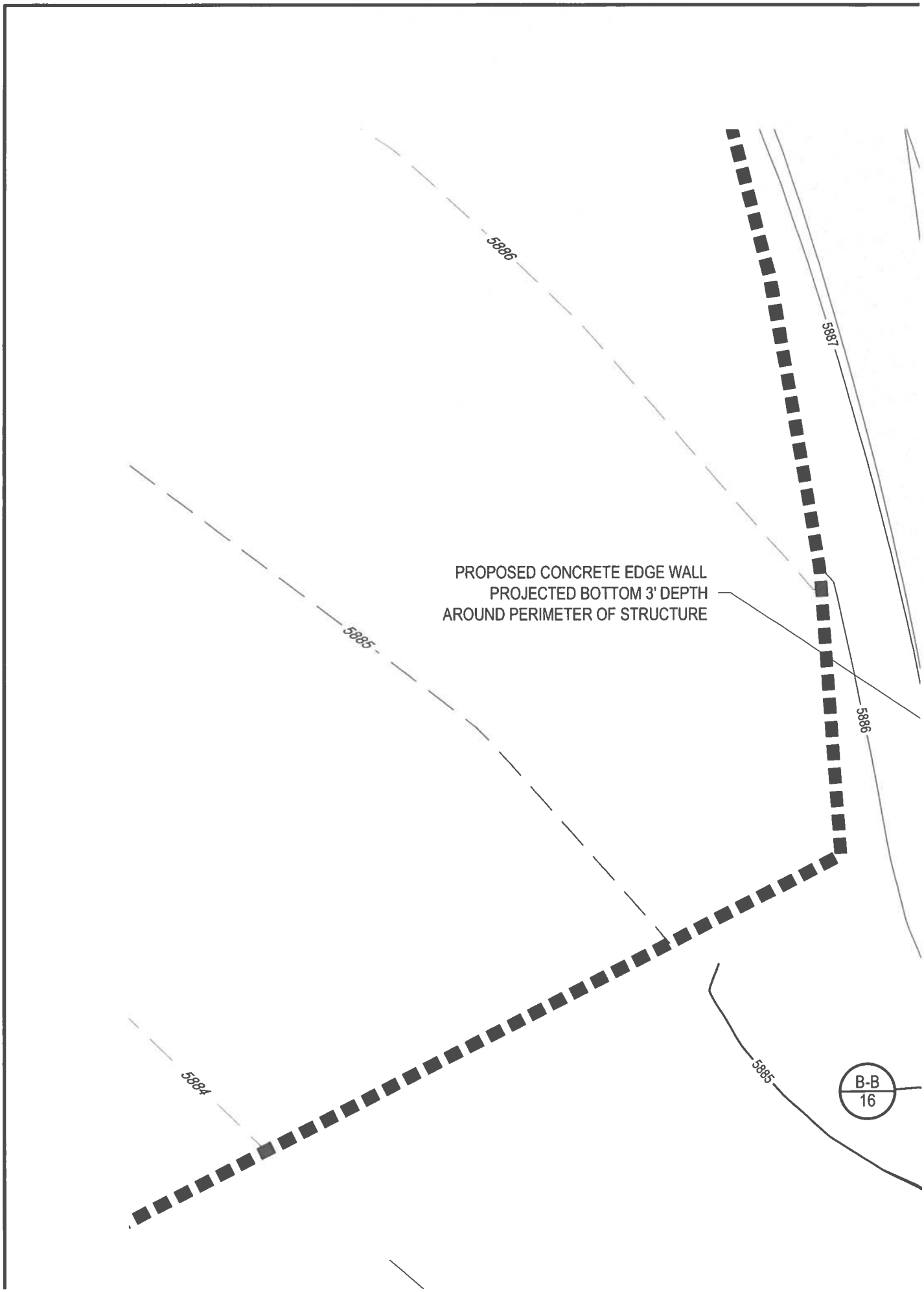
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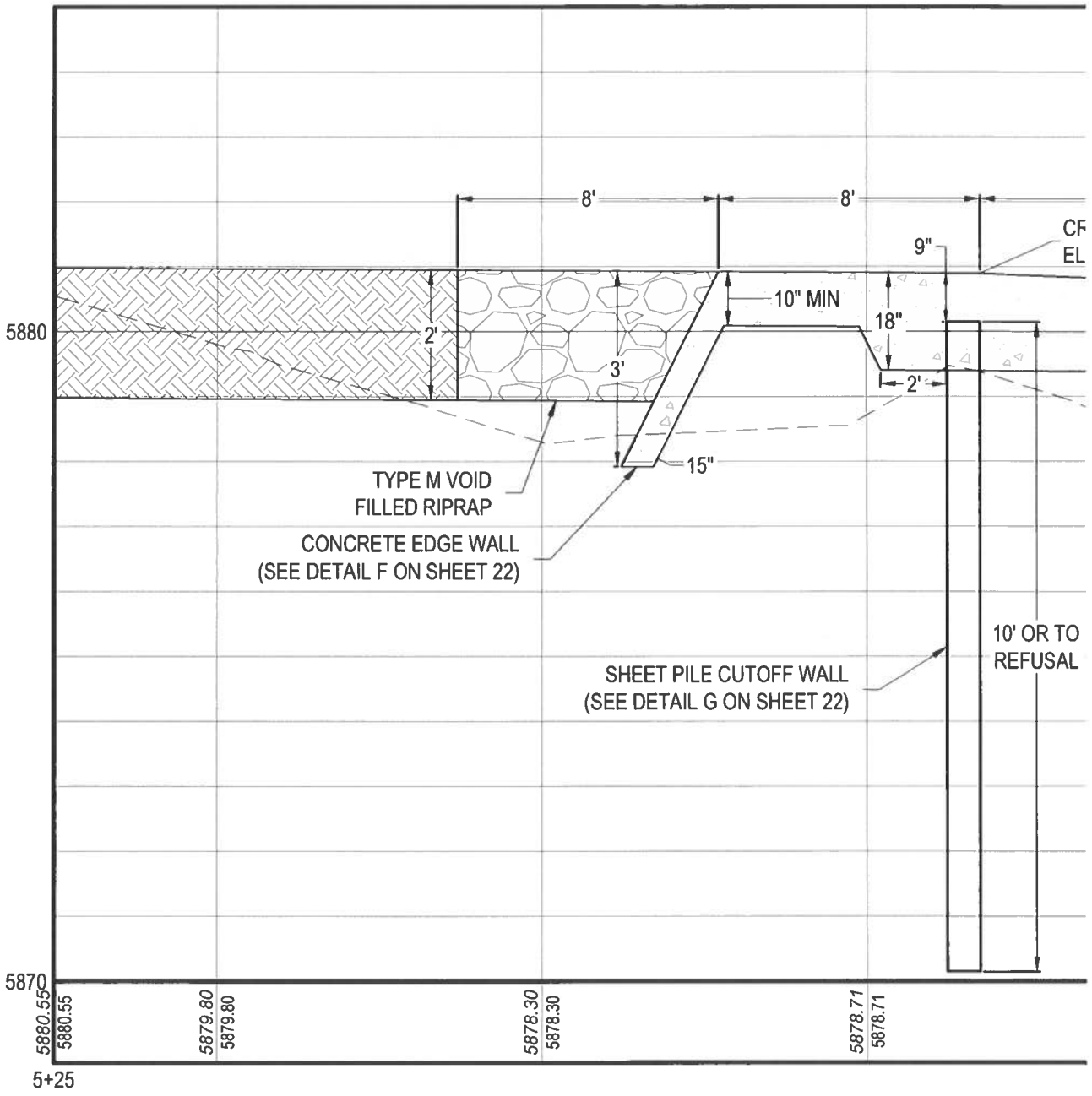
16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TYPE M VOID
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(SEE DETAIL F ON SHEET 22)
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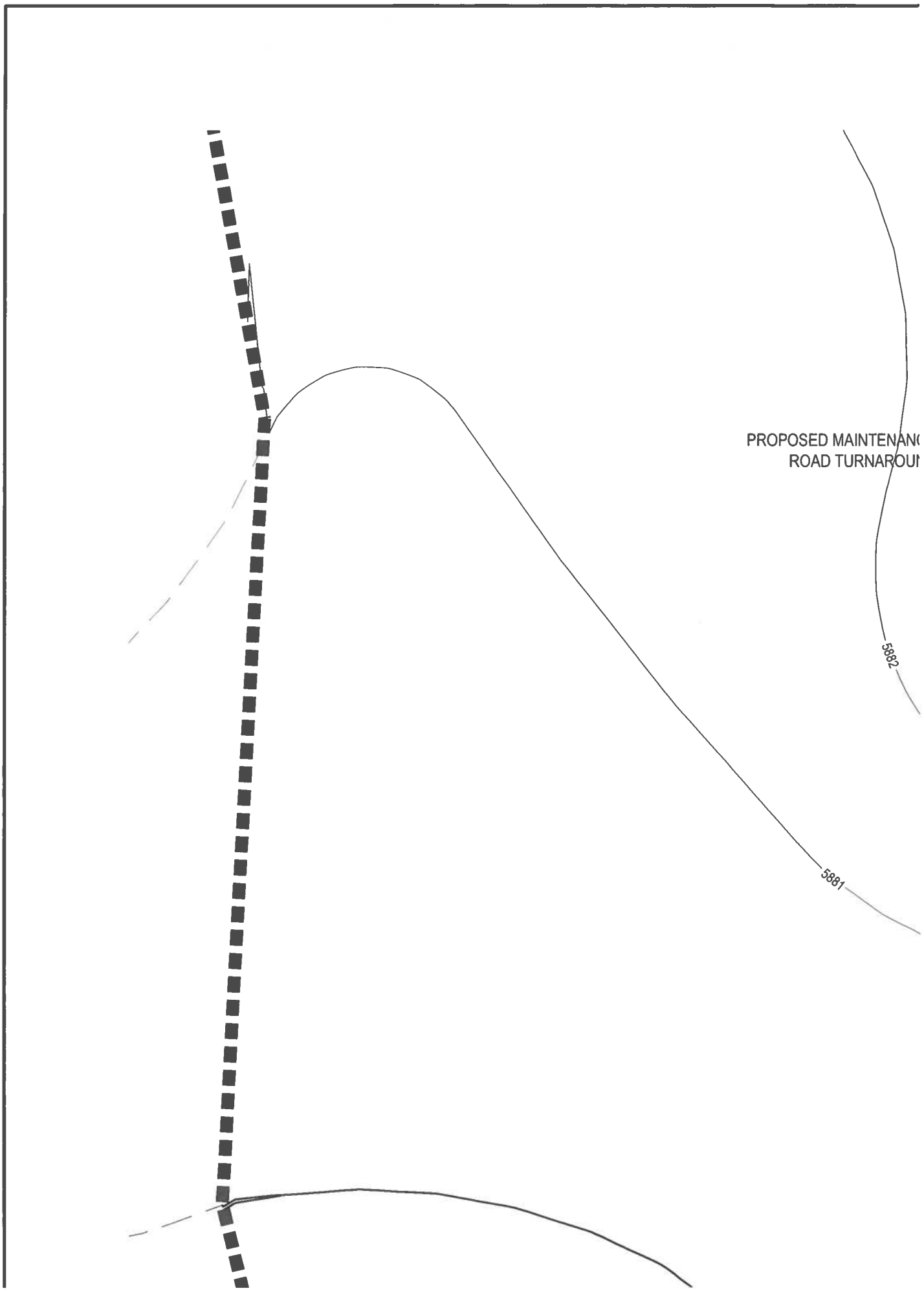
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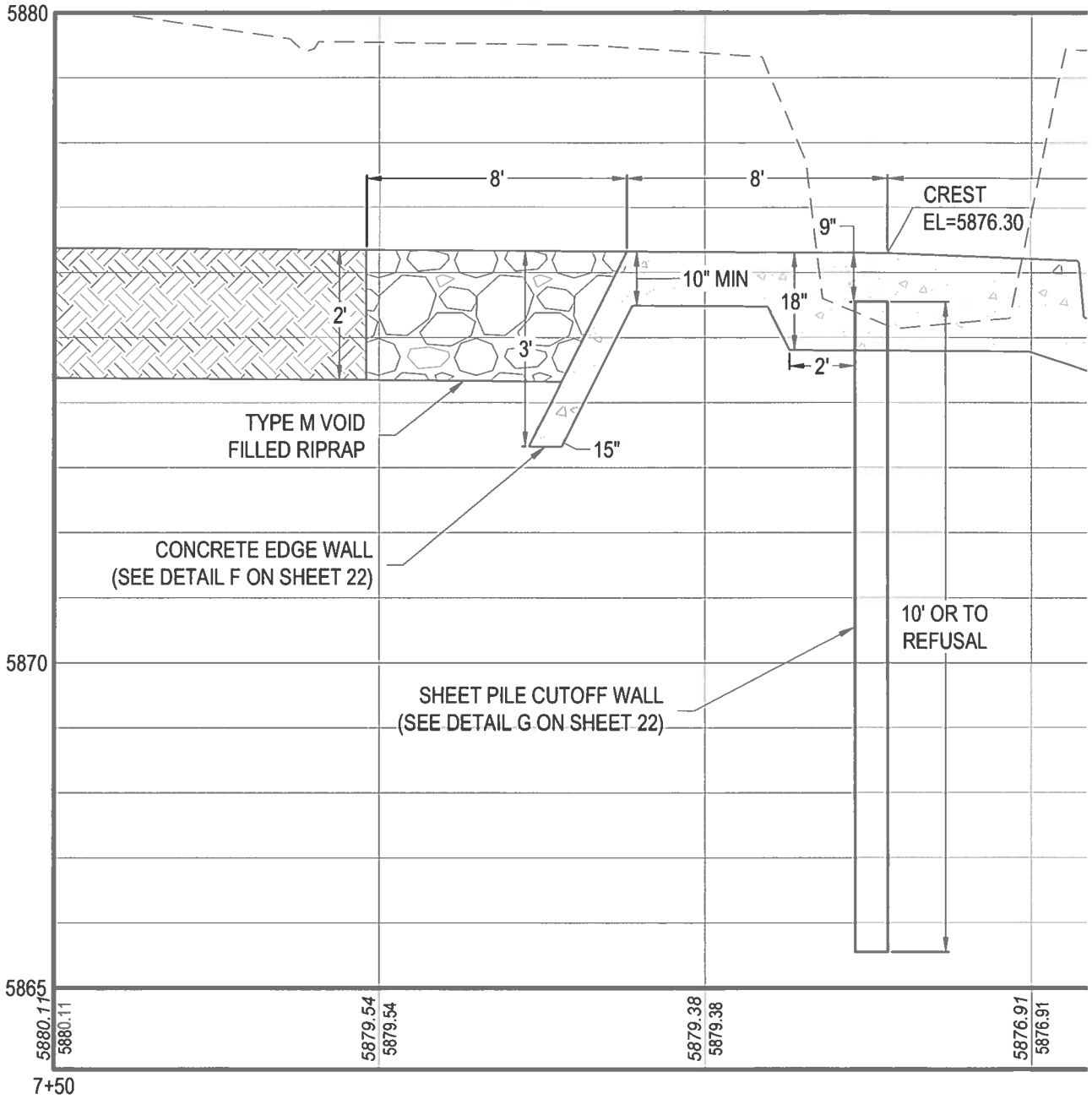
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SHEET PILE CUTOFF WALL
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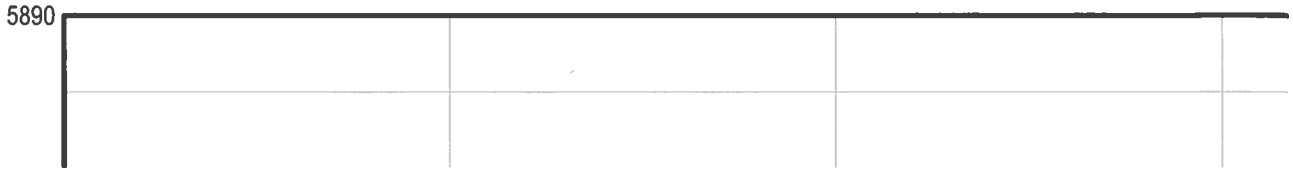
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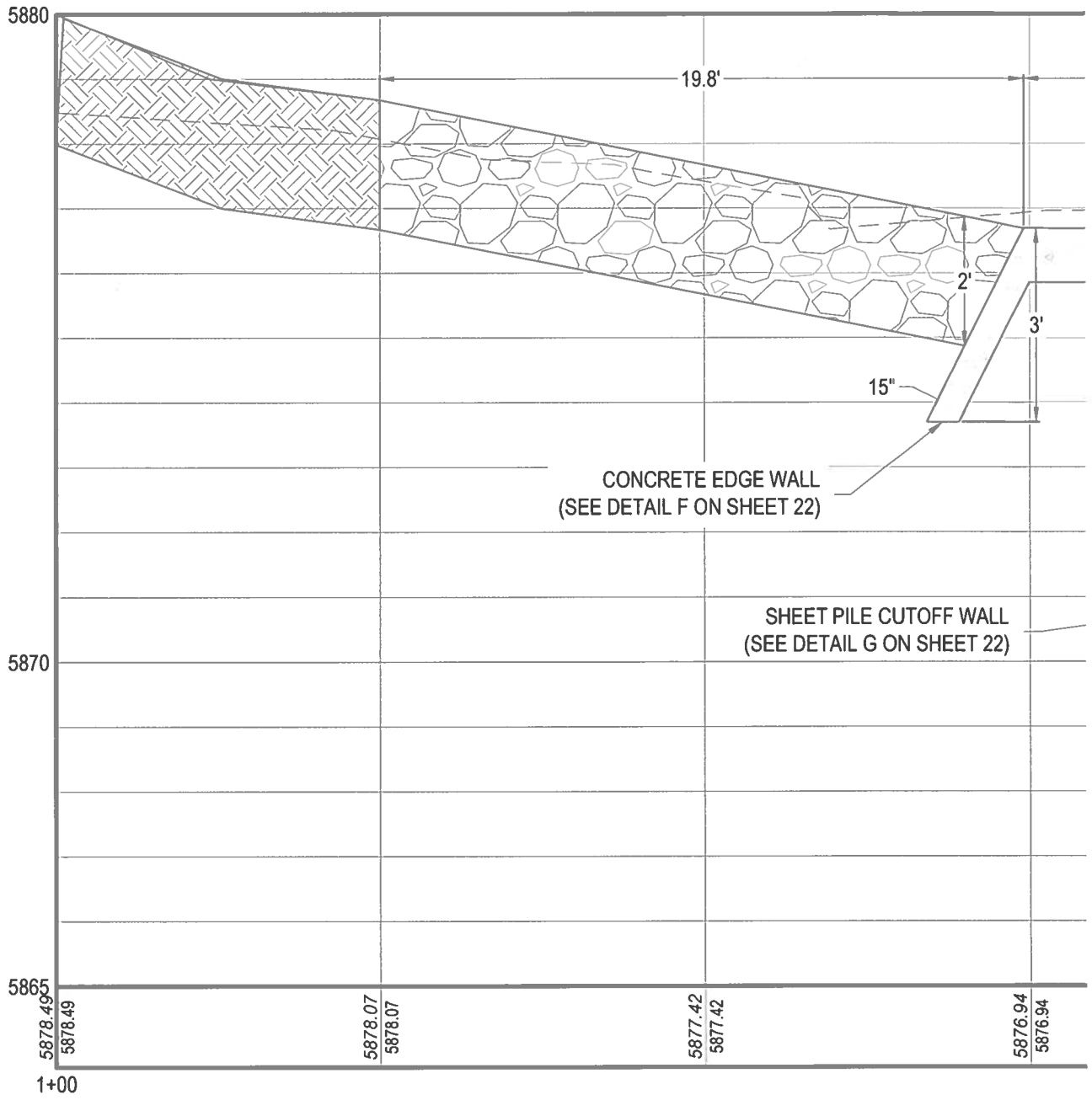
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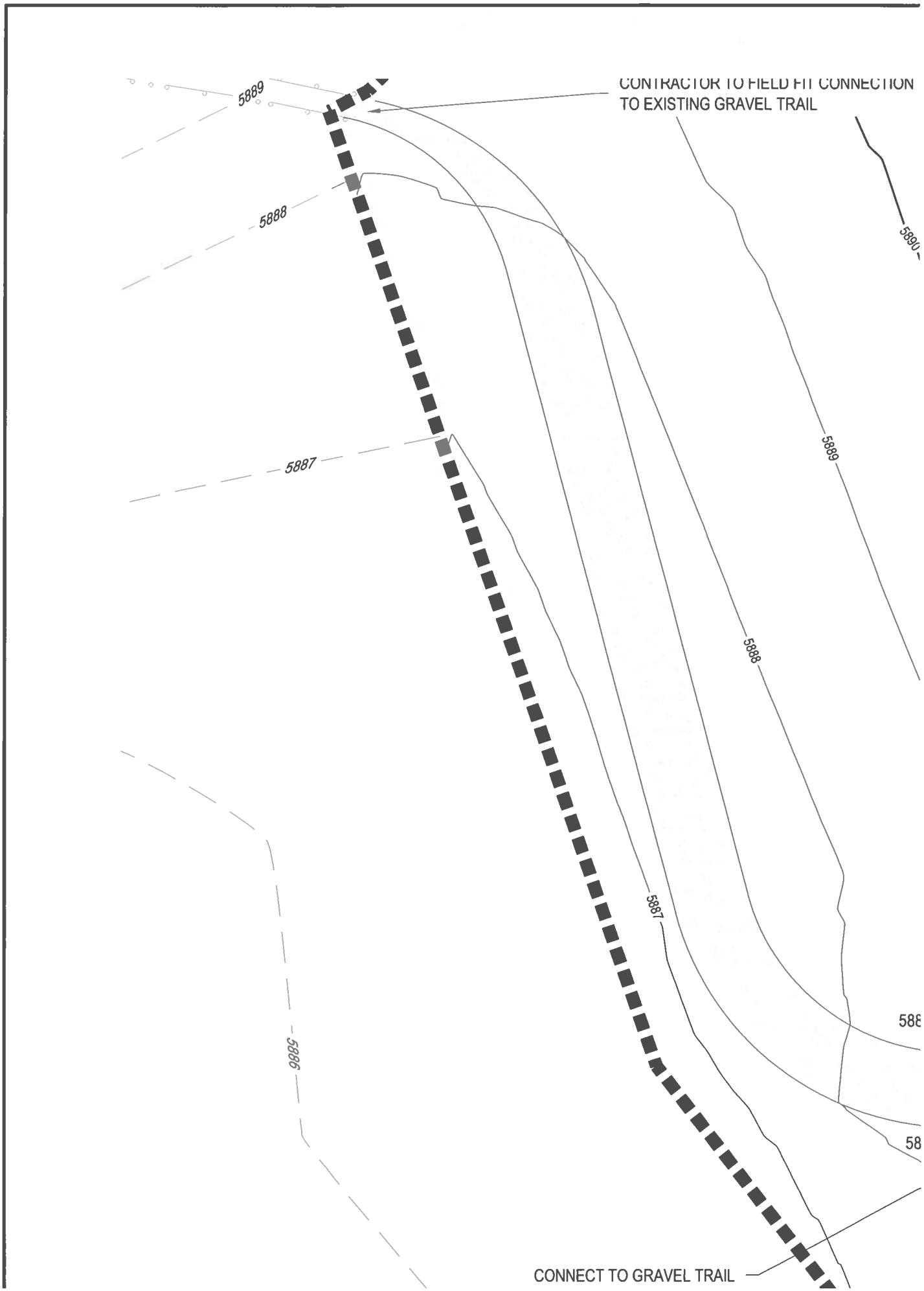
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TO EXISTING GRAVEL TRAIL
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58
CONNECT TO GRAVEL TRAIL

Appendix B - Pond 705 Downstream Tributary Channel Design Report

Otak

Peak Innovation Park- Pond 705 Tributary to Big Johnson Reservoir Stabilization Analysis

Pond 705 Downstream Tributary Channel Design Report

3rd Submittal

Submitted to:

Peak Metropolitan District #3
1515 Market Street, Suite 200
Denver, CO 80202

October 2023
January 2024
February 2024
April 2024

Prepared by:

Otak, Inc.
371 Centennial Parkway
Suite 210
Louisville, CO 80027

Project No. 021447.B00

Engineer's Statement:

This report and plan for the drainage design of Peak Innovation Park was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

SIGNATURE (Affix Seal):_____

Colorado P.E. No. Date CO PE#46893; April 26, 2024

Developer's Statement:

Colorado Springs Airport hereby certifies that the drainage facilities for Peak Innovation Park Pond 705 Downstream Tributary Channel shall be constructed according to the design presented in this report. I understand that (agency) does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the City of Colorado Springs reviews drainage plans pursuant to section 7.7.906 of the City Code; but cannot, on behalf of Peak Innovation Park Pond 705 Downstream Tributary Channel, guarantee that final drainage design review will absolve Colorado Springs Airport and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Colorado Springs Airport

Name of Developer

_____

Authorized Signature Date

Troy Stover

Printed Name

Airport Business Park Director

Title

30 S. Nevada Avenue, Suite 604, Colorado Springs, CO 80903

Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

Heidi M. McMacken 8/28/2024

For City Engineer Date

Table of Contents

Section 1. Purpose and Scope of Project

UFCS Airport as part of the COSA: Peak Innovation Park development has requested Otak to analyze the downstream drainageway south of Powers Boulevard and determine recommendations for long-term stabilization and establish a protected drainage path based on a Geomorphic and Hydraulic assessment. Currently, Peak Innovation Park is developing with plans to continue to develop and expand within the Colorado Springs Airport. The purpose of this project is to evaluate the existing and future channel conditions and develop design recommendations for improvements that provide long-term channel stability, reduce future maintenance needs, establish a protected floodplain, and maximize ecological uplift.

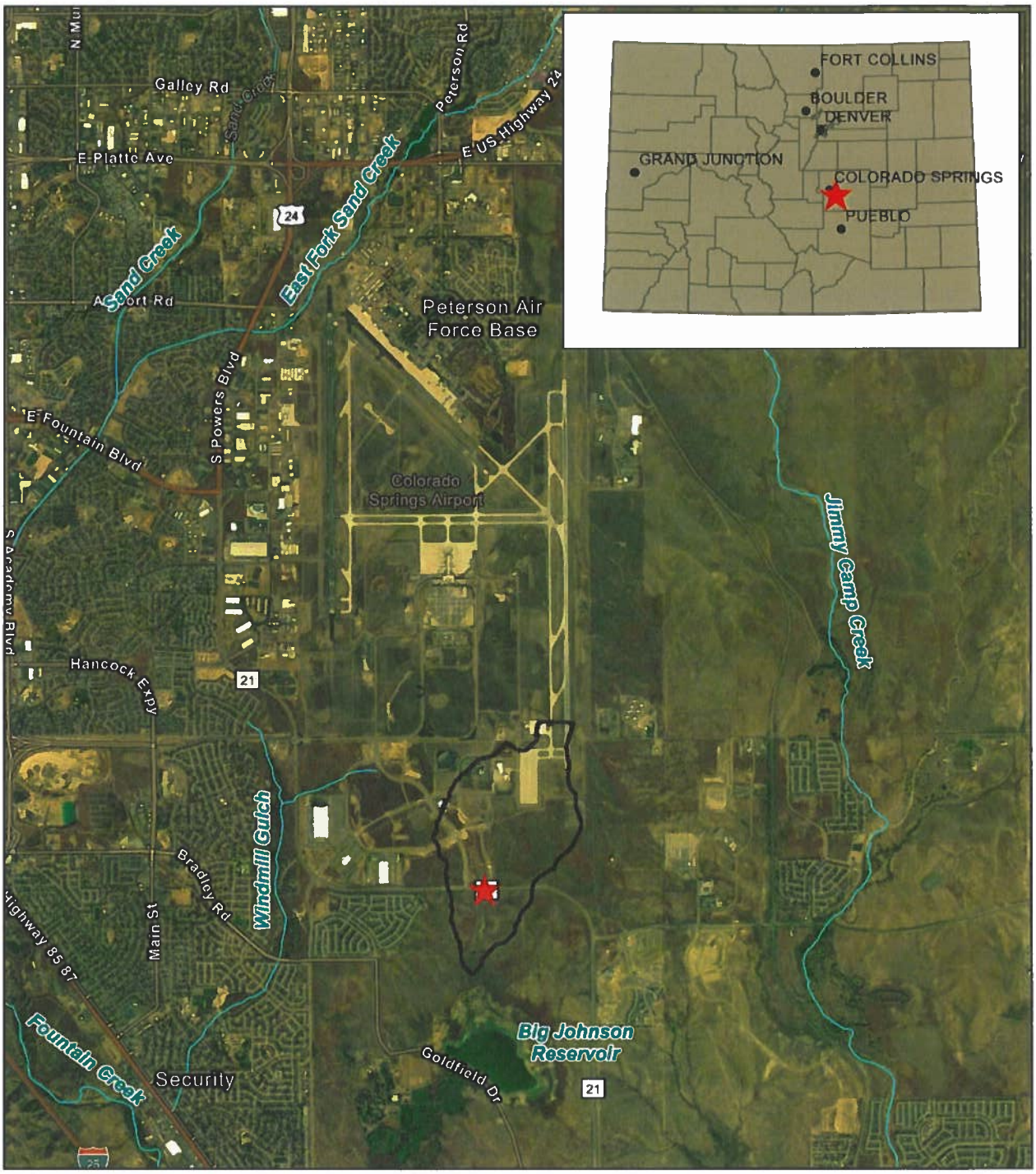
To accomplish these goals, the following scope items were developed for this project:

- Review of existing and future conditions hydrology for the watershed,
- Completion of a geomorphic stream assessment evaluating historic, current, and future stream conditions and channel evolution due to upstream changes in hydrology.
- Develop design recommendations and perform hydraulic analysis for a range of flows, that include frequent (occurring often) and infrequent flows (rare floods).
- Provide recommendations for regional recreation trail, including suggestions for amenities that may enhance the recreational experience within the stream corridor.
- Support the design concepts and analysis with defendable design standards that meet City of Colorado Springs standards of practice including the City's Four-Step Process to minimize adverse impacts of urbanization by:
    1. Reduce Runoff Volumes
    2. Treating the Water Quality Capture Volume (WQCV)
    3. **Stabilizing Drainageways**: This channel design report provides the geomorphic and hydraulic assessment that determined the recommended design criteria for long-term stabilization and to establish a protected drainageway.
    4. Implementing long-term source controls.

Section 2. Watershed Site Assessment

Reach Description

The tributary downstream of Peak Innovation Park Pond 705 is unnamed and a first-order stream, flowing from north to south. The tributary drains to Big Johnson Reservoir and the Peak Innovation Park drainage area to the tributary is approximately 450 Acres with the total drainage area being ~582 Acres. The tributary is located in Section 8, Township 15 South, Range 65 West of the 6th Principal Meridian, in the City of Colorado Springs, El Paso County, Colorado (Figure 1). The existing tributary is within multiple jurisdictions and landowners (CDOT, City of Colorado Springs, Colorado Springs Airport, El Paso County, and Cygnet). The proposed improvements will be owned and maintained by the Metro District.



VICINITY MAP

COSA POND 705
HYDRAULIC ANALYSIS
PROJECT 21447.B

COLORADO SPRINGS, CO

Data Sources:
Date: 2/8/2024
Disclaimer: This data is not to survey accuracy and is meant for planning purposes only

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Project Location
Streams
Pond 705 Basin

Feet
0
5,000

Otak

Figure 1: Vicinity Map

Un-named Tributary

The project reach begins at the 8-ft x 8-ft Colorado Department of Transportation's (CDOT) concrete box culvert (RCBC) outfall on the south side of Powers Boulevard. The tributary runs from the north to the south across private property (Cygnet) for the first ~200-feet, then onto City of Colorado Springs open space until it reaches Big Johnson Reservoir. The project is proposing to stabilize approximately 1,100 feet of channel starting at the 8-ft x 8-ft RCBC south towards Big Johnson Reservoir. The tributary is within the FEMA Firm Panel 08041C0764G (Effective 12/7/2018; see Firm in Appendix). It is not within any jurisdictional floodplain and will not require any flood hazard area mapping. The channel also does not have any jurisdictional wetlands or endangered species and will not require any U.S. Army Corp of Engineering permitting. The drainage area is located within the Foothill Grasslands level IV ecoregion (Chapman et al., 2006) and is best characterized as a grassland swale with sandy or gravelly loam. Historical aerial imagery from 1947 shows that while there was a smaller stream network closer to Big Johnson Reservoir, it appears it did not extend up to the current day location of Powers Boulevard (Figure 2). There are no existing utilities within the project corridor.

Figure 2: 1947 Aerial Imagery of Project Area

Hydrology

Peak Innovation Park is at the top of the tributary watershed. Historically the property has been grasslands with very little urban development until the airport was built in 1927. Since then, development has been slowly occurring within the area and the excess runoff has led to destabilizing of the tributary from the airport east runway to Big Johnson Reservoir.

The drainage area north of Powers (COSA: Peak Innovation Park) is 450 acres. Like many drainageways in the arid front range, urbanization of the watershed significantly impacts the hydrology and causes instability within the drainageways.

The philosophy of this design effort is to build on hydrologic and geomorphologic understanding of the watershed with each evaluation building on the other. The foundation of stream assessment and function is hydrology, which then allows for the evaluation and assessment of hydraulics that directly impacts and determines stream morphology. The goal of this tiered evaluation is to determine a long-term stream configuration that supports a rich and diverse ecology that supports stream stability and ultimately in-stream water quality and habitat for aquatic species and local wildlife. To develop a design that is resilient to significant flooding events and ecologically functional, an understanding of the hydrology of the watershed must be developed including determination of base flows, bankfull flows, and recurrent flooding events. We discuss the flow conditions used to develop and evaluate the design below.

Flood Discharges

As part of the design analysis, Otak reviewed the previous City's Drainage Basin Planning Study (DBPS) for this area. The Windmill Gulch and Big Johnson Reservoir studies were completed in 1991 and 1992. Based on the significant changes to the areas (development) and hydrologic modeling improvements since then, Otak chose not to use these plans as part of this analysis. Otak used the Master Development Drainage Plan hydrology in the COSA: Peak Innovation Park Master Development Drainage Plan (August 2020) and COSA: Peak Innovation Park MDDP Amendments 1 & 2 (September 2021 and September 2022) by Enginuity Engineering Solutions (See Appendix for Amendment 2 Hydrology Map from Report). Otak also is currently working with UFCS and Enertia Consulting Group on Amendment 3 for the Pond 705 analysis to determine minor and major flows discharging to Powers Boulevard and the existing 8-ft x 8-ft RCBC. The SWMM model is included in the Appendix and is labeled Future Conditions Pond 705. The 5-year, 10-year, and 100-year have been included. The outfall node DP-Powers represents the outfall to the 8-ft x 8-ft RCBC crossing Powers. For clarity, it has been highlighted. Otak also evaluated the contributing areas south of Powers Boulevard. This was done with Stream Stats and the results were compared to the minor and major flows reported in the Peak Innovation Park Amendment 2 and Future Amendment analysis. See Table 1 for Flood Flows from both Peak Innovation Park and Stream Stats. The chosen design flows were based on the future amendment analysis, which provided the most conservative 5-Yr and 10-Yr peak flows. The 100-Yr flow was also based on the future amendment analysis but was increased by 15% to be conservative. The chosen design flows are highlighted in Table 1.

Table 1: Flood Flows

	5-Yr CFS	10-Yr CFS	100-Yr CFS
COSA: Peak Innovation Park Amend 2	101	136	414
Stream Stats	56	102	410
COSA: Peak Innovation Park Pond 705 (Future Amend)	151	245	370
Design Flows	**151**	**245**	**425**

Bankfull and Low Flow Discharges

The definition of bankfull discharge is the point where flow transitions from the channel to the floodplain (USDCM). This is the flow that develops the stable cross-section, bed profile, and planar form geometries. Bankfull flows usually fall between the 1- and 2-year storm events.

The Colorado Springs Drainage Criteria Manual provides guidance for determining the low flow discharges. It recommends a hydrologic analysis of historic conditions, or the use of a regression equation based on a study of Jimmy Camp Creek performed by Matrix Design Group 2013.

As part of the design for the unnamed tributary, Otak determined a historic low flow discharge comparing the COSA: Peak Innovation Historic Hydrologic Analysis (2-Yr event) (see Appendix) and the historic regression equation. The results are shown in Table 2. It should be noted that future condition flows will be regulated by two regional detention facilities. These facilities will be full spectrum detention with a 40-hour water quality release as well as an EURV release. This will reduce the low flow discharges significantly versus the historic flows. The results are listed in Table 2. For the channel design, Otak chose to use the more conservative flow as the bankfull discharge (89). But for the base flow pedestrian crossing design, Otak chose to use the future water quality release from both regional ponds, as this will be the new base flow that accounts for urban irrigation runoff as well as the 80th percentile of storms.

Table 2: Bankfull – Low Flow Discharges

	Contributing Area Sq. Miles	2-Yr Historic CFS	Historic Reg. Eq. CFS	Future 2-Yr CFS	Future WQ CFS
DP700	0.7	87	**89**	25.9	**2.9**

Geomorphology and Stream Assessment

Methodology

Urban geomorphology is the process of applying fundamental stream mechanics, hydrology, and sediment transport to streams within an urban or developing environment. When watersheds develop around a stream, they change the overall balance of the stream system. Urbanization changes the sediment supply into a stream, it changes the timing and peaking of hydrographs in response to rainfall events, and it increases the volume and durations of frequent flow events. Urbanization can transform a stream that was once dry and ephemeral into a "wet" system with perennial flows.

Additionally, urbanization can create a clear water scour condition by eliminating sediment supply from the upstream watershed, or it can introduce non-native material into the system as a result of sanding of roads and parking lots to address winter driving conditions. Like all geomorphological assessments, the assessment performed for this report includes a visual and computational approach, which is discussed in subsequent sections.

Visual Assessment

This section discusses the visual assessment from the site visit of the fundamental stream system in its current and expected future.

Existing Stream Conditions and Features

Upstream of Powers Boulevard

A site visit was conducted on June 6, 2023, to assess existing conditions. The site visit consisted of walking approximately 750 feet upstream and 1,500 feet downstream of Powers Boulevard. The area upstream of Powers Boulevard was a recently constructed channel stabilization project that included a 40-foot bottom width and well vegetated stable 3:1 side slopes (Figure 3). Within the channel, the stream appeared to be shifting around the channel bottom allowing for multiple low flow paths with sand bars present. The channel bottom also consists of varying vegetation including some younger cottonwoods (Figure 4). Local incision was present where jersey barriers were placed in the bottom of the channel which constricted flow to a single discharge point, however, the stream was generally stable and

represents a potential stable design reference. The stream crosses under Powers Boulevard in an 8-ft x 8-ft RCBC, and there is a rip rap rundown on the downstream side (Figure 5).

Figure 3: Upstream of Powers in the restored section (looking upstream)

Figure 4: Upstream of Powers in the restored section (looking downstream)

Figure 5 (Station 1+00): 8-foot by 8-foot box culvert under Powers Blvd (looking upstream)

Downstream of Powers Boulevard

The channel section immediately downstream of the Powers Boulevard culvert and rip rap rundown is incised and has vertical cut banks 4-6 feet below the valley bottom (Figure 6). The bed and bank material are easily erodible and bank failure was evident throughout the reach (Figure 7 and Figure 8). In one location a trail that crossed the Unnamed Tributary had failed and been washed out into the stream and the culvert under the crossing had been filled with sediment leading to flows flanking and by-passing the culvert (Figure 9). Local pockets of claystone were encountered in the channel bed (Figure 10). Generally, this reach was 15-25 feet wide, and is in the Cluer and Thorne (2014) stream evolution model stage of degradation and widening.

Further south, the channel transitions away from incision and is best characterized as a sand wash (approximately 90-foot wide; Figure 11 and Figure 12). Approximately 50 feet of the wash was active with wetted sands surrounding the main channel. Grasses were growing everywhere outside of the more active portions of the wide shallow wash. This section is more vertically stable than the reach closer to Powers Boulevard as flows are able to spread out across the wash, and because surrounding vegetation is able to provide additional stability.

It should be noted that Otak also identified a side tributary to the Unnamed Tributary that collects flows from Powers Boulevard and a small detention facility north of Powers Boulevard and enters the Unnamed Tributary approximately 700 feet downstream of the Powers Boulevard crossing. The tributary follows a similar trajectory from 4-6 feet incision closer to Powers Boulevard, eventually widening and shallowing before entering the channel (Figure 13). This side tributary is proposed to remain undisturbed except for where the channel connects with the main tributary (Drop #4). Flows were determined from Stream Stats and are provided in the Appendix. Channel improvements at the drop are provided in the Design Recommendations.

Figure 6 (Station 1+50): Degraded section downstream of culvert with rip rap rundown (looking downstream)

Figure 7 (Station 4+50): Bank failure within reach (looking downstream)

Figure 8 (Station 5+00): Typical bank height and material

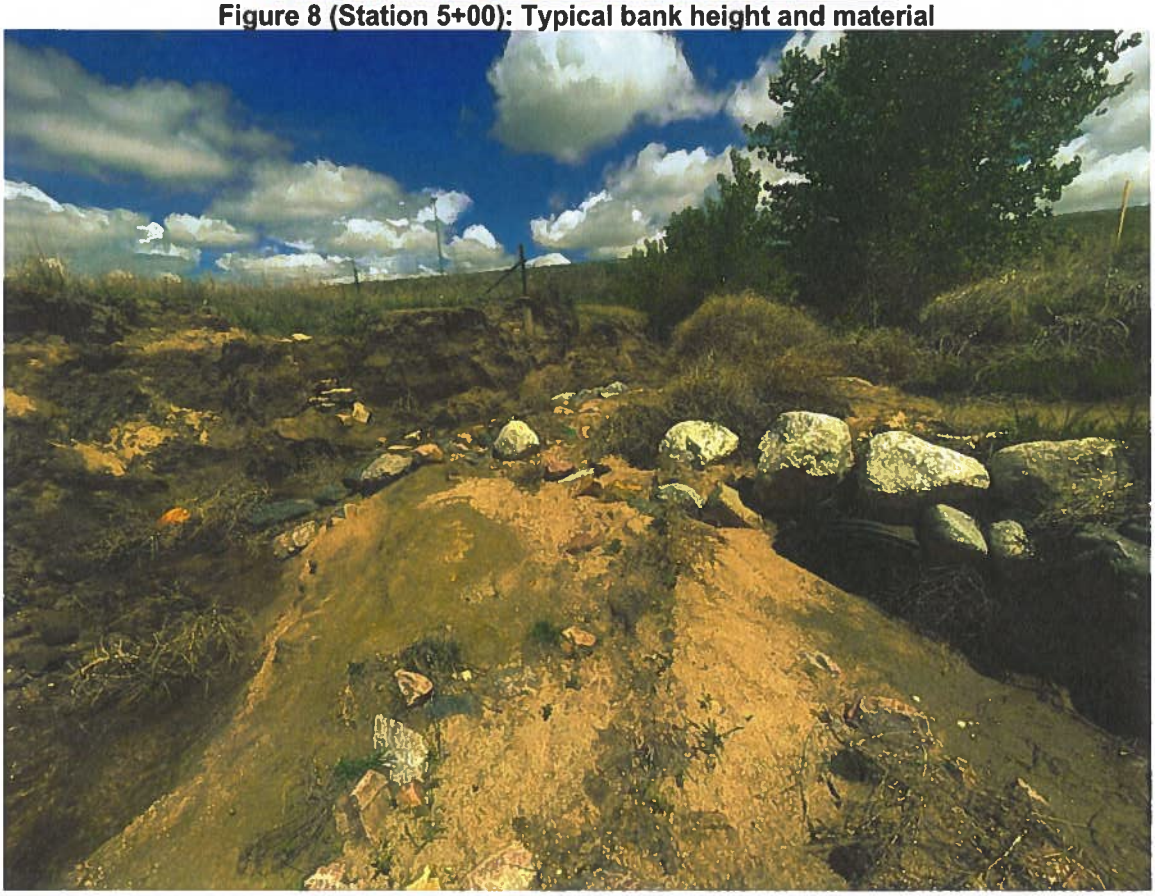

Figure 9 (Station 3+50): Flanked culvert and failed trail crossing (looking upstream)

Figure 10 (Station 3+50): Example of claystone encountered in channel bed

Figure 11(Station 14+00): Wide alluvial wash (looking upstream)

Figure 12 (Station 14+00): Wide alluvial wash with vegetation in the channel (looking downstream)

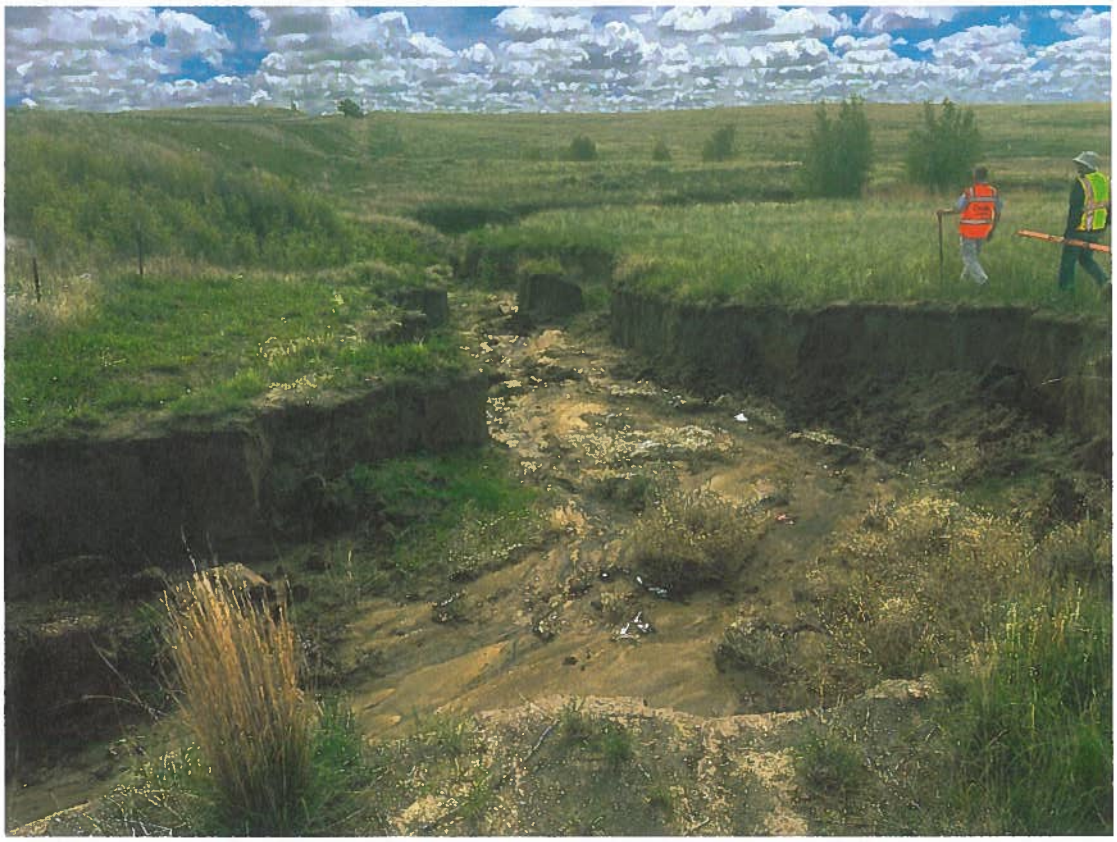

Figure 13: Incised side tributary immediately downstream of Powers Boulevard (looking downstream)

Observation of Soils

During the site visit, there was a small base flow within the main channel (<1 cfs). However, this small flow was enough to entrain the highly erodible windblown and alluvial sediment. As hydromodification continues to increase flows within the contributing basin, more and more sediment will be entrained, and the stream will continue to down cut and widen. Additionally, the increased stream flow and scour may continue to disturb vegetation, which is currently providing stability to the stream. If left un-checked downcutting is likely to continue downstream of Powers Boulevard until the stream reaches a more stable slope.

Four bulk sediment samples (labeled S1 through S4 in Figure 14) were taken from the channel bed during the site visit and were analyzed by Advanced Terra Testing. The results of the analysis can be seen Figure 14 and Table 3. The bed material was at least 95% sand in each of the bed samples with limited gravels in the stream. This is consistent with the NRCS Soil Survey, which identifies the soils as mostly sandy loams with a hydrologic soil group of type A (See Appendix for Soils Report).

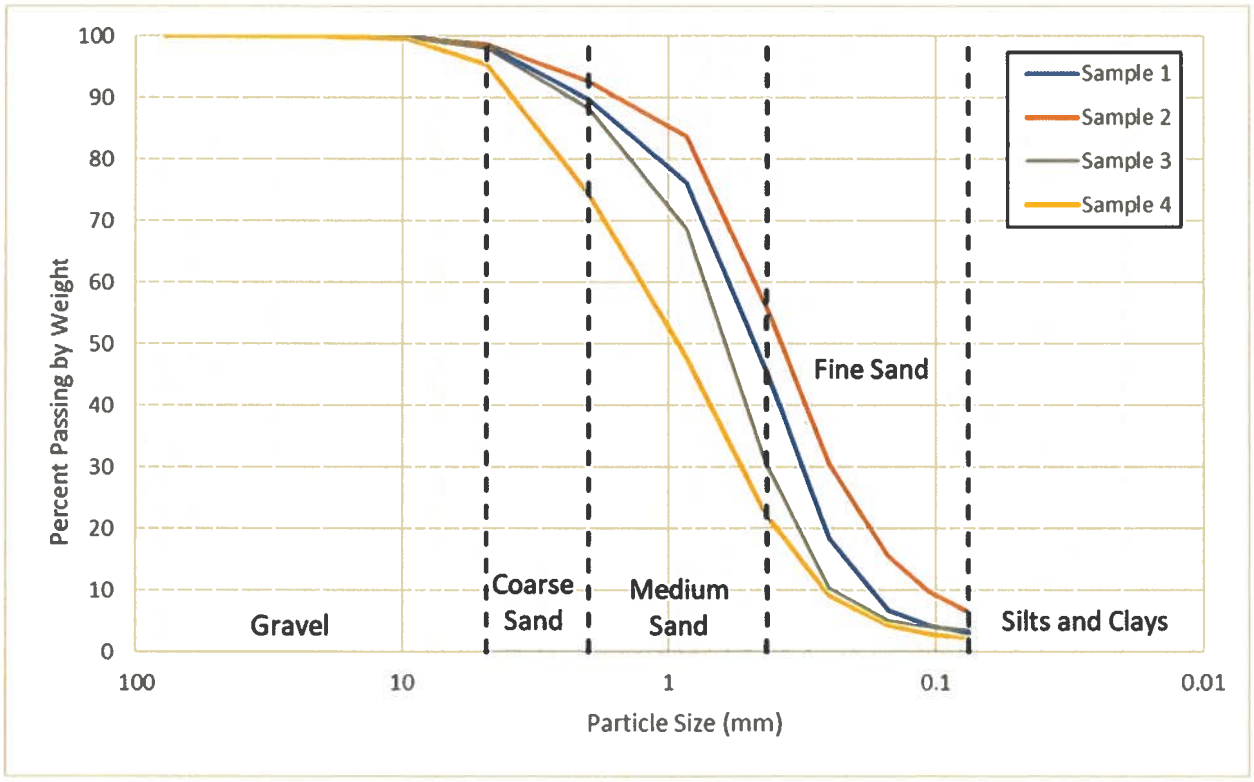

Figure 14: Results of Bulk Sample Analysis

Table 3: Results of Bulk Sample Analysis

	Sample 1	Sample 2	Sample 3	Sample 4
D16 (mm)	0.2	0.2	0.3	0.3
D50 (mm)	0.5	0.4	0.6	1.0
D84 (mm)	1.5	0.9	1.7	3.3

Recommendations

Because the recently restored portion of the Unnamed Tributary (upstream of Powers Boulevard) appeared to be stable and ecologically productive, it seems appropriate to use it as a guide for restoration

of the stream downstream of Powers Boulevard. This design approach can be used within the sections of the stream that are currently downcutting and widening. However, no restoration is required at this time in the section that is a wide alluvial wash. To confirm that the proposed design meets criteria and is performing as expected, Otak modeled the proposed design surface in a hydraulic model. Ecological restoration should be considered as a part of the design as vegetation can be vital to providing stability in these channel systems. Lastly, monitoring into the future should be considered, especially in the downstream wash, to see if any potential degradation begins to threaten the restoration project.

Section 3. Design Recommendations

Based on the hydrology, geomorphology recommendations, and design criteria manuals (City of Colorado Springs, MHFD, and National Engineering Handbook), Otak recommended the following design criteria.

Channel Geometry

The Natural Resources Conservation Service (NRCS) Stream Restoration Design National Engineering Handbook (NEH) provides design recommendations and criteria for stream design. Based on the geomorphic assessment this channel is an alluvian channel. An alluvial stream is defined as stable when it has the ability to pass the incoming sediment load without significant degradation or aggradation, and when its width, depth, and slope are fairly consistent over time (NEH). One of the approaches recommended for stable channel design in an alluvial channel is to use the channel dimensions of a stable channel reach i.e. a reference reach. Based on the geomorphology recommendation, Otak reviewed the upstream channel design as a stable reference reach. The upstream channel design plans were prepared by CH2M-Hill in 2013. The plans show a channel slope of 0.3%, a natural bottom width of 40-feet with 3:1 side slopes, and Type M riprap along the toe of the channel side slopes. Based on this channel geometry, Otak did an initial hydraulic analysis using Hydraulic Toolbox to evaluate the hydraulics of the channel. Mannings n values were selected based on the DCM Table 12-2 and US Geological Survey Water Supply Paper 2339. An initial Manning's n value of 0.045 was used. Table 4 summarizes the results of the analysis for different hydrologic flows.

Table 4: Initial Channel Hydraulics using Hydraulic Toolbox

	Q CFS	V FPS	Depth FT	Froude Number	Ave Shear Stress PSF	Max Shear Stress PSF
Low Flow	89	1.81	1.11	0.32	0.19	0.21
5-Yr	151	2.18	1.51	0.33	0.25	0.25
10-Yr	245	2.57	1.99	0.35	0.32	0.37
100-Yr	425	3.07	2.72	0.36	0.42	0.51

Based on the results of the initial hydraulic analysis, the Low Flow and 100-Year analysis meet the City of Colorado Springs design criteria for erosive soils (DCM Table 12-3). Otak recommends the following channel geometry based on this reference reach.

Table 5: Recommended Channel Geometry

	Channel Bottom Width FT	Slope %	Side Slopes FT/FT
Unnamed Trib	40	0.3	4:1

Due to the low velocities and shear stresses and the performance of the reference reach upstream, Otak proposes that the channel match the reference reach and be a natural bottom channel without armoring,

but that riprap be placed along the toe of the channel side slopes for the entire length of the project. The riprap should extend 1-foot above the 100-Year water surface elevation and at least 18-inches below the channel bottom. Riprap calcs were performed based on the City's DCM and are included in the Appendix. Type L soil riprap was recommended for the toe of the channel side slopes and Type M void-filled riprap for the drop approaches and end sills based on the calculations (see Appendix).

Drop Structure Geometry

Based on the recommended slope, it was determined that four grade control drop structures would be needed from Powers Boulevard to the wide alluvial wash stable section of the unnamed trib. Per discussions with the City of Colorado Springs, they required the use of sculpted concrete. Otak used the Colorado Springs Drainage Criteria Manual and the Mile High Flood District (MHFD) criteria manual to determine initial drop structure geometry recommendations. Based on the MHFD criteria, Otak used the standard drop structure recommendations provided by the MHFD. These were then modified based on engineering experience and judgement. A summary of the recommended drop structure geometries is listed in Table 6.

Table 6: Recommended Drop Structure Geometries

	Drop Height FT	Drop Width FT	Unit Discharge CFS/FT	Longitudinal Slope %	Stilling Basin Length FT
Drop #1	4	40	10.6	25	20
Drop #2	4	40	10.6	20	20
Drop #3	4	40	10.6	20	20
Drop #4	4	40	10.6	20	20

The recommended drop structure geometries were then used to design the drop structures. Enertia Consulting Group prepared the design plans and provided the following drop structure geometries.

Table 7: Designed Drop Structure Geometries

	Drop Height FT	Drop Width FT	Unit Discharge CFS/FT	Longitudinal Slope %	Stilling Basin Length FT
Drop #1	5	40	10.6	25	25
Drop #2	4	40	10.6	12.5	20
Drop #3	4	40	10.6	16.7	20
Drop #4	4	40	10.6	16.7	30

Due to the existing degradation at the 8-ft x8-ft RCBC, a 5-foot drop will be needed for Drop #1. This is outside of the recommendations in the Colorado Springs DCM, but within the MHFD criteria. A variance for Drop #1 is requested. Drop structures 2-4 meet the Colorado Springs DCM recommended geometries and provide a flatter longitudinal slope. This was discussed and provides additional value for the hydraulics as well as public safety and interaction due to the trail crossing over Drop 2 and the additional drops being relatively close to the regional trail. In addition to the longitudinal slope, each stilling basin was designed to be free draining. Otak coordinated with Enertia to determine a v-notch opening based on the bankfull – low flow discharges. Otak then evaluated the drop structures in HEC-RAS to verify the design.

Seepage Control

To provide seepage control, Otak is recommending that sheet pile be placed at the top of each drop per the Colorado Springs DCM and MHFD USDCM. Otak is recommending that PZ-22 steel sheet pile be

used to a depth of 10-feet. To validate the design, Otak performed a Lane's Creep analysis Lane's Creep determines a weighted-creep head ratio (C_w) based on the head differential (H_s) and the horizontal (L_h) and vertical creep distances (L_v). The analysis looks at the calculated creep ratio for each drop structure and compares it to the recommended minimum ratio for Fine Sand. If the calculated ratio is greater than the recommended minimum than the sheet pile depth and seepage is acceptable. If it is less than the recommended minimum ratio, than the sheet pile depth should be increased. Otak found that the creep ratios were all greater than the recommended minimum based on a sheet pile depth of 10-feet (See Table 8). Although not required for drops 5-feet or less, Otak recommended weep drains be placed per the City of Colorado Springs DCM and MHFD criteria. Weep drains should be placed at a minimum of 10-foot spacing on center, see design plans for specific placement.

Table 8: Lane's Creep Analysis

	Hs FT	Lh FT	Lv FT	Cw (Calc.)	Cw (Min)
Drop #1	5.0	68.2	23.1	9.2	7
Drop #2	4.8	75.9	25.5	10.6	7
Drop #3	3.3	60.0	26.1	13.9	7
Drop #4	1.6	60.0	26.1	29.8	7

Long-Term Stability

As part of the long-term stabilization, Otak evaluated the possibility of long-term degradation and determined that there could be the potential for some degradation as the downstream natural slope is greater than the design slope. To account for this, Otak recommended that Drop #4 be modified and that the concrete edge wall on the downstream side be replaced and the drop be extended 5-feet below the surface as recommended by the MHFD to account for the potential future degradation (see USDCM Figure 9-17 A3). In addition to this, Otak recommends yearly visual inspection downstream of the improvements (~200-300 ft). If any degradation/head cutting is encountered this should be discussed with the City of Colorado Springs and a maintenance plan be developed and implemented.

Side Tributary

Otak also reviewed the side tributary and how it may be connected to the proposed stable channel. Otak reviewed the historic and existing conditions. Currently, the side tributary is unstable from Powers Boulevard to the existing maintenance access road. At this point it appears that the upstream sediment is being deposited due to the flattening out of the topography compared to the upstream conditions. The side tributary from this point downstream is widening out, well vegetated, and appears to be stable. Based on the topography as well as the aerial imagery, it appears that the channel may flow to the west of Drop #4 and the Pond 705 Tributary. Although the existing side tributary appears to be running parallel to the west of Pond 705 Tributary, Otak provided a connection point for the side tributary at Drop #4 should this tributary ever need to be stabilized and tie into the Pond 705 Tributary. Drop #4 is designed and meets criteria for 425 cfs, therefore it is reasonable to assume it would meet criteria for the Stream Stats hydrology of 56 cfs for the contributing area.

Baseflow Pedestrian Crossing

Otak in coordination with Enertia designed a baseflow crossing at the top of Drop #2. As discussed above, these flows were chosen because the future base flow will be controlled by these two regional facilities. All proposed development will be routed through both facilities; thus, any urban 'drool' or

irrigation runoff will be regulated by the water quality release system for both facilities as well as 80% of storms.

The proposed crossing will have raised boulders as steppingstones that are embedded in the concrete drop structure. The boulders will be 3.5-feet wide with 1.5-ft gaps and are elevated 6-inches above the invert of the channel. The boulders will span the entire 40-foot bottom width. Hydraulic Toolbox was used to analyze the proposed crossing using the future regional detention water quality flows. The results are included in the Appendix. The analysis indicates that under a full Water Quality event the pedestrian crossing will not overtop.

Maintenance

As part of the design, Otak is proposing that a maintenance access path be provided along the west side of the proposed improvements. This access path will allow for visual inspection and if needed any maintenance operations to gain access and perform any maintenance work. The tributary maintenance path will be accessed via the existing Cygnet maintenance trail to the west.

The drop structures should be inspected yearly to evaluate any issues. Maintenance should be performed if any excess scour or deposition is encountered. Vegetation should be checked, and additional seeding provided annually to provide for long term stability. Downstream of Drop #4 (~200-300 ft) should be reviewed and evaluated to determine if there are any issues with degradation and stabilization. Also, the side tributary to the west should be monitored upstream of Drop #4 to evaluate and determine if there are any issues with degradation and stabilization. Maintenance should follow the DCM and MHFD criteria.

Hydraulic Analysis of the Design

The full build out hydrologic scenario and proposed channel design was modeled within HEC-RAS v.6.4.1 to assess the accuracy of the channel and drop structure geometry and to ensure long-term channel and ecological stability. The hydraulic analysis was performed based on the DCM and MHFD criteria manual for detailed drop structure design. The detailed design evaluated the specific force, the tailwater depth, and minimum hydraulic jump length for each structure. Each drop structure met the design criteria (see Tables 8-10).

Table 9: Detailed Drop Structure Design Criteria

	Specific Force Toe of Drop (CU FT)	Specific Force d/s Tailwater (CU FT)	Req.Tailwater Depth (FT)	Hydraulic Jump Length (FT)	Min. Stilling Basin Length FT	Meets Criteria
Drop #1	246	266	4.3	25	15	Yes
Drop #2	194	271	3.5	18	11	Yes
Drop #3	206	276	3.6	20	12	Yes
Drop #4	206	271	3.6	20	12	Yes

Figure 13 shows the profile for the 100-year hydraulic analysis under a mixed flow regime. The results show that the flow regimes transitioning from subcritical flow to supercritical flow and then a hydraulic jump occurring starting at the toe of each drop and returning to subcritical flow in the proposed stilling basin.

Figure 14 shows the cross-sectional view of station 1330 for the 100-year event which is in the unlined natural channel section between drops 2 and 3 under a mixed flow regime. The cross-sectional view shows the anticipated hydraulic function of the recommended channel geometry and that the flow is subcritical. All cross-sections are included in the Appendix.

Riprap sizing calculations were performed based on the City of Colorado Springs DCM and MHFD USDCM using the results from the HEC-RAS Analysis. As the slopes for the stabilized channel are less than 2%, the mild slope conditions equation was used for the drop approach, end sill conditions, and the side slope conditions. The analysis evaluated the most conservative velocities and slopes for each condition. The results indicate that Type VL riprap is the minimum acceptable riprap size for the side slope protection, all the drop approaches, and the end sill condition. However, to be conservative and match the reference reach, Otak recommends that Type L soil riprap be used for the side slopes, and Type M void filled riprap be used for the drop approaches and end sills. The calculations are included in the Appendix. Riprap length, width, and depth is based on the MHFD USDCM and the recommended riprap size discussed above.

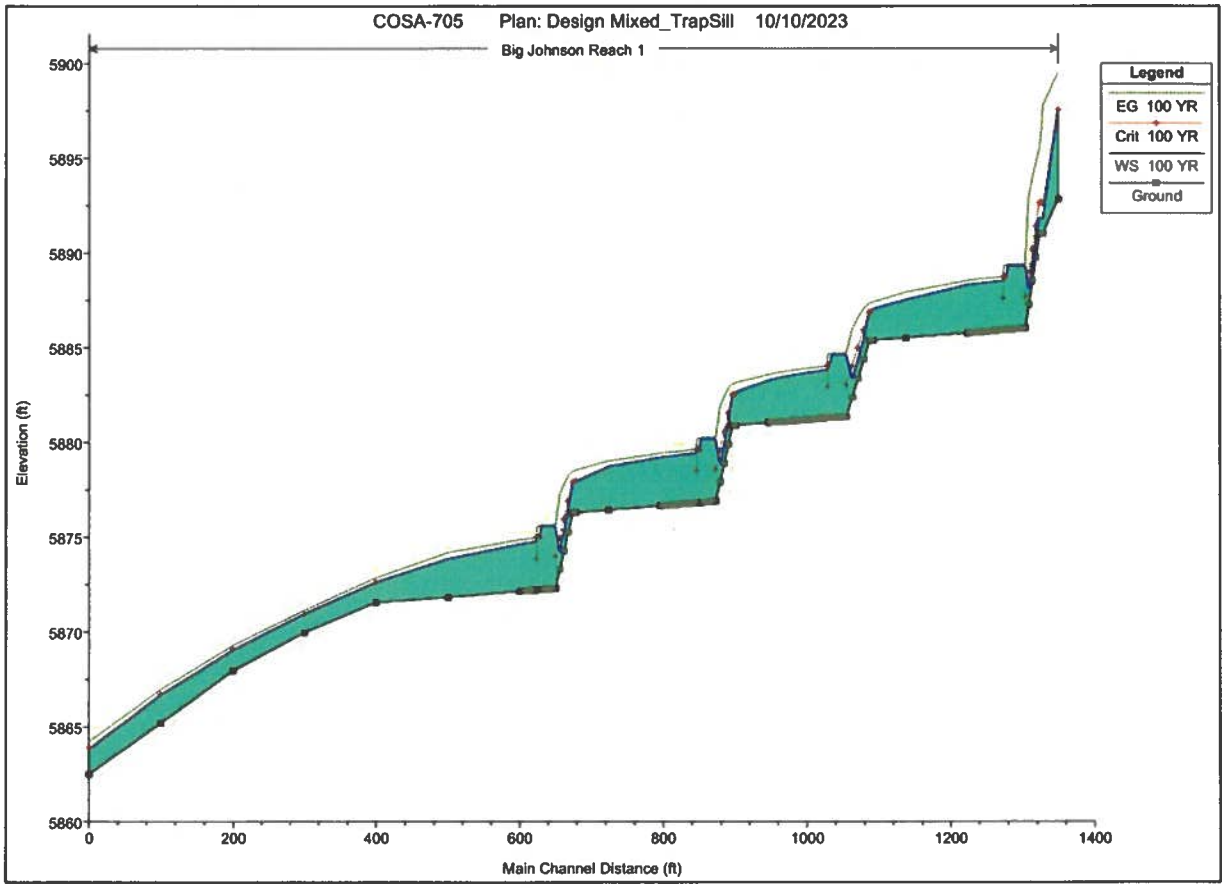

Figure 15: HEC-RAS Analysis Profile

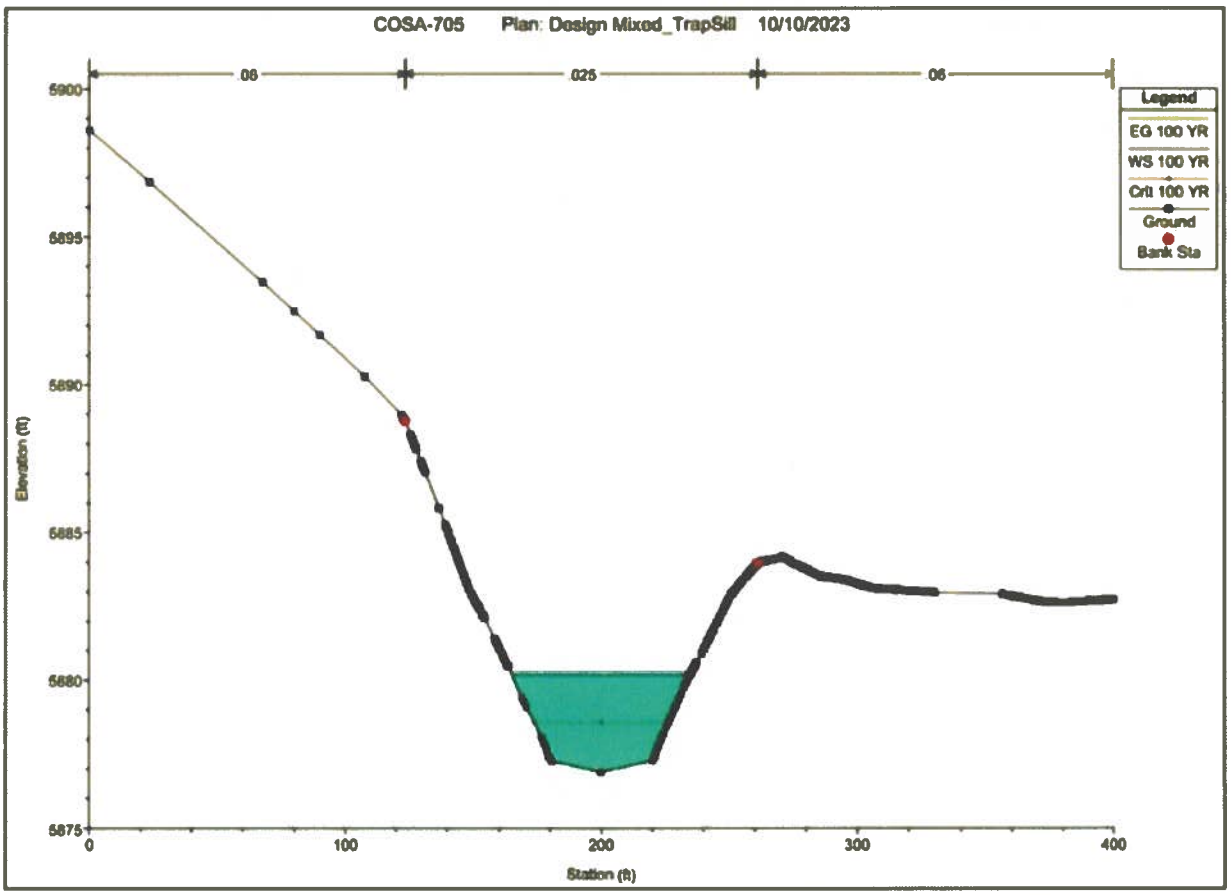

Figure 16: HEC-RAS Analysis Cross-Section 1330

Findings on Hydraulics

The following are findings from the hydraulic analysis:

Table 10: Final Natural Channel Unlined Hydraulics using HEC-RAS

	Q CFS	Ave V FPS	Max V FPS	Ave Froude	Max Froude	Ave Shear Stress PSF	Max Shear Stress PSF
Low Flow	89	2.18	2.41	0.41	0.47	0.20	0.20
100-Year	425	3.89	5.13	0.50	0.75	0.54	1.06

Table 11: Hydraulic Design Criteria for Natural Unlined Channels

	Max V FPS	Max Froude	Max Shear Stress PSF
Low Flow	3.5	0.50	-
100-Year	5.0	0.60	0.60

1. Vertical stabilization will be required to maintain a healthy channel cross section and keep velocities within acceptable ranges. The proposed designed drop structure geometries are acceptable and meet DCM and MHFD criteria. See Table 8 above.
2. The downstream tie-in cross section is 938. This cross-section has a velocity of 4.6 fps, a Froude number of 0.75 and a shear stress of 0.7 psf.

3. The velocities for the stabilized unlined natural channel sections were reviewed. All of the velocities for the Low Flow event met DCM criteria. The maximum velocity for the 100-year event was found to be 5.1 fps at cross-section 1595. This was the only stabilized natural unlined cross-section that exceeded the DCM. The rest of the stabilized unlined natural channel sections were below 5 fps and meet the recommended criteria. The entire stabilized channel improvements will include riprap along the toe of the 4:1 side slopes to prevent scour along the toes. It should also be noted that the maximum velocity will occur along the top of the wetted cross-section where there is a no-slip condition. And that the manning's n value used in the HEC-RAS analysis assumes no vegetation (most conservative). The average velocities for the unlined natural channel sections between the drops is 3.9 fps for the 100-Year event and the proposed channel slope is 0.3%.
4. The proposed channel geometry (40-foot bottom width and 4:1 side slopes) will convey the 100-Year flows at acceptable velocities.
5. The Froude Number for the stabilized unlined natural channel sections were reviewed. All the Low Flow Froude numbers meet the DCM. For the 100-Year event, the maximum Froude number was found to be 0.75 at cross-section 958 (~ downstream tie-in). In addition to this cross-section, the model results indicate that cross-section 1595 had a Froude number of 0.72. Every other cross-section meets the DCM value of 0.6 or less. While cross-sections 1595 and 958 are slightly higher than the recommended max value, they are both considered to be sub-critical flow regimes. The average Froude number through the stabilized channel reach is 0.50 for the 100-Year event. This is consistent with the initial channel hydraulics analysis.
6. The shear stresses for the stabilized unlined natural channel sections were reviewed. All of the Low Flow shear stresses meet the DCM. For the 100-Year event, the maximum shear was found to be 1.06 at cross-section 1595. In addition to this cross-section, the model results indicate that the cross-sections approaching Drop #3 had an increase in shear stress ranging from 0.6-0.8 psf. Also, cross-section 1182 upstream of Drop #4 had an increase in shear stress (0.76 psf). The average shear stress through the stabilized channel reach will be ~0.54 psf for the 100-Year event. This is consistent with the initial channel hydraulics analysis.
7. Overall, the design meets the City of Colorado Springs and MHFD design criteria for stabilizing natural channels and drop structures. There are a few cross-sections that exceed the design criteria for velocity, Froude number, and/or shear stress (958, 1182, and 1595). Based on the performance of the upstream reference reach over the past 10 years and that the variance from the recommended design criteria is minor, Otak believes that the design recommendations are appropriate and will provide for a stable channel reach.
8. Riprap sizing calculations following City of Colorado Springs DCM and MHFD USDCM were performed to determine a minimum riprap size. While the minimum calculated size is VL, Otak recommends Type L along the side slopes, and to be consistent with the upstream reference reach, Type M void filled riprap for the drop approaches and end sills.
9. Variances will be required for exceedance of the standard design criteria.

Section 4. Conclusion

The following are the conclusions from the Unnamed Tributary Geomorphology and Hydraulic analysis. They are following the City of Colorado Springs DCM, USDCM, NEH criteria, and previous reports and analysis.

1. The upstream reference reach channel geometry is recommended for the unnamed tributary downstream of Powers Boulevard to provide channel stability and ecological productivity.
    a. Trapezoidal channel with 40-foot bottom width and 4:1 side slopes
    b. Channel slope of 0.3%

2. Vertical stabilization structures will be required to meet the design slope of 0.3% and to keep average velocities below 5 fps. The designed drop structure geometries are appropriate and meet hydraulic criteria.
3. Variances will be requested for the HEC-RAS cross-sections 958, 1182, and 1595. These cross-sections are outside of the Colorado Springs DCM.
4. Type L soil riprap is recommended along the slope of the channel and Type M void filled riprap at the design approach and end sill.
5. As the channel transitions from the stabilized section to the natural section there is an anticipated increase in the velocities, Froude number, and shear stress due to the increase in slope. But the wide natural floodplain and vegetation are anticipated to help reduce future erosion. The results show that the channel velocities are increasing slightly but less than 5 fps, flows are remaining sub-critical (Fr < 1), and shear stresses are remaining less than 1 psf. Drop #4 will have an extended drop structure on the downstream side that will be buried to account for potential future degradation.

No downstream infrastructure or property will be adversely impacted by the proposed design.

The project is proposed to be completed within 6-months with work to be mostly completed within the winter season. If water control is needed, all water control will follow the City of Colorado Springs DCM, and MHFD USDCM.

Section 5. References

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2. Mile High Flood District Criteria Manual, USDCM Volumes 1-3, 2017.
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Appendix C - Maintenance and Inspection Forms

Stormwater Management Facility Maintenance and Inspection Form

General Information:

Contractor Name: _____ Contractor Email: _____

Contractor Address: _____ Project Name: _____

Contractor Phone: _____ Project Location: _____

Maintenance Required from Inspection based on Standard Operating Procedure (SOP):

Routine Work		Minor Work*		Major Work**	
Mowing	☐	Sediment Removal	☐	Major Sediment Removal	☐
Trash/Debris Removal	☐	Forebay	☐	Main Basin	☐
Outlet Works Cleaning	☐	Trickle Channel	☐	Filter Media	☐
Weed Control	☐	Inflow (s)	☐	Major Erosion Repair	☐
Mosquito Treatment	☐	Filter Media	☐	Outlet Works	☐
Algae Treatment	☐	Erosion Repair	☐	Main Basin	☐
		Inflow Point	☐	Spillway	☐
		Trickle Channel	☐	Structural Repair	☐
		Filter Media	☐	Inflow (s)	☐
		Vegetation Removal/Tree Thinning	☐	Outlet Works	☐
		Inflow (s)	☐	Forebay	☐
BMP Type		Trickle Channel	☐	Trickle channel	☐
Extended Detention Basin	☐	Main Basin	☐	Facility Rebuild	☐
Porous Landscape Detention	☐	Filter Media	☐	OTHER:_____	☐
Sand Filter Basin	☐	Revegetation	☐	_____	
Grass Swale	☐	Jet-Vac/Clearing Drains	☐	_____	
Grass Buffer	☐	Forebay	☐		
Open Channel	☐	Outlet Works	☐		
Constructed Wetland Basin	☐	Inflow (s)	☐		
Constructed Wetland Channel	☐	Underdrain (s)	☐		

Inspection Notes:

_____

_____

_____

_____

_____

Attach any inspection photos from the inspection.

Inspector Sign Off: _____ **Date**: _____