



9F 2326

**PRIVATE STORMWATER FACILITY AND WETLAND  
MAINTENANCE AGREEMENT AND EASEMENT**

This PRIVATE STORMWATER FACILITY MAINTENANCE AGREEMENT AND EASEMENT (Agreement) is made by and between EL PASO COUNTY by and through THE BOARD OF COUNTY COMMISSIONERS OF EL PASO COUNTY, COLORADO (County) and PRI #2, LLC (“Developer”) and FLYING HORSE NORTH METROPOLITAN DISTRICT (“Metro District”), a quasi-municipal corporation and political subdivision of the State of Colorado. The above may occasionally be referred to herein singularly as “Party” and collectively as “Parties.”

**RECITALS**

A. WHEREAS, the Metro District provides various municipal services to certain real property in El Paso County, Colorado referred to as FLYING HORSE NORTH; and

B. WHEREAS, Developer is the owner of certain real estate in El Paso County, Colorado, which Property is legally described in Exhibit A attached hereto and incorporated herein by this reference (“Property”); and

C. WHEREAS, Developer desires to plat and develop the Property as a Subdivision to be known as FLYING HORSE NORTH FILING NO. 3 (“Development”); and

D. WHEREAS, the development of the Property will materially increase the volume and decrease the quality of stormwater runoff from the Property; therefore, it is in the best interest of the public health, safety and welfare for the County to condition approval of this Development on Developer’s promise to construct adequate stormwater control facilities including permanent stormwater quality structural Best Management Practices (“BMPs”) for the Development; and

E. WHEREAS, the El Paso County Land Development Code, as periodically amended, requires the construction and maintenance of detention ponds and other drainage facilities adequate to maintain historic stormwater flow patterns, protect natural and man-made drainage conveyances, and prevent property damage in connection with land development and subdivisions, and further requires that developers enter into maintenance agreements and easements with the County for such drainage facilities; and

F. WHEREAS, the El Paso County Drainage Criteria Manual, Volume 2, as amended by Appendix I of the El Paso County Engineering Criteria Manual (“ECM”), as each may be periodically amended, promulgated pursuant to the County’s Colorado Discharge Permit System General Permit (MS4 Permit), which MS4 Permit requires that the County take measures to protect the quality of stormwater from sediment and other contaminants, requires subdividers, developers, landowners, and owners of facilities located in the County’s rights-of-way or easements to provide adequate permanent stormwater quality facilities and BMPs with new development or significant redevelopment and to enter into maintenance agreements and easements with the County for such facilities and BMPs; and

G. WHEREAS, Section 2.9 of the El Paso County Drainage Criteria Manual, Volume I provides for a developer's promise to maintain a development's drainage facilities in the event the County does not assume such responsibility; and

H. WHEREAS, Developer desires to construct for the Development drainage conveyance facilities, detention basins, stormwater control measures, and/or permanent stormwater quality BMPs (collectively, "Stormwater Facilities") as the means for providing adequate drainage and stormwater runoff control and to meet the requirements of the County's MS4 Permit, and to operate, clean, maintain and repair such Stormwater Facilities; and

I. WHEREAS, Developer desires to construct the Stormwater Facilities on property as set forth on Exhibit B attached hereto and incorporated herein by this reference ("Stormwater Facilities Area"); and

J. WHEREAS, Developer shall be charged with the duty of constructing the Stormwater Facilities and the Metro District shall be charged with the duty of operating, maintaining, and repairing the Stormwater Facilities; and

K. WHEREAS, the County, in order to protect the public health, safety and welfare, desires the means to access, construct, maintain, and repair the Stormwater Facilities, and to recover its costs incurred in connection therewith, in the event the Developer or Metro District fails to meet their obligations to do the same; and

L. WHEREAS, the County conditions approval of this Development on the Developer's promise to construct the Stormwater Facilities, and further conditions approval on the Metro District's promise to reimburse the County in the event the County must clean, maintain, or repair the Stormwater Facilities; and

M. WHEREAS, the County, in order to secure performance of the promises contained herein, conditions approval of this Development upon Developer's grant herein of a perpetual Easement over the Stormwater Facilities Area for the purpose of allowing the County access to construct, upgrade, clean, maintain and/or repair the Stormwater Facilities; and

N. WHEREAS, Pursuant to Colorado Constitution, Article XIV, Section 18(2) and Section 29-1-203, Colorado Revised Statutes, governmental entities may cooperate and contract with each other to provide any function, services, or facilities lawfully authorized to each.

### **AGREEMENT**

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

1. Incorporation of Recitals: The Parties incorporate the Recitals above into this Agreement.

2. Covenants Running with the Land: The Parties agrees that this entire Agreement and the performance thereof shall become a covenant running with the land, which land is legally described in Exhibit A attached hereto, and that this entire Agreement and the performance thereof shall be binding upon each Party and their successors and assigns.

3. Construction: Developer shall construct the following Stormwater Facilities on the Stormwater Facilities Area: Private Extended Detention Basin (Pond) A, Private Extended Detention Basin (Pond) B, and Rolled Matting in designated areas per the Construction Drawings and Grading & Erosion Control Plans. Developer shall not commence construction of the Stormwater Facilities until the El Paso County Planning and Community Development Department (“PCD”) has approved in writing the plans and specifications for the Stormwater Facilities and this Agreement has been signed by all Parties and returned to the PCD. Developer shall complete construction of the Stormwater Facilities in substantial compliance with the County-approved plans and specifications for the Stormwater Facilities and shall provide certification from a Colorado registered Professional Engineer that the Stormwater Facilities were constructed in compliance with and provide the volume and capacity required by such plans and specifications in accordance with ECM requirements. Failure to meet these requirements shall be a material breach of this Agreement and shall entitle the County to pursue any remedies available to it at law or in equity to enforce the same. Construction of the Stormwater Facilities shall be substantially completed within one (1) year (defined as 365 days), which one-year period will commence to run on the date the Erosion and Stormwater Quality Control Permit (ESQCP) and associated Construction Permit are issued. Rough grading of the permanent stormwater BMP facilities must be completed and inspected by the PCD prior to commencing road construction, and water quality capture volume (WQCV) outlet control structures must be substantially complete prior to paving roads or parking areas.

In the event construction of the Stormwater Facilities is not substantially completed within the one (1) year period, or if the Development is in violation of its ESQCP terms and conditions and Developer has not made an effort to remedy the violation in a reasonable amount of time as determined by the County, then the County may exercise its discretion to complete the Stormwater Facilities and shall have the right to seek reimbursement from the Developer and its respective successors and assigns for its actual costs and expenses incurred in the process of completing construction.

4. Maintenance of Stormwater Facilities: The Developer and the Metro District agrees for itself and its successors and assigns that it will regularly and routinely inspect, clean and maintain the Stormwater Facilities in compliance with the County-reviewed Operation and Maintenance Manual, attached hereto and incorporated herein by this reference as Exhibit C, and otherwise keep the same in good repair, all at its own cost and expense. No trees or shrubs that will impair the structural integrity of the Stormwater Facilities shall be planted or allowed to grow within or adjacent to the Stormwater Facilities.

5. Creation of Easements: Developer hereby grants the County and the Metro District a non-exclusive perpetual easement upon and across the Stormwater Facilities Area. The purpose of the easement is to allow the County and the Metro District to access, inspect, clean, repair and maintain the Stormwater Facilities; however, the creation of the easement does not expressly or

implicitly impose on the County a duty to so inspect, clean, repair or maintain the Stormwater Facilities or any appurtenant improvements

6. County's Rights and Obligations: Any time the County determines, in the sole exercise of its discretion, that the Stormwater Facilities have not been properly cleaned, maintained, or otherwise kept in good repair, the County shall give reasonable notice of such to the responsible Party and its successors and assigns. The notice shall provide a reasonable time to correct the problems. Should the responsible Parties fail to correct the specified problems, the County may enter upon the property described in **Exhibit B** to perform the needed work and shall have the right to seek reimbursement from the responsible Parties for its actual costs and expenses in performing the work. Notice shall be effective to the above by the County's deposit of the same into the regular United States mail, postage pre-paid. Notwithstanding the foregoing, this Agreement does not expressly or implicitly impose on the County a duty to inspect, construct, clean, repair or maintain the Stormwater Facilities.

7. Actual Costs and Expenses: The Developer and the Metro District agree and covenant, for themselves and their successors and assigns, that they will reimburse the County for the County's actual costs and expenses incurred in the process of completing construction of, cleaning, maintaining, or repairing the Stormwater Facilities, pursuant to the provisions of this Agreement.

The term "actual costs and expenses" as used in this Agreement shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, engineering and design costs, and costs to contract with specialized professionals or consultants, including but not limited to wetlands scientists, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to perform the work. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney's fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same.

8. Contingencies of Land Use/Land Disturbance Approval: Developer's and the Metro District's execution of this Agreement is a condition of subdivision, land use, or land disturbance approval. Additional conditions of this Agreement include, but are not limited to, the following:

- a. Conveyance of the Stormwater Facilities Area described in Exhibit B from Developer to the Metro District (which will include a reservation of easement in favor of the County for purposes of accessing, inspecting, cleaning, maintaining, and repairing the Stormwater Facilities) and recording of the Deed for the same.

The County shall have the right, in the sole exercise of its discretion, to approve or disapprove any documentation submitted to it under the conditions of this Paragraph, including but not limited to, any separate agreement or amendment, if applicable, identifying any specific maintenance responsibilities not addressed herein. The County's rejection of any documentation

submitted hereunder shall mean that the appropriate condition of this Agreement has not been fulfilled.

9. Agreement Monitored by El Paso County Planning and Community Development Department and/or El Paso County Department of Public Works: Any and all actions and decisions to be made hereunder by the County shall be made by the Executive Director of the El Paso County Planning and Community Development Department and/or the Executive Director of the El Paso County Department of Public Works. Accordingly, any and all documents, submissions, plan approvals, inspections, etc. shall be submitted to and shall be made by the Executive Director of the Planning and Community Development Department and/or the Executive Director of the El Paso County Department of Public Works.

10. Indemnification and Hold Harmless: Developer and the Metro District agree, for themselves, their successors and assigns, that they will indemnify, defend, and hold the County harmless from any and all loss, costs, damage, injury, liability, claim, lien, demand, action and causes of action whatsoever, whether at law or in equity, arising from or related to their intentional or negligent acts, errors or omissions or that of their agents, officers, servants, employees, invitees and licensees in the construction, operation, inspection, cleaning (including analyzing and disposing of any solid or hazardous wastes as defined by State and/or Federal environmental laws and regulations), maintenance, and repair of the Stormwater Facilities or wetlands, and such obligation arising under this Paragraph shall be joint and several. Nothing in this Paragraph shall be deemed to waive or otherwise limit the defense available to the County pursuant to the Colorado Governmental Immunity Act, Sections 24-10-101, *et seq.* C.R.S., or as otherwise provided by law.

11. Severability: In the event any Court of competent jurisdiction declares any part of this Agreement to be unenforceable, such declaration shall not affect the enforceability of the remaining parts of this Agreement.

12. Third Parties: This Agreement does not and shall not be deemed to confer upon or grant to any third party any right to claim damages or to bring any lawsuit, action or other proceeding against the County, the Developer, the Metro District, or their respective successors and assigns, because of any breach hereof or because of any terms, covenants, agreements or conditions contained herein.

13. Solid Waste or Hazardous Materials: Should any refuse from the stormwater facilities be suspected or identified as solid waste or petroleum products, hazardous substances or hazardous materials (collectively referred to herein as "hazardous materials"), the Developer and the Metro District shall take all necessary and proper steps to characterize the solid waste or hazardous materials and properly dispose of it in accordance with applicable State and/or Federal environmental laws and regulations, including, but not limited to, the following: Solid Wastes Disposal Sites and Facilities Acts, §§ 30-20-100.5 – 30-20-119, C.R.S., Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, 6 C.C.R. 1007-2, *et seq.*, Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k, and Federal Solid Waste Regulations 40 CFR Ch. I. The County shall not be responsible or liable for identifying, characterizing, cleaning up, or disposing of such solid waste or hazardous materials. Notwithstanding the previous sentence, should any refuse cleaned up and disposed of by the County be determined to be solid waste or hazardous

materials, the Developer and the Metro District, but not the County, shall be responsible and liable as the owner, generator, and/or transporter of said solid waste or hazardous materials.

14. Applicable Law and Venue: The laws, rules, and regulations of the State of Colorado and El Paso County shall be applicable in the enforcement, interpretation, and execution of this Agreement, except that Federal law may be applicable regarding solid waste or hazardous materials. Venue shall be in the El Paso County District Court.

15. Limitation on Developer's Obligation and Liability: The obligation and liability of the Developer hereunder shall only continue until such time as the Final Plat of the Development is recorded (if applicable) and the Developer completes the construction of the Stormwater Facilities and transfers all applicable maintenance and operation responsibilities to the Metro District. By execution of this agreement, the Metro District agrees to accept all responsibilities and to perform all duties assigned to it, including those of the Developer, as specified and subject to the terms herein.

*[Remainder of page intentionally left blank]*

Executed this 30<sup>th</sup> day of July, 2024, by:  
PRI #2, LLC.

By: [Signature]  
JEFFREY B. SMITH, GENERAL PARTNER

The foregoing instrument was acknowledged before me this 30<sup>th</sup> day of July, 2024, by JEFFREY B. SMITH, GENERAL PARTNER, PRI #2, LLC.

Witness my hand and official seal.

My commission expires: 2-14-27

STEPHANIE SARAH WOOLFOLK  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 19964012660  
MY COMMISSION EXPIRES FEBRUARY 14, 2027

[Signature]  
Notary Public

Executed this 30<sup>th</sup> day of July, 2024, by:  
FLYING HORSE NORTH METROPOLITAN DISTRICT NO. 1-5

By: [Signature]  
DREW BALSICK, PRESIDENT

Attest:  
By: [Signature]  
ADAM DOYLE, ASSISTANT SECRETARY

The foregoing instrument was acknowledged before me this 30<sup>th</sup> day of July, 2024, by DREW BALSICK, President and Adam Doyle, Assistant Secretary, FLYING HORSE NORTH METROPOLITAN DISTRICT NO. 1-5

Witness my hand and official seal.

My commission expires: 2-14-27

STEPHANIE SARAH WOOLFOLK  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 19964012660  
MY COMMISSION EXPIRES FEBRUARY 14, 2027

[Signature]  
Notary Public

Executed this 30<sup>th</sup> day of July, 2024, by:

BOARD OF COUNTY COMMISSIONERS  
OF EL PASO COUNTY, COLORADO

By: *[Signature]*

Gilbert LaForce, Engineering Manager  
Department of Public Works  
Authorized signatory as County Engineering  
designee pursuant to Resolution 24-145

The foregoing instrument was acknowledged before me this 1<sup>ST</sup> day of AUGUST, 2024, by GILBERT LAFORCE ~~Executive Director, Planning and Community Development Department.~~ ENGINEERING MANAGER, DEPARTMENT OF PUBLIC WORKS.

Witness my hand and official seal.

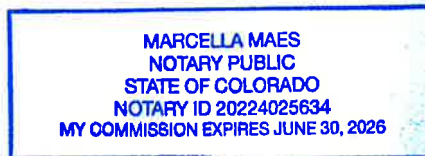
My commission expires: JUNE 30, 2026

*Marcella Maes*

Notary Public

Approved as to Content and Form:

*Lori L. Seago*  
Assistant County Attorney





**EXHIBIT A**  
**Property**

**LEGAL DESCRIPTION:** FLYING HORSE NORTH FILING NO. 3

A TRACT OF LAND BEING A PORTION OF SECTION 36, TOWNSHIP 11 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, AND A PORTION OF THE NORTHWEST QUARTER OF SECTION 31, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF SIXTH PRINCIPAL MERIDIAN, THE BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

**BASIS OF BEARINGS:**

THE NORTH LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 11 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE WEST END BY A 1" YELLOW PLASTIC CAP STAMPED "18235" AND THE EAST END BY A 2" ALUMINUM CAP STAMPED "32439" WITH APPROPRIATE MARKINGS, IS ASSUMED TO BEAR N89°03'58"E A DISTANCE OF 1,332.09 FEET.

COMMENCING AT THE SOUTHWEST CORNER OF SECTION 36, TOWNSHIP 11 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, SAID POINT BEING THE POINT OF BEGINNING; THENCE N00°14'34"W, ON THE WEST LINE OF SAID SECTION 36, A DISTANCE OF 1,120.17 FEET TO THE SOUTHWESTERLY CORNER OF SAID FLYING HORSE NORTH FILING NO. 1 AS RECORDED UNDER RECEPTION NO. 218714238;

THENCE ON THE SOUTHERLY BOUNDARY OF SAID FLYING HORSE NORTH FILING NO. 1 THE FOLLOWING NINE (9) COURSES:

1. S72°33'10"E A DISTANCE OF 134.21 FEET;
2. N40°01'04"E A DISTANCE OF 569.80 FEET;
3. N38°52'02"E A DISTANCE OF 60.00 FEET TO A POINT ON CURVE;
4. ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS N38°52'02"E, HAVING A DELTA OF 48°03'23", A RADIUS OF 520.00 FEET, A DISTANCE OF 436.14 FEET TO A POINT ON CURVE;
5. N86°55'25"E A DISTANCE OF 49.85 FEET TO A POINT ON CURVE;
6. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS N28°22'34"E, HAVING A DELTA OF 26°35'09", A RADIUS OF 60.00 FEET, A DISTANCE OF 27.84 FEET TO A POINT OF TANGENT;
7. S88°12'35"E A DISTANCE OF 210.24 FEET;
8. S59°10'55"E A DISTANCE OF 565.00 FEET TO A POINT OF CURVE;

9. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF  $82^{\circ}31'23''$ , A RADIUS OF 60.00 FEET, A DISTANCE OF 86.42 FEET TO A POINT ON CURVE, SAID POINT BEING ON THE WESTERLY BOUNDARY OF FLYING HORSE NORTH FILING NO. 2 RECORDED UNDER RECEPTION NO. 222715009;

THENCE ON THE BOUNDARY OF SAID FLYING HORSE NORTH FILING NO. 2 THE FOLLOWING FOUR (4) COURSES:

1.  $S52^{\circ}59'28''E$  A DISTANCE OF 282.69 FEET;
2.  $N31^{\circ}14'50''E$  A DISTANCE OF 8.64 FEET TO A POINT OF CURVE;
3. ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF  $37^{\circ}09'00''$ , A RADIUS OF 231.00 FEET, A DISTANCE OF 149.78 FEET TO A POINT ON CURVE;
4. THENCE  $N21^{\circ}50'10''W$  A DISTANCE OF 407.62 FEET TO A POINT ON CURVE SAID POINT BEING ON THE SOUTHERLY BOUNDARY OF SAID FLYING HORSE NORTH FILING NO. 1;

THENCE ON THE BOUNDARY OF SAID FLYING HORSE NORTH FILING NO. 1 THE FOLLOWING TWENTY-EIGHT (28) COURSES:

1. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS  $N20^{\circ}27'45''W$ , HAVING A DELTA OF  $04^{\circ}42'48''$ , A RADIUS OF 180.00 FEET, A DISTANCE OF 14.81 FEET TO A POINT OF TANGENT;
2.  $N64^{\circ}49'27''E$  A DISTANCE OF 387.40 FEET;
3.  $S69^{\circ}37'09''E$  A DISTANCE OF 609.64 FEET TO A POINT ON CURVE;
4. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS  $S53^{\circ}58'28''E$ , HAVING A DELTA OF  $17^{\circ}58'26''$ , A RADIUS OF 182.00 FEET, A DISTANCE OF 57.09 FEET TO A POINT OF TANGENT;
5.  $S18^{\circ}03'07''W$  A DISTANCE OF 513.19 FEET TO A POINT OF CURVE;
6. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF  $42^{\circ}54'04''$ , A RADIUS OF 180.00 FEET, A DISTANCE OF 134.78 FEET TO A POINT OF TANGENT;
7.  $S24^{\circ}50'58''E$  A DISTANCE OF 794.30 FEET TO A POINT ON CURVE;
8. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS  $N64^{\circ}45'42''E$ , HAVING A DELTA OF  $62^{\circ}51'48''$ , A RADIUS OF 60.00 FEET, A DISTANCE OF 65.83 FEET TO A POINT ON CURVE;
9.  $S28^{\circ}40'51''E$  A DISTANCE OF 24.35 FEET TO A POINT ON CURVE;
10. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS  $N10^{\circ}33'41''W$ , HAVING A DELTA OF  $11^{\circ}46'40''$ , A RADIUS OF 470.00 FEET, A DISTANCE OF 96.61 FEET TO A POINT ON CURVE;
11.  $N32^{\circ}14'22''W$  A DISTANCE OF 83.48 FEET;
12.  $N07^{\circ}36'57''W$  A DISTANCE OF 778.36 FEET;
13.  $N19^{\circ}58'12''E$  A DISTANCE OF 445.86 FEET TO A POINT ON CURVE;

14. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS N72°45'28"W, HAVING A DELTA OF 65°10'59", A RADIUS OF 180.00 FEET, A DISTANCE OF 204.78 FEET TO A POINT ON CURVE;
15. N05°55'12"E A DISTANCE OF 73.94 FEET TO A POINT OF CURVE;
16. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 66°48'26", A RADIUS OF 60.00 FEET, A DISTANCE OF 69.96 FEET TO A POINT OF TANGENT;
17. N60°53'14"W A DISTANCE OF 270.58 FEET;
18. N67°30'10"E A DISTANCE OF 203.94 FEET;
19. N18°26'34"E DISTANCE OF 216.03 FEET;
20. S49°40'30"E A DISTANCE OF 407.47 FEET TO A POINT OF CURVE;
21. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 42°44'34", A RADIUS OF 260.00 FEET, A DISTANCE OF 193.96 FEET TO A POINT OF TANGENT;
22. N87°34'56"E A DISTANCE OF 570.22 FEET;
23. S01°27'54"W A DISTANCE OF 421.65 FEET;
24. S04°30'48"W A DISTANCE OF 138.74 FEET TO A POINT OF CURVE;
25. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 122°48'28", A RADIUS OF 180.00 FEET, A DISTANCE OF 385.81 FEET TO A POINT ON CURVE;
26. S59°17'05"E A DISTANCE OF 59.71 FEET;
27. S09°25'47"E A DISTANCE OF 25.35 FEET TO A POINT OF CURVE;
28. ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 111°46'10", A RADIUS OF 60.00 FEET, A DISTANCE OF 117.04 FEET TO A POINT ON CURVE;

THENCE S35°14'00"E A DISTANCE OF 310.03 FEET TO A POINT ON CURVE;  
 THENCE ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS N65°06'43"W, HAVING A DELTA OF 02°22'21", A RADIUS OF 470.00 FEET A DISTANCE OF 19.46 FEET TO A POINT OF TANGENT; THENCE N22°30'56"E A DISTANCE OF 152.89 FEET TO A POINT OF CURVE;  
 THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 17°59'00, A RADIUS OF 470.00 FEET A DISTANCE OF 147.52 FEET TO A POINT OF TANGENT; THENCE N04°31'56"E A DISTANCE OF 244.95 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 12°33'58", A RADIUS OF 530.00 FEET A DISTANCE OF 116.24 FEET TO A POINT OF TANGENT; THENCE N17°05'54"E A DISTANCE OF 216.15 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 17°54'41", A RADIUS OF 470.00 FEET A DISTANCE OF 146.93 FEET TO A POINT OF TANGENT; THENCE N00°48'47"W A DISTANCE OF 40.27 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 11°16'06", A RADIUS OF 187.00 FEET A DISTANCE OF 36.78 FEET TO A POINT OF REVERSE CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 11°16'06", A RADIUS OF 228.00 FEET A DISTANCE OF 44.84 FEET TO A POINT OF TANGENT; THENCE N00°48'47"W A DISTANCE OF 10.02 FEET TO A

POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 11°16'06", A RADIUS OF 228.00 FEET, A DISTANCE OF 44.84 FEET TO A POINT OF REVERSE CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 11°16'06", A RADIUS OF 187.00 FEET A DISTANCE OF 36.78 FEET TO A POINT OF TANGENT; THENCE N00°48'47"W A DISTANCE OF 209.02 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 32°57'06", A RADIUS OF 470.00 FEET A DISTANCE OF 270.30 FEET TO A POINT OF TANGENT; THENCE N33°45'53"W A DISTANCE OF 496.37 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA 22°00'35", A RADIUS OF 530.00 FEET A DISTANCE OF 203.60 FEET TO A POINT ON CURVE SAID POINT BEING THE SOUTHWEST CORNER OF ALLEN RANCH DRIVE AS PLATTED IN SAID FLYING HORSE NORTH FILING NO. 1; THENCE ON THE BOUNDARY LINE OF SAID FILING HORSE FILING NO. 1, THE FOLLOWING TWENTY-TWO (22) COURSES:

1. N78°14'42"E A DISTANCE OF 60.00 FEET TO A POINT ON CURVE;
2. ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS N78°14'42"E, HAVING A DELTA OF 07°44'47", A RADIUS OF 470.00 FEET A DISTANCE OF 63.54 FEET TO A POINT ON CURVE;
3. N88°03'35"E A DISTANCE OF 162.46 FEET;
4. S27°57'38"W A DISTANCE OF 123.86 FEET TO A POINT ON CURVE;
5. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S55°48'13"E, HAVING A DELTA OF 79°31'17", A RADIUS OF 60.00 FEET, A DISTANCE OF 83.27 FEET TO A POINT OF TANGENT;
6. S45°19'30"E A DISTANCE OF 529.41 FEET;
7. N43°38'05"E A DISTANCE OF 217.42 FEET;
8. S47°25'19"E A DISTANCE OF 125.23 FEET;
9. S12°39'47"W A DISTANCE OF 431.89 FEET TO A POINT ON CURVE;
10. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S78°44'16"E, HAVING DELTA OF 101°02'05", A RADIUS OF 180.00 FEET, A DISTANCE OF 317.41 FEET TO A POINT ON CURVE;
11. S36°07'10"E A DISTANCE OF 51.40 FEET;
12. S25°28'43"W A DISTANCE OF 583.21 FEET;
13. S11°05'37"W A DISTANCE OF 649.91 FEET;
14. S01°45'55"W A DISTANCE OF 367.28 FEET TO A POINT ON CURVE;
15. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S82°45'19"E, HAVING A DELTA OF 27°10'25", A RADIUS OF 206.15 FEET, A DISTANCE OF 97.77 FEET TO A POINT ON CURVE;
16. S44°23'58"W A DISTANCE OF 446.26 FEET;
17. N78°50'05"W A DISTANCE OF 682.24 FEET;
18. S89°54'56"W A DISTANCE OF 681.31 FEET;
19. N39°18'58"W A DISTANCE OF 58.41 FEET TO A POINT ON CURVE;
20. ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS N42°37'31"W, HAVING A DELTA OF 24°06'18", A RADIUS OF 530.00 FEET, A DISTANCE OF 222.98 FEET TO A POINT ON CURVE;

21. S63°45'49"E A DISTANCE OF 50.01 FEET;
22. THENCE S02°21'44"E A DISTANCE OF 263.10 FEET;

THENCE CONTINUING S02°21'44"E A DISTANCE OF 120.00 FEET TO THE SOUTH QUARTER CORNER OF SAID SECTION 36; THENCE S89°20'35"W ON THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 36, A DISTANCE OF 2,674.50 FEET TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 170.554 ACRES.

TOGETHER WITH TRACT J AND TRACT L AS PLATTED FLYING HORSE NORTH FILING NO. 1, RECORDED UNDER RECEPTION NUMBER 218714238.

CONTAINING A CALCULATED AREA OF 120.231 ACRES.

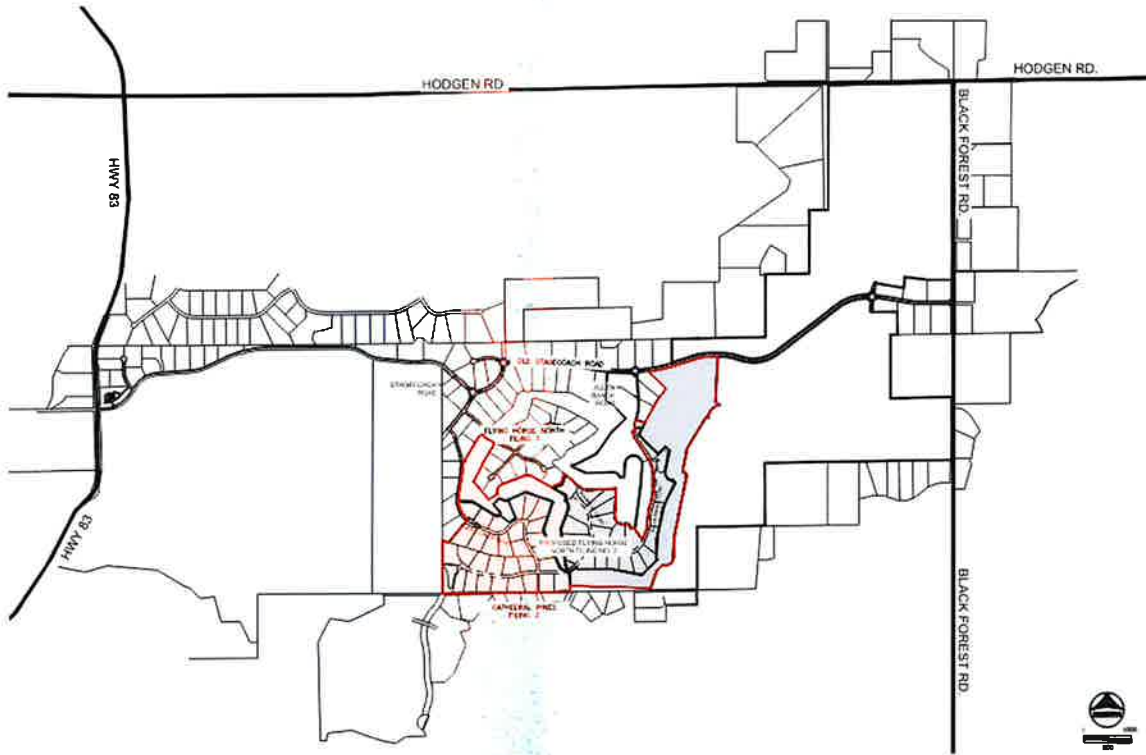
TOGETHER WITH LOT 1 AS PLATTED FLYING HORSE NORTH FILING NO. 2, RECORDED UNDER RECEPTION NUMBER 222715009.

CONTAINING A CALCULATED AREA OF 2.898 ACRES.

FLYNG HORSE FILING 3, CONTAINS A TOTAL CALCULATED AREA OF 293.683 ACRES.

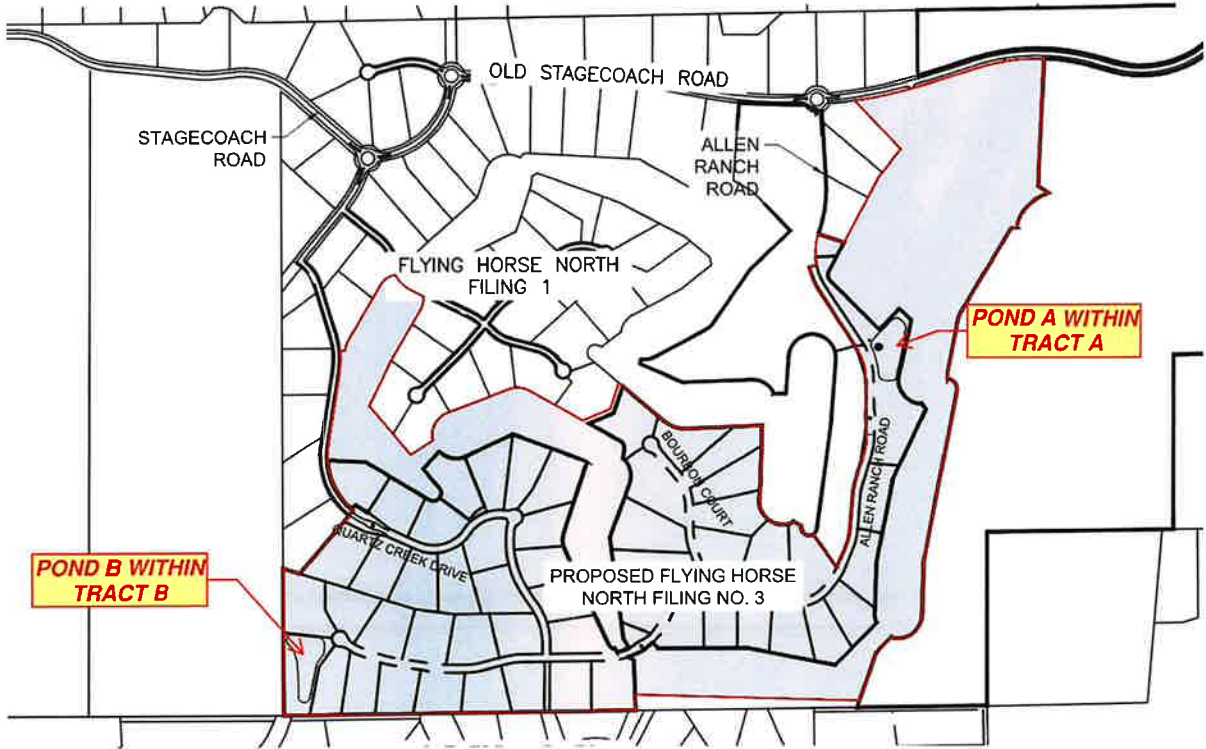
# FLYING HORSE NORTH FILING NO. 3 VICINITY MAP

A TRACT OF LAND BEING A PORTION OF SECTION 36, TOWNSHIP 11 SOUTH,  
RANGE 66 WEST OF THE 6TH P.M. AND A PORTION OF THE NORTHWEST QUARTER OF  
SECTION 31, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6TH P.M.,  
CITY OF COLORADO SPRINGS, COUNTY OF EL PASO, STATE OF COLORADO



**EXHIBIT B**  
**Stormwater Facilities Area**

Flying Horse North Filing No. 3 Tracts A and B



## **EXHIBIT C**

### **Open Drainage Channel Inspections, Operations and Maintenance (O&M)**

Routine maintenance of the open drainage channel system consists of litter and debris pickup, vegetation management, erosion control, and sediment removal when necessary. Removal of excessive shrubs and trees is required to ensure that the channel will flow in conformance with the original design. Mowing and vegetation management shall be performed with care to ensure that soils remain stable and not to cause erosion. Noxious weed management shall be performed as necessary and as required under project approval conditions. All dead trees and trees growing in the flowline of a structure such as a bridge or culvert shall be removed.

Removal of sediment shall be performed with the use of equipment such as a skid steer, backhoe, and front-end loader. The removed materials shall be hauled to an acceptable landfill site unless otherwise legally permitted to be utilized elsewhere. Materials are not to be stored onsite. Equipment shall utilize the designated access roads and shall not be used in a manner to cause damage to adjacent vegetated and stable areas to the extent possible. If drainage channels contain wetlands many activities, including maintenance, may be subject to regulation and permitting.

Erosion control and restoration work such as side slope reconstruction, revegetation, riprap installation, and other stabilization methods will require the use of heavy equipment.

Maintaining altered watercourses is a minimum requirement of the National Flood Insurance Program (NFIP). In fact, failure to maintain such watercourses may result in a revision to the community's Flood Insurance Rate Map (FIRM). If a stream is altered after the community's FIRM is published, the NFIP requires the community to ensure that the channel's carrying capacity is not adversely altered. This is required in 44 CFR 60.3(b)(7) of the Federal Emergency Management Agency's (FEMA's) NFIP regulations.



**Table 1 – General Channel Maintenance Guidelines**

<b>Activity</b>	<b>Maintenance Action</b>	<b>Frequency of Action</b>
Mowing, vegetation management, and lawn care	Occasional mowing to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and non-irrigated native grasses at 4 to 6 inches tall.	Routine – depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from the entire channel to improve flow characteristics and aesthetics. Dispose of as appropriate.	Routine – including annual, pre-storm season (April and May) and following significant rainfall events.
Erosion and sediment control	Repair and revegetate eroded areas in the channel.	Non-routine –as necessary based on inspection.
Structural	Repair inflow structures, low flow channel linings, and energy dissipation structures as needed.	Non-routine – repair as needed based on regular inspections.
Inspections	Inspect channel to ensure continued function as initially intended. Check for erosion, slumping, excessive sedimentation, overgrowth, embankment and inflow integrity, and damage to any structural elements. Report any illicit discharge immediately.	Routine – annual inspection of hydraulic and structural facilities. Also check for obvious problems during routine maintenance visits.
Nuisance control	Address odor, insects, and other issues associated with stagnant or standing water.	Non-routine –as necessary per inspection or complaint.
Sediment removal	Remove accumulated sediment from the channel bottom.	Non-routine –as necessary per inspection.

**Routine Maintenance Activities**

The majority of this work consists of scheduled mowing, litter and debris pickups for the drainage channel during the growing season. It also includes activities such as weed control. These activities normally will be performed numerous times during the year. These items typically do not require any prior correspondence with EPC; however, completed inspection and maintenance forms shall be retained and submitted to EPC for each inspection and maintenance upon request. The Routine Maintenance Activities are summarized below, and further described in the following sections.

**Table 2 – Summary of Routine Maintenance Activities**

<b>Activity</b>	<b>Maintenance Action</b>	<b>Look for:</b>	<b>Minimum Frequency</b>
Mowing	2"-4" irrigated grass height; 4-6" natural grass height	Excessive grass height/aesthetics	Routine – twice annually
Litter / Debris Removal	Remove and dispose of litter and debris	Litter / debris in drainage channel	Routine – twice annually
Woody growth control / weed removal	Treat w/herbicide or hand pull	Noxious weeds, undesirable vegetation	Routine – minimum twice annually

Properly dispose of litter and debris materials at an approved landfill or recycling facility. It should be noted that major debris removal may require other regulatory permits prior to completing the work.

Noxious weeds and other unwanted vegetation must be treated as needed throughout the drainage channel. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with the County Environmental Division is recommended prior to the use of herbicide. Herbicides should be utilized sparingly and as a last resort. All herbicide applications should be in accordance with the manufacturer's recommendations.

Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. These items may require prior approval from EPC depending on the scope of work. Completed inspection and maintenance forms shall be retained for each inspection and maintenance period. In the event that the drainage channel needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. The appropriate permits shall be obtained prior to any dewatering activity.

**Table 3 – Summary of Minor Maintenance Activities**

<b>Activity</b>	<b>Maintenance Action</b>	<b>Look for:</b>	<b>Minimum Frequency</b>
Sediment/Pollutant Removal	Remove and dispose of accumulated sediment from the channel bottom.	Minor sediment and pollution build-up in channel bottom; potential decrease in channel flow rate	Non-routine – as needed based on inspection.
Erosion Repair	Repair eroded areas and revegetate; address cause.	Rills/gullies on sides of channel	Non-routine – as needed, based on inspection.

Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater drainage facilities. This work will likely require approval from EPC Engineering to ensure the proper maintenance is performed. This work requires that Engineering Staff review the original design and construction drawings to assess the situation and necessary maintenance activities. This work may also require more specialized maintenance equipment, design plans/details, surveying, and assistance through private contractors and consultants. In the event that the drainage channel needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. The appropriate permits shall be obtained prior to any dewatering activity.

**Table 4 – Summary of Major Maintenance Activities**

<b>Activity</b>	<b>Maintenance Action</b>	<b>Look for:</b>	<b>Minimum Frequency</b>
Major Sediment / Pollutant Removal	Remove and dispose of sediment. Repair vegetation as necessary	Large quantities of sediment in the channel and reduced conveyance rate/capacity	Non-routine –as necessary based on inspection.
Major Erosion Repair	Repair erosion – find cause of problem and address to avoid future erosion	Severe erosion including gullies, excessive soil displacement, unusual areas of settlement, holes	Non-routine –as necessary based on inspection.
Structural Repair	Structural repair to restore portions of the channel to its original design	Deterioration and/or damage to structural components – broken concrete, damaged pipe, drop/check structures or dissipators	Non-routine –as necessary based on inspection.
Drainage Channel Rebuild	Contact EPC Engineering	Overall channel failure	Non-routine –as needed due to complete failure of drainage channel

Inspection Procedures

Periodic inspections of drainage channels and associated stormwater control measures in developed areas are needed in every community to prevent the accumulation of debris deposited by storms, dumping, or natural processes. Inspections must be conducted at least once each year and after each storm that could adversely impact the drainage system. Inspections are also needed in response to citizen complaints.

Conduct annual visual inspections during the dry season to determine if there are problem inlets where sediment/trash or other pollutants accumulate. Inspection and maintenance records should be used to determine problem areas that may need to be checked more often. Appropriate action must be taken after an inspection identifies the need for maintenance or cleaning.

The attached form includes the typical information necessary for and during an inspection. Similar forms or electronic record keeping may be utilized if all relevant information is recorded. The entity responsible for channel maintenance is required to submit the periodic inspection reports upon request by County Staff. Inspections involving decisions about structural issues shall be signed by a licensed professional engineer.

Inspections of inflow structures including detention spillways and water quality outlet pipes discharging to the channel shall be coordinated with channel inspections.

Illicit discharges such as dumping of home goods or garbage, appliances, yard wastes, paint spills, abandoned oil containers and other pollutants shall be immediately reported to EPC Staff and other agencies as appropriate. Reference El Paso County Ordinance No. 07-01, as amended. EPC recommends that the responsible entity encourage public

reporting of improper waste disposal by posting “No Dumping” signs, neighborhood notices, and/or social media when available, with contact information to report violations.

#### Wetlands

If drainage channels contain wetlands many activities, including maintenance, may be subject to regulation and permitting. The responsible maintenance entity shall maintain wetlands vegetation as appropriate and in consultation with the proper authorities including the U.S. Army Corps of Engineers when applicable. The responsible maintenance entity shall ensure proper training / licensing of contractors and staff to minimize the potential for damages to the wetlands.

All applicable safety and environmental considerations with regards to the application of any pesticides or herbicides shall be verified. It is also strongly encouraged that the responsible entity employ or consult a wetlands specialist or certified arborist with the ability to identify invasive/exotic species. Due to the sensitive nature of using chemicals near water bodies, a written Quality Assurance/Quality Control (QA/QC) plan shall be implemented.

Employees shall be trained in accordance with any local, state, and federal regulations and laws prior to any application of chemicals. A copy of the QA/QC plan must be submitted to the County Environmental Division prior to any chemical applications. In addition to the QA/QC plan, copies of the Safety Data Sheets (SDS) for all the chemicals being used shall be provided upon request.

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

Section 404 - establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. CWA Section 404(b)(1) Guidelines – U.S. Environmental Protection Agency (EPA) (Although they are called “guidelines,” these criteria are established in regulations (40 CFR Part 230) and are legally binding.)

<https://www.epa.gov/cwa-404/clean-water-laws-regulations-and-executive-orders-related-section-404>

Open Drainage Channel Inspection Report Form

Date: \_\_\_\_\_ Inspector: \_\_\_\_\_

Type of inspection: Post-Storm \_\_\_\_\_ Complaint \_\_\_\_\_ Routine \_\_\_\_\_

Location: (Identify stream or basin name, downstream and upstream streets or reference points, and location of problem. Provide sketch as needed.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Type of problem: Litter \_\_\_ Minor \_\_\_ Obstruction \_\_\_ Structural \_\_\_ Illicit Discharge\*\* \_\_\_

Recommended maintenance: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Is equipment needed? \_\_\_\_\_ If so, list equipment needed: \_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_ Offsite Right of entry needed? \_\_\_\_\_

Work order description: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

State permit(s) needed? \_\_\_\_\_ Work order number: \_\_\_\_\_

Date: \_\_\_\_\_ Crew chief: \_\_\_\_\_

Maintenance performed: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspected by: \_\_\_\_\_

Use other side for additional recommendations for this site.

**\*\*Report illicit discharges to the County and appropriate agencies.**



Standard Operation Procedures  
for  
Inspection and Maintenance  
of  
Extended Detention Basin(s)  
  
Flying Horse North Filing No. 3

PCD FILE NO.: SF2326

Owner:  
PRI #2, LLC.

El Paso County Department of Public Works  
3275 Akers Drive  
Colorado Springs, CO 80922

[dotweb@elpasoco.com](mailto:dotweb@elpasoco.com)  
719-520-6900

## Introduction

This plan addresses operation and maintenance of public detention / water quality facilities (Detention Pond A and Detention Pond B) constructed as part of the Flying Horse North Filing No. 3 development project at the south of Stagecoach Road, east of State Highway 83, at Allen Ranch Road (EPC PCD projects number(s): **SF-2326** . The plat number of Flying Horse North Filing No. 3 is \_\_\_\_\_.

## Background

The State of Colorado Department of Public Health and Environment, Water Quality Control Division (CDPHE), has implemented federal regulations within the State of Colorado through permitting, and has included El Paso County as one of numerous Municipal Separate Storm Sewer Systems (MS4s) required to be permitted in compliance with National Pollutant Discharge Elimination System (NPDES) Phase 2 Regulations, as defined within Colorado's Phase 2 Municipal Guidance.

NPDES Phase 2 MS4s stormwater discharges are covered under a general permit under the Colorado Discharge Permit System (CDPS) under Regulation 61, and as a minimum require the MS4's operator (e.g., El Paso County) to develop, implement, and enforce a stormwater management program to reduce the discharge of pollutants to the maximum extent practicable to protect water quality requirements of the Colorado Water Quality Control Act, Colorado Code of Regulations [CCR] 61.8(11)(a)(i)).

This Stormwater Facilities Operation and Maintenance Plan (O&M Plan) is for public subregional detention facilities Pond A and Pond B constructed as part of the development project referenced above.

## Associated Ag

The Subdivision Improvements Agreement (SIA) for the development (recorded at Reception No. XXXXXXXXXXXX) required the developer to complete the Pond A and Pond B public improvements as itemized in the associated Financial Assurance Estimate (FAE).

Paragraph #[xx] of the SIA indemnifies the County from any losses or damages caused by overtopping or spillage from the detention ponds located within the subdivision.

Paragraph #[xx] of the SIA allowed the developer to defer payment of drainage basin fees because the construction costs of Ponds A and B would exceed the drainage basin fees due, and to recover the construction costs exceeding the drainage basin fees due from the basin fund.

The SIA and FAE require as-built plans and certification of completion of the detention facilities in general conformance with the approved construction drawings.

## Funding for and Organization of Facility Operation and Maintenance

PRI #2, LLC. will be responsible for operations and maintenance of the Detention Ponds A and B detention facilities upon acceptance of the facilities.

## Site and Facilities Description

Detention Pond A:  
Detention Pond A is a water quality and full spectrum detention extended detention basin located within Tract A of Filing No. 3, within the northeast of the filing. The pond is accessed via a paved maintenance pathway from the County right-of-way and is continued with a gravel maintenance path to the bottom of pond to access the forebay and outlet structure. The rip-rap emergency spillway is located to the northeast of the pond and drains toward the existing golf course via overland flow over the spillway weir. The pond consist of a concrete forebay, trickle channel, outlet structure with a micropool, orifice plate, restrictor plate, and 18" private RCP outlet pipe that daylights downstream.

#### Detention Pond B:

Detention Pond B is a water quality and full spectrum detention extended detention basin located within Tract B of Filing No. 3, within the southwest of the filing. The pond is accessed via a paved maintenance pathway from the County right-of-way at the cul-de-sac of Allen Ranch Road and is continued with a gravel maintenance path to the bottom of pond to access the forebay and outlet structure. The rip-rap emergency spillway is located to the west of the pond and drains toward State Highway 83 via overland flow over the spillway weir. The forebay inflow is conveyed from a rip-rap rundown rock chute from the east side of the pond. The pond consist of a concrete forebay, trickle channel, outlet structure with a micropool, orifice plate, restrictor plate, and 24" private RCP outlet pipe that daylights downstream.

## **Extended Detention Basin (EDB) Description**

The subsections below describe general EDB operations and maintenance.

### **EDB-1 GENERAL EDB CONCEPT**

Extended Detention Basins (EDBs) are one of the most common types of permanent stormwater control measures utilized within the Front Range of Colorado. An EDB is a sedimentation basin designed to "extend" the runoff detention time, but to drain completely sometime after stormwater runoff ends. An EDB's drain time for the water quality portion of the facility is typically 40 hours. The basins are considered to be "dry" because the majority of the basin is designed not to have a significant permanent pool of water remaining between runoff events.

EDBs are an adaptation of a detention basin used for flood control, with the primary difference being the addition of forebays, micropools and a slow release outlet design. Forebays are shallow concrete "pans" located at the inflow points to the basin and are provided to facilitate sediment removal within a contained area prior to releasing into the pond. The forebays collect and briefly hold stormwater runoff resulting in a process called sedimentation, dropping sediment out of the stormwater. The stormwater is then routed from the forebay into the concrete trickle channel and upper basin, the large grassy portion of the basin. The EDB includes an outlet structure that extends the drain time of frequently occurring runoff events to facilitate pollutant removal. An EDB also includes a small micropool just upstream of the outlet structure or built into the outlet structure. The micropool is designed to hold a small amount of water to keep sediment and floatables from blocking the outlet orifices.

### **EDB-2 INSPECTING EXTENDED DETENTION BASINS (EDBs)**

#### **EDB-2.1 Access and Easements**

Inspection and maintenance personnel may utilize the attached stormwater facility map containing the location(s) of the access points and maintenance easements of the EDB(s) within this development.

#### **EDB-2.2 Stormwater Management Facilities Locations**

Inspection and maintenance personnel may utilize the attached stormwater facility map located in containing the location(s) of the EDB(s) within this development.

#### **EDB-2.3 Extended Detention Basin (EDB) Features**

EDBs have a number of features that are designed to serve a particular function. Many times the proper function of one feature depends on another. For example, if a forebay is not properly maintained, it could negatively affect the performance of a downstream feature (trickle channel, micropool, etc.).

Therefore, it is critical that each feature of the EDB is properly inspected and maintained to ensure that the overall facility functions as it was intended. Below is a list and description of the most common features within an EDB and the corresponding maintenance inspection items that can be anticipated:



**Table EDB-1: Typical Inspection & Maintenance Requirements Matrix**

EDB Features	Sediment Removal	Mowing/ Weed Control	Trash & Debris Removal	Erosion	Over-grown Vegetation Removal	Standing Water (mosquito/ algae control)	Structure Repair
Inflow Points (outfalls)	X		X	X			X
Forebays	X		X				X
Low-Flow Channel	X		X	X	X		X
Bottom Stage	X	X	X	X	X	X	
Micropool	X		X		X	X	X
Outlet Works	X		X				X
Emergency Spillway			X	X	X		X
Upper Stage			X	X			
Embankment		X		X	X		

**EDB-2.3.1 Inflow Points**

Inflow Points or Outfalls into EDBs are the point source of the stormwater discharge into the facility. An inflow point is commonly a storm sewer pipe with a flared end section that discharges into the EDB. In some instances, an inflow point could be a drainage channel or ditch that flows into the facility.

An energy dissipater (riprap or hard armor protection) is typically immediately downstream of the discharge point into the EDB to protect from erosion. In some cases, the storm sewer outfall can have a toe- wall or cut-off wall immediately below the structure to prevent undercutting of the outfall from erosion.

*The typical maintenance items that are found with inflow points are as follows:*

*a. Riprap Displaced* – Many times, because the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap apron appears to have settled, soil is present between the riprap, or the riprap has shifted, maintenance may be required to ensure future erosion is prevented.

*b. Erosion Present/Outfall Undercut* – In some situations, the energy dissipater may not have been sized, constructed, or maintained appropriately and erosion has occurred. Any erosion within the vicinity of the inflow point will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.

*c. Sediment Accumulation* – Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in hydraulic performance of the upstream infrastructure, sediment that accumulates in this area must be removed in a timely manner.

*d. Structural Damage* – Structural damage can occur at any time during the life of the facility. Typically, for an inflow, the structural damage occurs to the pipe flared end section (concrete or steel). Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

*e. Woody Growth/Weeds Present* – Undesirable vegetation can grow in and around

the inflow area to an EDB that can significantly affect the performance of the drainage facilities discharging into the facility. This type of vegetation includes trees (typically cottonwoods) and dense areas of shrubs (willows). If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the discharge. Also, tree roots can cause damage to the structural components of the inflow. Routine maintenance is essential for trees (removing a small tree/sapling is much cheaper and “quieter” than a mature tree). In addition, noxious weeds growing in the facility can result in the loss of desirable native vegetation and impact adjacent open spaces/land.

#### EDB-2.3.2 Forebay

A forebay is a solid surface (pad), typically constructed of concrete, immediately downstream of the inflow point. The forebay is designed to capture larger particles and trash to prevent them from entering the main portion of the EDB. The solid surface is designed to facilitate mechanical sediment removal (via a skid steer or shovel). The forebay typically includes a small diameter discharge pipe or weir on the downstream end, which is designed to drain the forebay in a specified period of time to promote sedimentation. Forebays vary in size and depth depending on the design and site constraints.

*The typical maintenance items that are found with forebays are as follows:*

- a. Sediment/Debris Accumulation* – Because this feature of the EDB is designed to provide the initial sedimentation, debris and sediment frequently accumulate in this area. If the sediment and debris is not removed from the forebay on a regular basis, it can significantly affect the function of other features within the EDB. Routine sediment removal from the forebay can significantly reduce the need for dredging of the main portion of the EDB using specialized equipment (long reach excavators). Routine removal of sediment from the forebay can substantially decrease the long-term sediment removal costs of an EDB.
- b. Concrete Cracking/Failing* – The forebay is primarily constructed of concrete, which cracks, spalls, and settles. Damage to the forebay can result in decreased performance and impact maintenance efforts.
- c. Drain Pipe/Weir Clogged* – Many times the drainpipe or weir can be clogged with debris, and prevent the forebay from draining properly. If standing water is present in the forebay (and there is not a base flow), the forebay is most likely not draining properly. This can result in a decrease in performance and create potential nuisances with stagnant water (mosquitoes).
- d. Weir/Drain Pipe Damaged* – Routine maintenance activities, vandalism, or age may cause the weir or drain pipe in the forebay to become damaged. Weirs are typically constructed of concrete, which cracks and spalls. The drainpipe is typically constructed with plastic, which can fracture.

### EDB-2.3.3 Trickle Channel (Low-Flow)

The trickle channel conveys stormwater from the forebay to the micro- pool of the EDB. The trickle channel is typically made of concrete.

However, grass lined (riprap sides protected) is also common and can provide for an additional means of water quality within the EDB. The trickle channel is typically 6-9 inches in depth and can vary in width.

*The typical maintenance items that are found with trickle channels are as follows:*

- a. Sediment/Debris Accumulation* – Trickle channels are typically designed with a relatively flat slope that can promote sedimentation and the collection of debris. Also, if a trickle channel is grass lined it can accumulate sediment and debris at a much quicker rate. Routine removal of accumulated sediment and debris is essential in preventing flows from circumventing the trickle channel and affecting the dry storage portion of the pond.
- b. Concrete/Riprap Damage* – Concrete can crack, spall, and settle and must be repaired to ensure proper function of the trickle channel. Riprap can also shift over time and must be replaced/repared as necessary.
- c. Woody Growth/Weeds Present* – Because of the constant moisture in the area surrounding the trickle channel, woody growth (cottonwoods/willows) can become a problem. Trees and dense shrub type vegetation can affect the capacity of the trickle channel and can allow flows to circumvent the feature.
- d. Erosion Outside of Channel* – In larger precipitation events, the trickle channel capacity will likely be exceeded. This can result in erosion immediately adjacent to the trickle channel and must be repaired to prevent further damage to the structural components of the EDB.

### EDB-2.3.4 Bottom Stage (Initial Surcharge)

The bottom stage is at least 4 inches deeper than the upper stage and is located directly in front of the outlet works structure, and typically above the permanent water surface of the micropool and the invert of the trickle channel. The bottom stage is designed to store the smaller runoff events, assists in keeping the majority of the basin bottom dry resulting in easier maintenance operations, and enhances the facility's pollutant removal capabilities. This area of the EDB may develop wetland vegetation.

*The typical maintenance items that are found with the bottom stage are as follows:*

- a. Sediment/Debris Accumulation* – The micropool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.
- b. Woody Growth/Weeds Present* – Because of the constant moisture in the soil surrounding the micropool, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micropool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and less disruptive than removing a mature tree).
- c. Bank Erosion* – The micropool is usually a couple feet deeper than the other areas of the ponds. Erosion can be caused by water dropping into the micropool if

adequate protection/armor is not present. Erosion in this area must be mitigated to prevent sediment transport and other EDB feature damage.

*d. Mosquitoes/Algae Treatment* – Nuisance created by stagnant water can result from improper maintenance/treatment of the micropool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micropool may be necessary to reduce these impacts to adjacent homeowners.

*e. Petroleum/Chemical Sheen* – Many indicators of illicit discharges into the storm sewer systems will be present in the micropool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact County Stormwater immediately. Proper removal/mitigation of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

#### EDB-2.3.5 Micropool

The micropool is a concrete or grouted boulder walled structure directly in front of the outlet works. At a minimum, the micropool is 2.5 feet deep and is designed to hold water. The micropool is critical in the proper function of the EDB; it allows suspended sediment to be deposited at the bottom of the micropool and prevents these sediments from being deposited in front of the outlet works causing clogging of the outlet structure, which results in marshy areas within the top and bottom stages.

*The typical maintenance items that are found with micropools are as follows:*

*a. Sediment/Debris Accumulation* – The micropool can frequently accumulate sediment and debris. This material must be removed to maintain pond volume and proper function of the outlet structure.

*b. Woody Growth/Weeds Present* – Because of the constant moisture in the soil surrounding the micropool, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate outside of the micropool, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and less disruptive than removing a mature tree).

*c. Mosquitoes/Algae Treatment* – Nuisance created by stagnant water can result from improper maintenance/treatment of the micropool. Mosquito larvae can be laid by adult mosquitoes within the permanent pool. Also, aquatic vegetation that grows in shallow pools of water can decompose causing foul odors. Chemical/mechanical treatment of the micropool may be necessary to reduce these impacts to adjacent homeowners.

*d. Petroleum/Chemical Sheen* – Many indicators of illicit discharges into the storm sewer systems will be present in the micropool area of the EDB. These indicators can include sheens, odors, discolored soil, and dead vegetation. If it is suspected that an illicit discharge has occurred, contact the supervisor immediately. Proper removal of contaminated soils and water in the EDB is necessary to minimize any environmental impacts downstream.

### EDB-2.3.6 Outlet Works

The outlet works is the feature that drains the EDB in specified release rates and periods of time. The outlet works is typically constructed of reinforced concrete into the embankment of the EDB. The concrete structure typically has steel orifice plates anchored/embedded into it to control stormwater release rates. The larger openings for flood control on the outlet structure typically have trash racks over them to prevent clogging. The water quality orifice plate with small diameter holes will typically have a well screen covering it to prevent smaller materials from clogging it. The outlet structure is the single-most important feature in the EDB operation. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the EDB.

*The typical maintenance items that are found with the outlet works are as follows:*

- a. *Trash Rack/Well Screen Clogged* – Floatable material that enters the EDB will most likely make its way to the outlet structure. This material is trapped against the trash racks and well screens on the outlet structure (which is why they are there). This material must be removed on a routine basis to ensure the outlet structure drains in the specified design period.
- b. *Structural Damage* – The outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel trash racks and well screens are also susceptible to damage.
- c. *Orifice Plate Missing/Not Secure* – Many times residents, property owners, or maintenance personnel will remove or loosen orifice plates if they believe the pond is not draining properly. Any modification to the orifice plate(s) will significantly affect the designed discharge rates for water quality and/or flood control. Modification of the orifice plates is not allowed without EPC approval.
- d. *Manhole Access* – Access to the outlet structure is necessary to properly inspect and maintain the facility. If access is difficult or not available to inspect the structure, chances are it will be difficult to maintain as well.
- e. *Woody Growth/Weeds Present* – Because of the constant moisture in the soil surrounding the outlet works, woody growth (cottonwoods/willows) can create operational problems for the EDB. If woody vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate around the outlet works, which can cause problems with other EDB features. Also, tree roots can cause damage to the structural components of the outlet works. Routine management is essential for trees (removing a small tree/sapling is much cheaper and less disruptive than removing a mature tree).

### EDB-2.3.7 Emergency Spillway

An emergency spillway is typical of all EDBs and designed to serve as the overflow in the event the volume of the pond is exceeded. The emergency spillway is typically armored with riprap (or other hard armor) and is sometimes buried with soil. The emergency spillway is typically a weir (notch) in the pond embankment. Proper function of the emergency spillway is essential to ensure flooding does not affect adjacent properties.

*The typical maintenance items that are found with emergency spillways are as follows:*

- a. *Riprap Displaced* – As mentioned before, the emergency spillway is typically armored with riprap to provide erosion protection. Over the life of an EDB, the riprap may shift or dislodge due to flow.

*b. Erosion Present* – Although the spillway is typically armored, stormwater flowing through the spillway can cause erosion damage. Erosion must be repaired to ensure the integrity of the basin embankment, and proper function of the spillway.

*c. Woody Growth/Weeds Present* – Management of woody vegetation is essential in the proper long-term function of the spillway. Larger trees or dense shrubs can capture larger debris entering the EDB and reduce the capacity of the spillway.

*d. Obstruction Debris* – The spillway must be cleared of any obstruction (man-made or natural) to ensure the proper design capacity.

#### EDB-2.3.8 Upper Stage (Dry Storage)

The upper stage of the EDB provides the majority of the water quality flood detention volume. This area of the EDB is higher than the micro- pool and typically stays dry, except during storm events. The upper stage is the largest feature/area of the basin. Sometimes, the upper stage can be utilized for park space and other uses in larger EDBs.

With proper maintenance of the micropool and forebay(s), the upper stage should not experience much sedimentation; however, bottom elevations should be monitored to ensure adequate volume.

*The typical maintenance items that are found with upper stages are as follows:*

*a. Vegetation Sparse* – The upper basin is the most visible part of the EDB, and therefore aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance and acceptance of the EDB by the public. In addition, vegetation can reduce the potential for erosion and subsequent sediment transport to the other areas of the pond.

*b. Woody Growth/Undesirable Vegetation* – Although some trees and woody vegetation may be acceptable in the upper basin, some thinning of cottonwoods and willows may be necessary. Remember, the basin will have to be dredged to ensure volume, and large trees and shrubs will be difficult to protect during that operation.

*c. Standing Water/Boggy Areas* – Standing water or boggy areas in the upper stage is typically a sign that some other feature in the pond is not functioning properly. Routine maintenance (mowing, trash removal, etc.) can be extremely difficult for the upper stage if the ground is saturated. If this inspection item is checked, make sure you have identified the root cause of the problem.

*d. Sediment Accumulation* – Although other features within the EDB are designed to capture sediment, the upper storage area will collect sediment over time. Excessive amounts of sedimentation will result in a loss of storage volume. It may be more difficult to determine if this area has accumulated sediment without conducting a field survey.

Below is a list of indicators:

1. Ground adjacent to the trickle channel appears to be several inches higher than concrete/riprap
2. Standing water or boggy areas in upper stage
3. Uneven grades or mounds
4. Micropool or Forebay has excessive amounts of sediment

e. *Erosion (banks and bottom)* – The bottom grades of the dry storage are typically flat enough that erosion should not occur. However, inadequate vegetative cover may result in erosion of the upper stage. Erosion that occurs in the upper stage can result in increased dredging/maintenance of the micropool.

f. *Trash/Debris* – Trash and debris can accumulate in the upper area after large events, or from illegal dumping. Over time, this material can accumulate and clog the EDB outlet works.

g. *Maintenance Access* – Most EDBs typically have a gravel/concrete maintenance access path to either the upper stage, outlet works, and/or forebay. This access path should be inspected to ensure the surface is still drivable. Some of the smaller EDBs may not have maintenance access paths; however, the inspector should verify that access is available from adjacent properties.

#### EDB-2.3.9      Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the EDB. This category on the inspection form is for maintenance items that are commonly found in the EDB but may not be attributed to an individual feature.

a. *Encroachment in Easement Area* – Private lots/property can sometimes be located very close to the EDBs, even though they are required to be located in tracts with drainage easements. Property owners may place landscaping, trash, fencing, or other items within the easement area that may affect maintenance or the operation of the facility.

b. *Graffiti/Vandalism* – Damage to the EDB infrastructure can be caused by vandals. If criminal mischief is evident, the inspector should forward this information to the local Sheriff's Office.

c. *Public Hazards* – Public hazards include items such as vertical drops of greater than 4-feet, containers of unknown/suspicious substances, exposed metal/jagged concrete on structures. If any hazard is found within the facility area that poses an immediate threat to public safety, contact the Sheriff at 911 immediately!

d. *Burrowing Animals/Pests* – Prairie dogs and other burrowing rodents may cause damage to the EDB features and negatively affect the vegetation within the EDB. Consult EPC Environmental Division if this becomes an issue.

e. *Other* – Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

### **EDB-3      MAINTAINING EXTENDED DETENTION BASINS (EDBS)**

#### **EDB-3.1 Maintenance Personnel**

Maintenance personnel must be qualified to properly maintain EDBs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

#### **EDB-3.2 Equipment**

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on an EDB:

- 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.

### **EDB-3.3 Safety**

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified within the EDB that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

### **EDB-3.4 Maintenance Categories and Activities**

A typical EDB Maintenance Program will consist of three broad categories of work: routine, minor, and major maintenance activities. Within each category of work, a variety of maintenance activities can be performed on an EDB. A maintenance activity can be specific to each feature within the EDB, or general to the overall facility. A variety of maintenance activities are typical of EDBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of drainage infrastructure. The following three sub-sections (3.5, 3.6, and 3.7) explain each of the categories and briefly describes the typical maintenance activities for an EDB, including the objectives and frequency of actions.

### **EDB-3.5 Routine Maintenance Activities**

The majority of this work consists of regularly scheduled mowing and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as weed control, mosquito treatment, and algae treatment. These activities will normally be performed numerous times during the year. These items can be completed without any prior correspondence with the EPC Stormwater; however, completed



inspection and maintenance forms shall be retained for each inspection and maintenance activity.

The Maintenance Activities are summarized below, and further described in the following sub-sections.

**TABLE – EDB-2 Summary of Routine Maintenance Activities**

<b>MAINTENANCE ACTIVITY</b>	<b>MINIMUM FREQUENCY</b>	<b>LOOK FOR</b>	<b>MAINTENANCE ACTION</b>
<b>Mowing</b>	Twice annually	Excessive grass height/aesthetics	Mow grass to a height of 4" to 6"
<b>Trash/Debris Removal</b>	Twice annually	Trash & debris in EDB	Remove and dispose of trash and debris
<b>Outlet Works Cleaning</b>	As needed – after significant rain events – twice annually at a minimum	Clogged outlet structure; ponding water	Remove and dispose of debris/trash/sediment to allow outlet to function properly
<b>Weed control</b>	Minimum twice annually	Noxious weeds; Unwanted vegetation	Treat w/ herbicide or hand pull; Consult the local weed specialist
<b>Mosquito Treatment</b>	As needed	Standing water/ mosquito habitat	Treat w/ EPA approved chemicals
<b>Algae Treatment</b>	As needed	Standing water/ Algal growth/green color	Treat w/ EPA approved chemicals

EDB-3.5.1 Mowing

Occasional mowing is necessary to limit unwanted vegetation and to improve the overall appearance of the EDB. Native vegetation should be mowed to a height of 4-to-6 inches tall. Grass clippings should be collected and disposed of properly.

*Frequency* – Routine - Minimum of twice annually or depending on aesthetics.

EDB-3.5.2 Trash/Debris Removal

Trash and debris must be removed from the entire EDB area to minimize outlet clogging and to improve aesthetics. This activity must be performed prior to mowing operations.

*Frequency* – Routine – Prior to mowing operations and minimum of twice annually.

EDB-3.5.3 Outlet Works Cleaning

Debris and other materials can clog the outlet work's well screen, orifice plate(s), and trash rack. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

*Frequency* - Routine – After significant rainfall event or concurrently with other maintenance activities.

EDB-3.5.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the EDB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with the Environmental Division at 719-520-7878 is highly recommended prior to the use of herbicide.

*Frequency* – Routine – As needed based on inspections.

**EDB-3.5.5 Mosquito/Algae Treatment**

Treatment of permanent pools is 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.

*Frequency* – As needed.

**EDB- 3.6 Minor Maintenance Activities**

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. These items may require prior correspondence with EPC Stormwater and require completed inspection and maintenance forms to be submitted to EPC upon request for each inspection and maintenance activity.

**Table – EDB-3 Summary of Minor Maintenance Activities**

<b>MAINTENANCE ACTIVITY</b>	<b>MINIMUM FREQUENCY</b>	<b>LOOK FOR</b>	<b>MAINTENANCE ACTION</b>
<b>Sediment Removal</b>	As needed; typically every 1–2 years	Sediment build-up; decrease in pond volume	Remove and dispose of sediment
<b>Erosion Repair</b>	As needed, based upon inspection	Rills/gullies forming on side slopes, trickle channel, other areas	Repair eroded areas Revegetate; address source of erosion
<b>Vegetation Removal/Tree Thinning</b>	As needed, based upon inspection	Large trees/wood vegetation in lower stage of pond	Remove vegetation; restore grade and surface
<b>Drain Cleaning/Jet Vac</b>	As needed, based upon inspection	Sediment build-up/ non draining system	Clean drains; Jet Vac if needed

**EDB-3.6.1 Sediment Removal**

Sediment removal is necessary to maintain the original design volume of the EDB and to ensure proper function of the infrastructure. Regular sediment removal (minor) from the forebay, inflow(s), and trickle channel can significantly reduce the frequency of major sediment removal activities (dredging) in the upper and lower stages. The minor sediment removal activities can typically be addressed with shovels and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. The major sediment activities will also require surveying with an engineer’s level, and consultation with EPC Stormwater Staff to ensure design volumes/grades are achieved.

Stormwater sediments removed from EDBs do not meet the criteria of “hazardous waste”. However, these sediments are contaminated with a wide array of organic and inorganic pollutants and handling must be done with care. Sediments from permanent pools must be carefully removed to minimize turbidity, further sedimentation, or other adverse water quality impacts. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a landfill for proper disposal. Prompt and thorough cleanup is important should a spill occur during transportation.

*Frequency* – Nonroutine – As necessary based upon inspections. Sediment removal in the

forebay and trickle channel may be necessary as frequently as every 1-2 years.

#### EDB-3.6.2 Erosion Repair

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 repairs to trickle channels, energy dissipaters, and rilling to major gullies in the embankments and spillways. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, erosion control blankets, and turf reinforcement mats. Major erosion repair to the pond embankments, spillways, and adjacent to structures will require consultation with EPC Stormwater Staff.

*Frequency* – Nonroutine – As necessary based upon inspections.

#### EDB-3.6.3 Vegetation Removal/Tree Thinning

Dense stands of woody vegetation (willows, shrubs, etc) or trees can create maintenance problems for the infrastructure within an EDB. Tree roots can damage structures and invade pipes/channels thereby blocking flows. Also, trees growing in the upper and lower stages of the EDB will most likely have to be removed when sediment/dredging operations occur. A small tree is easier to remove than a large tree, therefore, regular removal/thinning is preferred. All trees and woody vegetation that is growing in the bottom of the EDB or near structures (inflows, trickle channels, outlet works, emergency spillways, etc) should be removed. Any trees or woody vegetation in the EDB should be limited to the upper portions of the pond banks.

*Frequency* – Nonroutine – As necessary based upon inspections.

#### EDB-3.6.4 Clearing Drains/Jet-Vac

An EDB contains many structures, openings, and pipes that can be frequently clogged with debris. These blockages can result in a decrease of hydraulic capacity and create standing water in areas outside of the micropool. Often the blockage to this infrastructure can be difficult to access and/or clean. Specialized equipment (jet-vac machines) may be necessary to clear debris from these difficult areas.

*Frequency* – Nonroutine – As necessary based upon inspections.

### **EDB-3.7 Major Maintenance Activities**

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires consultation with EPC Stormwater Staff to ensure the proper maintenance is performed. This work requires that the staff review the original design and construction drawings to assess the situation and assign the necessary maintenance. **An ESQCP permit may be required for major maintenance activities.** This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

**Table – EDB-4 Summary of Major Maintenance Activities**

<b>MAINTENANCE ACTIVITY</b>	<b>MINIMUM FREQUENCY</b>	<b>LOOK FOR</b>	<b>MAINTENANCE ACTION</b>
<b>Major Sediment Removal</b>	As needed – based upon scheduled inspections	Large quantities of sediment; reduced pond capacity	Remove and dispose of sediment. Repair vegetation as needed
<b>Major Erosion Repair</b>	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
<b>Structural Repair</b>	As needed – based upon scheduled inspections	Deterioration and/or damage to structural components – broken concrete, damaged pipes, outlet works	Structural repair to restore the structure to its original design

**EDB-3.7.1 Major Sediment Removal**

Major sediment removal consists of removal of large quantities of sediment or removal of sediment from vegetated areas. Care shall be given when removing large quantities of sediment and sediment deposited in vegetated areas. Large quantities of sediment need to be carefully removed, transported and disposed of. Vegetated areas need special care to ensure design volumes and grades are preserved.

*Frequency* – Nonroutine – Repair as needed based upon inspections.

**EDB-3.7.2 Major Erosion Repair**

Major erosion repair consists of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved.

*Frequency* – Nonroutine – Repair as needed based upon inspections.

**EDB-3.7.3 Structural Repair**

An EDB includes a variety of structures that can deteriorate or be damaged during the course of routine maintenance. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time.

These structures include items like outlet works, trickle channels, forebays, inflows, and other features. In-house operations staff can perform some of the minor structural repairs. Major repairs to structures may require input from a structural engineer and specialized contractors. Consultation with EPC Stormwater Staff should take place prior to all structural repairs.

*Frequency* – Nonroutine – Repair as needed based upon inspections.

**Reference:**

**This manual is adapted from SEMSWA and the Town of Parker, Colorado, *STORMWATER PERMANENT BEST MANAGEMENT PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL*, October 2004**

For additional resources and contact info, visit the EPC Stormwater website:  
<https://publicworks.elpasoco.com/stormwater/>