If members of the public wish to attend the meeting digitally the link is below in yellow. The meeting will go on in person regardless of technical difficulties with Zoom.

WINTER PARK TOWN COUNCIL MEETING

Winter Park Town Hall – 50 Vasquez Road
Tuesday, April 16, 2024 – 4:30 p.m.
Dinner Provided
Meeting will go directly into the executive session (closed to the public); Council will recess at 5p.m. and resume the regular meeting at 5:30 p.m.

AGENDA

1. Meeting Call To Order
    a. Pledge of Allegiance
    b. Roll Call of Council Members

2. Executive Session Pursuant to:
    a. C.R.S. 24-6-402(4)(b) to hold conference with the Town Attorney to receive legal advice on specific legal questions as part of pending litigation.
    b. C.R.S. 24-6-402(4)(a) and (e) to determine positions relative to matters subject to negotiations; developing strategy for negotiations; and instructing negotiators; and to discuss the purchase, acquisition, lease, transfer, or sale of any real property related to the potential gondola project.

RECESS WILL RESUME REGULAR MEETING AGAIN AT 5:30 p.m.

3. Resume Meeting 5:30 p.m.

4. Town Hall Meeting (*Public Comment*)
    Public Comment is restricted to three minutes per person, and you must state your name and physical address for the record. Please be mindful of not reiterating other people's comments.

5. Swear in the Newly Elected Councilors
    a. Oaths of Office
    b. Appoint Mayor & Mayor Pro Tem

6. “State of the Town”
   a. Video Presentation and Q & A forum with Council

7. Consent Agenda
   a. Approval of March 19, 2024, Regular Meeting Minutes
   b. Authorization to Sign Resort Area Development Metropolitan Districts Nos. 1-10 Intergovernmental Agreement with the Town of Winter Park
   c. Resolution 2132, A Resolution Approving Landscaping for Transit Maintenance Facility
   d. Resolution 2133, A Resolution Approving a Development Improvements Agreement Standard Form for Riverwalk at Winter Park Filing 2

8. Action Items
   a. Public Hearing, Special Event Application – Winter Park Resort E-Bike Tours
   b. Resolution 2134, A Resolution Re-Appointing Ronald W. Carlson as Presiding Municipal Judge
   c. Ordinance 618, An Ordinance of the Town Council of Winter Park Amending Title 7 Article 3 of the Winter Park Municipal Code, First Reading
   d. Ordinance 619, An Ordinance of the Town Council of the Town Winter Park, Colorado, Adopting by Reference the 2023 Colorado Electric Ready and Solar Ready Code, with Amendments, Related Definitions, and Setting Forth Penalties for Violations Thereof, Second Reading and Public Hearing
   e. Ordinance 620, An Ordinance of the Town of Winter Park, Colorado Annexing as an Enclave a 0.57 Acre Parcel of Land Located in Unincorporated Grand County Known as the Valley Hi Enclave, First Reading
   f. Ordinance 621, An Ordinance of the Town of Winter Park, Colorado Zoning Upon Annexation Certain Property Within the Town Known as the Valley Hi Enclave to Destination Center District (D-C), First Reading
   g. Public Hearing, Resolution 2135, A Resolution of the Town Council of the Town of Winter Park Approving a Major Site Plan for 820 Ski Idlewild Road, Idlewild Park (PLN23-115)
   h. Resolution 2136, A Resolution Approving a Development Improvements Agreement and Temporary Construction Easement Agreement Related to the Construction of Idlewild Park
   i. (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 29, A Resolution Authorizing the Chair to Execute a

Subordination of Declaration of Restrictive Covenant for Affordable Housing at Hideaway Junction Phase II to Allow CHFA Financing for the Development

9. Town Manager's Report
    a. Staff Quarterly Report, Slate Quarterly Report, and Local Social's March Report

10. Mayor's Report

11. Town Council Items for Discussion

You are invited to a Zoom webinar.
When: April 16, 2024, 05:30 PM Mountain Time (US and Canada)
Topic: Town of Winter Park Meeting

Register in advance for this webinar:
https://us02web.zoom.us/wePbinar/register/WN_DWzbonYxRzOczSD94EVv3w

MEMO

TO	Winter Park Town Council
FROM	Danielle Jardee, Town Clerk
CC	Keith Riesberg, Town Manager
DATE	April 16, 2024
RE	Terms of Office

The following four members of Council were up for election on April 2, 2024:

- Jennifer Hughes
- Art Ferrari
- Jeremy Henn
- Michael Periolat

The following five candidates ran for the available four seats in the April 2, 2024, Municipal Election:

- William Carlyle MacDonald
- Michael Periolat
- Jeremy Henn
- Arthur Ferrari
- Jennifer Hughes

Three (3) four-year terms of office and one (1) two-year term of office were available.

Per the attached Statement and Certificate of Determination of a Regular Municipal Election held in Winter Park, Colorado on Tuesday the second of April 2024, the results for Council seats and terms are as follows:

- Jeremy Henn had 105 votes elected **four-year term**.
- Jennifer Hughes had 99 votes elected **four- year term**.
- Arthur Ferrari had 92 votes elected **four-year term**.
- Michael Periolat had 84 votes elected **two-year term**.

50 Vasquez Rd | P.O. Box 3327
Winter Park, Colorado 80482
970-726-8081
www.wpgov.com

OATH OF OFFICE

STATE OF COLORADO
GRAND COUNTY
TOWN OF WINTER PARK

I, ___________________________, do solemnly, sincerely, and truly declare and affirm that I will support the Constitution of the United States and of the State of Colorado, this Charter and the ordinances of this Town and I will faithfully perform the duties of the office of Councilmember upon which I am about to enter.

____
Signature

Subscribed and affirmed to before me this 16th day of April 2024

____
Notary Public

ELECTION CERTIFICATE

STATEMENT AND CERTIFICATE OF DETERMINATION of a Municipal Election held in Winter Park, Colorado on Tuesday, the second day of April 2024.

FOR TOWN COUNCIL: William Carlyle MacDonald had 29 votes
Michael Periolat had 84 votes – two-year term
Jeremy Henn had 105 votes – four-year term
Arthur Ferrari had 92 votes – four-year term
Jennifer Hughes had 99 votes – four-year term

We, the undersigned, Canvassers of the Election Returns of the Municipal Election held in said Winter Park, in the State of Colorado, on Tuesday, the second day of April, 2024 for the election of three Council Members to a four year term and one Council Member to a two year term, do hereby certify that the above and foregoing is true and correct abstract of the votes cast at said election, as shown by the abstract for the Precinct of the Incorporated limits of the Town of Winter Park. Witness our hands and seal this 12th day of April 2024.

/s/Danielle Jardee, Town Clerk

/s/Nick Kutrumbos, Mayor

2024 STATE OF THE TOWN

TOWN OF winter park

Chat with our Mayor and Town Council about last year's accomplishments and this year's upcoming goals!

All are invited to watch a short video with our Mayor and Council Members, followed by an open Q&A forum. Our Council looks forward to hearing from you and celebrating the Town of Winter Park!

Light refreshments will be provided. Please RSVP to Dani Jardee at **djardee@wpgov.com**.

TUESDAY, APRIL 16
at 5:30 p.m.
Town Hall, 50 Vasquez Road

MINUTES

DATE: Tuesday, March 19, 2024

MEETING: Winter Park Town Council

PLACE: Town Hall Council Chambers and Zoom Meeting Call

PRESENT: Mayor Nick Kutrumbos, Mayor Pro Tem Jennifer Hughes, Councilors, Rebecca Kaufman, Art Ferrari, Jeremy Henn, Riley McDonough, and Michael Periolat, and Town Manager Keith Riesberg, Assistant Town Manager Alisha Janes, and Town Clerk Danielle Jardee

OTHERS PRESENT: Chief of Police Glen Trainor, Community Development Director James Shockey, Finance Director Craig Rutherford, Public Works Director Jamie Wolter, Building Official Tom Hawkinson, and Transit Manager Charles McCarthy

---

Mayor Nick Kutrumbos called the meeting to order at 5:30 p.m.

Mayor Nick Kutrumbos led those present in reciting the Pledge of Allegiance.

2. Town Hall Meeting

No comments were made.

3. Consent Agenda

3.a. Approval of March 5, 2024, Regular Meeting Minutes

Councilor Rebecca Kaufman moved and Councilor Art Ferrari seconded the motion approving the Consent Agenda. Motion carried: 7-0.

4. Action Items

4.a. Public Hearing, Special Event Permit Application – Le Feet Lab Garage Sale

Town Clerk Danielle Jardee stated Le Feet Lab would like to throw an end of season garage sale, similar to Uptripping's First Friday events. Ms. Jardee stated this is a way for them to get rid of some end-of-season inventory and make a community event by having live music and food. Ms. Jardee stated it will be Saturday, April 6 from 4 p.m. to 7 p.m. Ms. Jardee stated Staff recommends approval of this event. Mayor Kutrumbos opened the public hearing, hearing no comments. Mayor Kutrumbos closed the public hearing.

Councilor Riley McDonough moved and Mayor Pro Tem Jennifer Hughes seconded the motion approving Special Event Permit Application – Le Feet Lab Garage Sale. Motion carried: 7-0.

4.b. Resolution 2129, A Resolution Approving a Professional Services Agreement with Local Social for the Town's Social Media Accounts

Town Clerk Danielle Jardee stated earlier this year at your January 16th workshop, Slate Communications presented their 2024 scope of work plan. Ms. Jardee stated the Town has been working with Slate communications since 2017 and the social media contract has been wrapped up within their contract. Ms. Jardee stated at that workshop Slate gave Council two options one to keep the social media contract with them or to separate it out. Ms. Jardee stated Council gave direction to separate the social media contract out because social media is a key part to the Town's communications. Ms. Jardee stated we did an RFP (Request for Proposal) in early February, proposals were due February 21, we received two proposals from Local Social and 10 Pound Gorilla. Ms. Jardee stated the contract was for $50,000 dollars, and Local Social presented a budget option that came under that price point at $38,400 dollars. Ms. Jardee stated Staff recommends Local Social for the Town's annual social media contract.

Mayor Pro Tem Jennifer Hughes moved and Councilor Riley McDonough seconded the motion approving Resolution 2129, A Resolution Approving a Professional Services Agreement with Local Social for the Town's Social Media Accounts. Motion carried: 6-0. Mayor Nick Kutrumbos recused himself from the vote.

4.c. Resolution 2130, A Resolution Authorizing the Purchase of Three Buses from Auction and Appropriating Funds for the Purchase

Transit Manager Charles McCarthy stated this resolution is to purchase three buses from Denver Auction for a total of $167,127 dollars which includes everything to getting them serviced, wrapped, etc. Mr. McCarthy stated $15,000 dollars was budgeted and the remaining amount will be covered by funding that wasn't used. Mr. McCarthy stated these buses will replace busses that were originally purchased for the Town's initial fleet which are no longer operable. Mayor Pro Tem Jennifer Hughes asked how much it is to purchase a new diesel bus. Mr. McCarthy stated a new diesel bus cost about $550,000 dollars per bus. Councilor Art Ferrari asked what year the buses are we will be purchasing. Mr. McCarthy stated they are 2006s and have larger capacities.

Councilor Rebecca Kaufman moved and Councilor Art Ferrari seconded the motion approving Resolution 2130, A Resolution Authorizing the Purchase of Three Buses from Auction and Appropriating Funds for the Purchase. Motion carried: 7-0.

4.d. Resolution 2131, A Resolution of the Town Council of the Town of Winter Park Adopting the Winter Park Three-Mile Plan

Community Development Director James Shockey stated the three-mile plan is an annual plan required to be adopted by the Town each year and has to be adopted ahead of any annexations. Mr. Shockey stated the plan identifies six parcels that are within three miles of our municipal boundaries that are eligible for annexation. Mr. Shockey stated Planning Commission reviewed the plan on March 12 and approved it. Mr. Shockey stated Staff recommends approval.

Mayor Pro Tem Jennifer Hughes moved and Councilor Art Ferrari seconded the motion approving Resolution 2131, A Resolution of the Town Council of the Town of Winter Park Adopting the Winter Park Three-Mile Plan. Motion carried: 7-0.

4.e. Ordinance 618, An Ordinance of the Town Council of Winter Park Amending Title 7 Article 3 of the Winter Park Municipal Code, First Reading

Community Development Director James Shockey stated the request is to amend and completely replace the wetlands section of the Town Code. Mr. Shockey stated Planning Commission held two study sessions in January and Town Council held a workshop in February to discuss the regulations. Mr. Shockey stated a quick overview of the regulations, the proposal is for a five-foot absolute setback from the wetlands that could not be encroached upon and in addition there would be a twenty-five-foot setback that could be encroached upon if approved by Planning Commission through a disturbance plan. Mr. Shockey stated mitigation locations were updated to stop within the Town limits, if any mitigation was needed, it must be done in Town with a 2 to 1 mitigation requirement, onsite first and if mitigation couldn't be done onsite then within the Town's limits. Mr. Shockey stated Staff and Planning Commission are recommending updating the wetlands definition. Mr. Shockey stated Planning Commission reviewed the regulations on March 12 and recommended approval after a lengthy discussion and put it in their motion that the conversation must be included in the Staff memo. Mr. Shockey stated Staff recommends approval of this ordinance and if passed on first reading, the second reading and public hearing would be on April 16. Council asked questions and discussed wetlands at length. Council stated concerns that this ordinance will affect and impact all developments even ones that already have approved final development plans. Council stated concerns that they don't know where all wetlands are in Town and would like to know. Mr. Shockey stated the Supreme Court ruled on a new definition of a wetland, and it took protection away from about a third of the wetlands that were under jurisdictional protection in the U.S. Mr. Shockey stated the wetland definition now has to have a direct connection to a navigable body of water, so with that a lot of protection was lost so to add protection these regulations have been drafted. Mayor Kutrumbos stated the challenge here is that this would trigger a mitigation plan for everything and he is struggling with who and how we are defining wetlands. Mayor Kutrumbos stated we can't be moving goal posts as we go through the development process. Councilor Riley McDonough stated that is why the disturbance plan is there, to create a mitigation plan to move forward, wetlands are something to be mindful of, other mountain towns already have this in their UDC's (Unified Development Codes), so we need to figure it out and get something in place. Mayor Kutrumbos stated it is the uncertainty of what people can and can't do with their properties that is the challenge. Councilor Michael Periolat stated he was more comfortable when the Army Corps of Engineers had the authority to be in charge of the topic over Council making the call. Mayor Kutrumbos asked how a property owner knows what a wetland is. Mr. Shockey responded they hire an engineer. Councilor Rebecca Kaufman stated we intentionally held back on putting the wetland piece in the UDC because we knew how important it is to our community. Town Manager Keith Riesberg stated that he is hearing from Council three areas of concern, one, we don't have a good map of areas that are impacted by this ordinance and would like to work on putting together a map. Mr. Riesberg stated second there is some uncertainty around the mitigation plan process and what that looks like, so it is important to have that clearly defined. Mr. Riesberg stated the third thing is where in the community could mitigation occur if someone has to impact wetlands and do the mitigation. Mayor Kutrumbos stated yes, there needs to be a clear and transparent plan and path forward.

Councilor Jeremy Henn moved and Councilor Art Ferrari seconded the motion tabling Ordinance 618, An Ordinance of the Town Council of Winter Park Amending Title 7 Article 3 of the Winter Park Municipal Code, First Reading. Motion carried by following roll call vote:

Rebecca Kaufman	"Aye"	Art Ferrari	"Aye"
Riley McDonough	"Aye"	Jennifer Hughes	"Aye"
Mike Periolat	"Aye"	Jeremy Henn	"Aye"
Nick Kutrumbos	"Aye"		

4.f. Ordinance 619, An Ordinance of the Town Council of the Town Winter Park, Colorado, Adopting by Reference the 2023 Colorado Electric Ready and Solar Ready Code, with Amendments, Related Definitions, and Setting Forth Penalties for Violations Thereof, First Reading

Building Official Tom Hawkinson stated this code adoption is generated by Colorado House Bill 2022-1362 which required the Colorado Energy Office and the Colorado Department of Labor Affairs to create an Energy Code Board to approve and review any energy codes for new building and retrofits for existing buildings. Mr. Hawkinson stated the proposed code was created by the Energy Code Board and Town is required to adopt the model electric ready and solar ready code since we recently adopted the 2021 code series. Mr. Hawkinson stated the code has already been adopted in Granby and is in process to be adopted in Fraser. Mr. Hawkinson stated Staff recommends approval of ordinance 619.

Councilor Michael Periolat moved and Councilor Rebecca Kaufman seconded the motion approving Ordinance 619, An Ordinance of the Town Council of the Town Winter Park, Colorado, Adopting by Reference the 2023 Colorado Electric Ready and Solar Ready Code, with Amendments, Related Definitions, and Setting Forth Penalties for Violations Thereof, First Reading. Motion carried by following roll call vote:

Jeremy Henn	"Aye"	Michael Periolat	"Aye"
Jennifer Hughes	"Aye"	Riley McDonough	"Aye"
Art Ferrari	"Aye"	Rebecca Kaufman	"Aye"
Nick Kutrumbos	"Aye"		

4.g. (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 28, A Resolution Approving an Amended and Restated Declaration of Restrictive Covenant for All of Hideaway Junction Phase II and Authorizing Staff to Execute and Record a Second Amended and Restated Restrictive Covenant Only for Lots 7-9 and 14-20

Assistant Town Manager Alisha Janes stated there are two restrictive covenants you are considering here. Ms. Janes stated the first is a non-substantive update, since we recorded the first restrictive covenant and then clarified the HOA (Homeowners Association) declarations, the legal counsel we worked with was able to clarify that the community would be partially exempt from the Colorado Common Owners Interest Act. Ms. Janes stated this is a win because it keeps the community affordable and clarifies the restrictive covenant to say the community is partially exempt. Ms. Janes stated the second restrictive covenant is a result from our conversation with DOLA (Department of Local Affairs) concerning our $300,000 dollar grant for Hideaway Junction Phase II. Ms. Janes stated that Staff met with DOLA last Tuesday, in order to finalize, close out, and receive the payment of the grant to do so we would need to update the restrictive covenant and change the 300% AMI (Average Median Income) to 140% AMI. Ms. Janes stated this is a choice for Council, we could not receive the grant money and keep it at 300% AMI, or DOLA is able to say we met the AMI requirement through averaging for our first buyers so they will be exempt from the first sale. Ms. Janes stated buyers shouldn't experience any change and half of our applicant pool was under 140% AMI. Ms. Janes stated the grant funds only apply to the first 10 lots of Hideaway Junction Phase II. Ms. Janes stated that once the grant is closed out, Council could amend the restrictive covenant again if needed.

Councilor Rebecca Kaufman moved and Councilor Jeremy Henn seconded the motion approving (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 28, A Resolution Approving an Amended and Restated Declaration of Restrictive Covenant for All of Hideaway Junction Phase II and Authorizing Staff to Execute and Record a Second Amended and Restated Restrictive Covenant Only for Lots 7-9 and 14-20. Motion carried: 7-0.

4.h. (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 29, A Resolution Authorizing the Chair to Execute a Subordination of Declaration of Restrictive

Covenant for Affordable Housing at Hideaway Junction Phase II to Allow CHFA Financing for the Development
Assistant Town Manager Alisha Janes stated this is a request from our development partners to table this item to April 16, we are currently in negotiations with CHFA (Colorado Housing and Finance Authority) on closing the financing of Hideaway Junction Phase II.

Councilor Art Ferrari moved and Councilor Michael Periolat seconded the motion tabling (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 29, A Resolution Authorizing the Chair to Execute a Subordination of Declaration of Restrictive Covenant for Affordable Housing at Hideaway Junction Phase II to Allow CHFA Financing for the Development. Motion carried: 7-0.

4.i. (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 30, A Resolution Appointing Officers for Hideaway Junction Homeowners Association Phase II, Inc.
Assistant Town Manager Alisha Janes stated the last important task is to hold the first HOA (Homeowners Association) meeting so we can close and collect HOA dues. Ms. Janes stated at Council's last meeting you authorized the creation of the HOA. Ms. Janes stated that right now the HOA is under the declarant phase so you as the Housing Authority are still operating the HOA. Ms. Janes stated the Housing Authority has to designate officers, the officers listed are Staff and Development Partners, and we would only serve as the officers during the declarant phase, once up and operating the HOA will be turned over to the homeowners. Ms. Janes stated the next step is to hold the first meeting, record minutes, and be prepared for the first closing. Ms. Janes stated we will also arrange opportunities for Council to tour the houses before the first closing.

Councilor Rebecca Kaufman moved and Councilor Art Ferrari seconded the motion approving (Council Acting as Winter Park Housing Authority) Housing Authority Resolution 30, A Resolution Appointing Officers for Hideaway Junction Homeowners Association Phase II, Inc. Motion carried: 7-0.

5. <u>Town Manager's Report</u>
Town Manager Keith Riesberg stated are next regularly scheduled meeting is April 2, Staff plans on canceling that meeting due to the municipal election. Mr. Riesberg stated with the adoption of ordinance 617 the Town's lodging tax increase will be moving forward, Staff will be working with the Chamber of Commerce to send communications to lodging properties regarding the planned enforcement and implementation of that ordinance and will also be pushing that out through our normal communication channels. Mr. Riesberg stated yesterday Council received a report from our lobbyists on pending bills at the State legislature, if Council has feedback please share it with him.

6. <u>Mayor's Report</u>
Nothing to Report.

7. <u>Town Council Items for Discussion</u>
Councilor Rebecca Kaufman stated she had a sub-committee meeting for Senate Bill 174, the new housing bill for this year. Councilor Kaufman stated they asked for input, there is only 15 million dollars for this bill and it will put a lot of work on our Staff and Staff around the State for the things they are asking for. Councilor Kaufman stated her input was there should be additional funding for that and streamlined processes for RFPs (Request for Proposals) and everything involved with what that they are asking communities to do.

Mayor Nick Kutrumbos stated we did meet with CDOT (Colorado Department of Transportation) yesterday, and before the next winter season we will have a follow-up meeting with them on what improvements they are going to do in terms of Berthoud Pass and communication with our community for emergency services and avalanche mitigation.

There being no further business to discuss, upon a motion regularly adopted, the meeting was adjourned at 6:43 p.m.

The next scheduled meeting of the Town Council will be Tuesday, April 16, 2024, at 5:30 p.m.

____

Danielle Jardee, Town Clerk

TOWN OF winter park

MEMO

TO	Mayor and Town Council
FROM	Dani Jardee, Town Clerk
CC	Keith Riesberg, Town Manager
DATE	April 12, 2024
RE	Resort Area Development Metro District Nos. 1-10 IGA

Background

On September 5, 2023, Council approved Resolution 2086, A Resolution Approving the Service Plan for the Resort Area Development Metropolitan District Nos. 1-10. Resolution 2086, Section 3 (a), states the District shall execute the IGA (Intergovernmental Agreement) with the Town attached to this resolution and required by the Service Plan and deliver to the Town after its organizational election.

Analysis

The Resort Area Development Metropolitan District Nos. 1-10 have now been formed and created. The next step is for the Town to execute the IGA. Staff recommend approving the authorization to sign the Resort Area Development Metropolitan District Nos. 1-10 IGA.

Recommendation

The Council approved the IGA with Resort Area Development when the Council approved their formation. Now that the Districts have officially been formed, we are notifying Council of the need to execute (sign) the previously approved IGA.

To authorize the execution of the IGA, the following motion should be made:

> I move to approve the authorization to sign the Resort Area Development Metropolitan District Nos. 1-10 Intergovernmental Agreement with the Town.

Should you have any questions or need additional information regarding this matter, please contact me.

INTERGOVERNMENTAL AGREEMENT

Between

THE TOWN OF WINTER PARK, COLORADO,
and
RESORT AREA DEVELOPMENT METROPOLITAN
DISTRICT NOS. 1-10

THIS AGREEMENT is made and entered into as of this 30th day of January, 2024, by and between the TOWN OF WINTER PARK, a Colorado home rule municipal corporation (the "**Town**"), and RESORT AREA DEVELOPMENT METROPOLITAN DISTRICT NOS. 1-10, a quasi-municipal corporation and political subdivision of the State of Colorado (each a "**District**" and collectively, the "**Districts**"). The Town and the Districts are each a "**Party**" and may collectively be referred to as the "**Parties**."

RECITALS

WHEREAS, the Districts have been organized as a means of furnishing certain capital facilities and services to and for the benefit of property in the Town, which is currently being developed under the name "Winter Park Base Area," which name may change as development progresses (the "**Development**"), as more fully set forth in the Districts' Service Plan approved by the Town on September 5, 2023 (the "**Service Plan**"); and

WHEREAS, the Service Plan makes reference to the execution of an intergovernmental agreement between the Town and the Districts; and

WHEREAS, the Town and the Districts have determined it to be in the best interests of their respective taxpayers, residents, and property owners to enter into this Intergovernmental Agreement (the "**Agreement**") to promote the coordinated development of the Development.

NOW, THEREFORE, in consideration of the covenants and mutual agreements herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

COVENANTS AND AGREEMENTS

1. Town Land Use Powers Exclusive. The Town shall have and will exercise sole and exclusive jurisdiction over land use and building, *e.g.* zoning, subdivision, building permitting, and decisions affecting development of property within the boundaries of the Districts. Construction of all Public Improvements shall be subject to applicable ordinances, codes, and regulations of the Town. The Districts shall take no action contrary to such decisions or orders of the Town, nor will the Districts take or attempt to take any action, either directly or by omission, in violation of any such decision or order. Except as provided in Section 3.b below, District projects and the construction thereof shall be subject to Town ordinances, codes, and regulations.

2. Change in Boundaries. The boundaries of the Districts may be adjusted via the inclusion of property within the Inclusion Area Boundaries in accordance with the applicable provisions of the Special District Act. The inclusion of additional property located within the Town but not located within the Service Area of the Districts shall be subject to the approval of the Town, which approval shall not be unreasonably withheld or conditioned. In no event shall the Districts include into its legal boundaries any property not located within the corporate limits of the Town at the time of inclusion.

3. Public Improvements.

a. Construction by the Districts. The obligations of Alterra Mtn Co Real Estate Development, Inc (the "**Developer**") under the Town's subdivision and other regulations to construct public improvements for the benefit of the Development may be performed by the Districts. If constructed by the Districts, the improvements shall be subject to this Agreement and shall be referred to herein as "**Public Improvements**."

b. Town Ownership, Operation. The dedication of specific Public Improvements to and acceptance thereof by the Town for operation and maintenance shall be determined by the Town in accordance with Town ordinances, codes, and regulations at the time of and in connection with the Town's review and consideration of subdivision plats filed by the owner or developer of property within the Development. Each Public Improvement to be dedicated to the Town for operation and maintenance shall be designed, acquired, constructed, and installed in accordance with Town standards, and Town ordinances, codes, and regulations shall govern and control the process and requirements for design, construction, and dedication of such Public Improvements to the Town. The Town shall be under no obligation to accept any Public Improvement that does not conform with all such requirements.

c. Design Standards. The Districts will ensure that the Public Improvements are designed and constructed in accordance with the standards and specifications of the Town and of other governmental entities having proper jurisdiction. The Districts or the applicable constructing party will obtain the applicable permits for construction and installation of Public Improvements prior to performing such work.

d. Operation and Maintenance. All Public Improvements which are not conveyed to and accepted by the Town or some other public entity shall be subject to the ordinances, codes, and regulations of the Town but shall be owned and/or operated, maintained, repaired, and replaced by the Districts. They shall be public facilities and shall be generally available for use by the public at large. All Public Improvements shall be fully accessible by and available to duly authorized representatives of the Town, including police and building/zoning officials, and to providers of fire, ambulance, and other health and emergency services.

4. Bankruptcy. All of the limitations contained in the Service Plan, including, but not limited to, those pertaining to the Maximum Debt Mill Levy, have been established under the authority of the Town to approve a Service Plan with conditions pursuant to Section 32-1-204.5, C.R.S. It is expressly intended that such limitations:

a. Shall not be subject to set-aside for any reason or by any court of competent jurisdiction, absent a Service Plan Amendment.

b. Are, together with all other requirements of Colorado law, included in the "political or governmental power" reserved to the State under the U.S. Bankruptcy Code (11 U.S.C.) Section 903, and are also included in the "regulatory or electoral approval necessary under applicable non-bankruptcy law" as required for confirmation of a Chapter 9 Bankruptcy Plan under Bankruptcy Code Section 943(b)(6).

Any Debt, issued with a pledge or which results in a pledge, that exceeds the Maximum Debt Mill Levy shall be deemed a material modification of the Service Plan pursuant to Section 32-1-207(2), C.R.S. and shall not be an authorized issuance of Debt unless and until such material modification has been approved by the Town as part of a Service Plan Amendment.

5. Maximum Debt Mill Levy. The "Maximum Debt Mill Levy" shall be the maximum mill levy each District is permitted to impose upon the taxable property within the District for payment of Debt, and shall be determined as follows:

a. For the portion of any aggregate Debt which exceeds fifty percent (50%) of the District's assessed valuation, the Maximum Debt Mill Levy for such portion of Debt shall be fifty (50) mills less the number of mills necessary to pay unlimited mill levy Debt described in Section 5.b below; provided that if, on or after January 1, 2021, there are changes in the method of calculating assessed valuation or any constitutionally or legislatively mandated tax credit, cut, or abatement, the mill levy limitation applicable to such Debt may be increased or decreased to reflect such changes, such increases or decreases to be determined by the Board in good faith (such determination to be binding and final) so that to the extent possible, the actual tax revenues generated by the mill levy, as adjusted for changes occurring after January 1, 2021, are neither diminished nor enhanced as a result of such changes. For purposes of the foregoing, a change in the ratio of actual valuation shall be deemed to be a change in the method of calculating assessed valuation.

b. For the portion of any aggregate Debt which is equal to or less than fifty percent (50%) of the District's assessed valuation, either on the date of issuance or at any time thereafter, the mill levy to be imposed to repay such portion of Debt shall not be subject to the Maximum Debt Mill Levy and, as a result, the mill levy may be such amount as is necessary to pay the Debt service on such Debt, without limitation of rate.

c. For purposes of the foregoing, once Debt has been determined to be within Section 5.b above, so that the District is entitled to pledge to its payment an unlimited ad valorem mill levy, the District may provide that such Debt shall remain secured by such unlimited mill levy, notwithstanding any subsequent change in the District's Debt to assessed ratio. All Debt issued by the District must be issued in compliance with the requirements of Section 32-1-1101, C.R.S., and all other requirements of State law.

To the extent that a District is composed of or subsequently organized into one or more subdistricts as permitted under Section 32-1-1101, C.R.S., the term "District" as used herein shall be deemed to refer to each District and to each such subdistrict separately, so that each of the subdistricts shall be treated as a separate, independent district for purposes of the application of this definition.

6. **Additional Provisions.** The Districts will comply with the following provisions, which are also additional requirements and limitations imposed upon the Districts in the Service Plan or are conditions of the Town's approval thereof:

a. The Districts may exercise their respective powers granted herein and by the Special District Act, other applicable statutes, common law, and the Constitution of the State of Colorado, as the same currently exist and as may be amended from time to time in the future, insofar as it does not deviate in a material manner from the requirements of the Service Plan pursuant to Section 32-1-207(2), C.R.S., which material modification may be enjoined by the Town unless approval from the Town is first obtained.

b. Unless otherwise approved in writing by the Town Council, which approval shall not be unreasonably withheld, delayed, or conditioned, the Districts shall be subject to an aggregate Debt limit of $203,000,000 (the "**Debt Cap**"), a maximum net effective interest rate of eighteen percent (18%) per annum, and a maximum underwriter discount of five percent (5%). These limitations were established and agreed based upon current financial market conditions and current construction costs generally. District requests based upon changes in these and over relevant and appropriate factors shall be given favorable consideration. No such change shall be deemed a material modification of the Service Plan.

c. The Districts shall not apply for or claim any entitlement to Conservation Trust Fund money for which the Town is eligible to apply.

d. The Town's remedies for failure of the Districts to comply with this Agreement or any material provision of the Service Plan shall include authority for the Town, upon a finding of such failure by the Town Council, following notice to the Districts and an opportunity to be heard, to pursue any remedy at law including pursuant to the Special District Act.

The Districts shall file any ballot issue with the Town prior to referring the same to their electors and will provide the Town a copy of any financial plan (including interest rates and security terms) prior to any Debt issuance if the financial plan differs from that attached to the Service Plan as Exhibit E. The ballot issues to be presented to the electors at the election proposing the organization of the District are attached to the Service Plan as Exhibit F thereto. The Town may, pursuant to the provisions of Section 32-1- 207(3)(a), C.R.S., enjoin any proposed action in connection therewith which is not in material compliance with the Service Plan. The Districts will work cooperatively with the Town to implement the various provisions of the Service Plan. Notwithstanding the foregoing, nothing shall prohibit the Districts from seeking approval of the full amount of the Debt Cap for each of the various Public Improvement types, to vote dollar amounts, interest rates, or terms for any debt or taxing question that exceed the various limits provided herein in order to provide sufficient flexibility for the Districts to operate in the future. The Districts shall not, however, be authorized to issue Debt, levy taxes, or take other action in material violation with the Service Plan or this Agreement, regardless of whether such action is authorized in any election.

e. The rate of interest paid by any District on any loan from or any reimbursement payable to the Developer shall not exceed eight percent (8%) per annum, compounded annually.

f. The Districts will use reasonable good faith efforts to assure that all developers of the property located within the Districts provide written notice to all initial purchasers of property in the Districts regarding the Maximum Debt Mill Levy, as well as a general description of the Districts' authority to impose and collect rates, fees, tolls, and charges, in accordance with Sections 38-35.7-101, -110, C.R.S., as applicable.

g. To the extent applicable and required by the Town, the Districts shall comply with the reporting requirements contained in Section 32-1-207, C.R.S., as may be amended from time to time.

h. The Districts shall pay the full cost incurred by the Town to review and consider any and all applications for an amendment to the Service Plan.

7. Notices. All notices, demands, requests, or other communications to be sent by one Party to the others 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 address or by courier delivery, via United Parcel Service or other nationally recognized overnight air courier service, or by depositing same in the United States mail, postage prepaid, addressed as follows:

To the District:
Resort Area Development Metropolitan District Nos. 1-10
WHITE BEAR ANKELE TANAKA & WALDRON
2154 E. Commons Ave, Suite 2000
Centennial, CO 80122
Attn: Robert Rogers
rogersrg@gmail.com
512-740-1146

To the Town:
Town of Winter Park
P.O. Box 3327
Winter Park, CO 80482

With a copy to:
Town Attorney
Hoffmann, Parker Wilson & Carberry, P.C.
511 Sixteenth Street, Suite 610
Denver, CO 80202

All notices, demands, requests, or other communications shall be effective upon such personal delivery or one (1) business day after being deposited with United Parcel Service or other nationally recognized overnight air courier service for overnight delivery, or three (3) business days after deposit in the United States mail. By giving the other Parties 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.

8. **Precedence.** Recognizing that full development of the Development may take considerable time, the Town approved the Service Plan with sufficient flexibility to accommodate and enable the Districts to respond to changed conditions over time, while still relying upon the provisions of this Agreement to enable the Town to exercise appropriate control and supervision of the Districts as provided by state law. Accordingly, any conflict or inconsistency between the Service Plan and this Agreement shall be resolved in favor of the provisions of this Agreement.

9. **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.

10. **Amendment.** This Agreement may be amended, modified, changed, or terminated in whole or in part only by written agreement duly executed by the Parties and authorized by their respective governing bodies, without necessarily requiring amendment to any Service Plan. The need for formal amendment to the Service Plan shall be determined according to state law then in effect and any applicable express provision of this Agreement or the Service Plan.

11. **Enforcement.** This Agreement may be enforced in law or in equity according to the laws and statutes of the State of Colorado. By executing this Agreement each Party commits itself to perform pursuant to these terms contained herein, and a breach hereof which results in recoverable damages shall not cause the termination of any obligations created by this Agreement unless such termination is declared by the Party not in breach hereof.

12. **Venue; Choice of Law.** Venue for the trial of any action arising out of any dispute hereunder shall be in the district court of the State of Colorado serving Grand County pursuant to the appropriate rules of civil procedure. This Agreement shall be governed and construed in accordance with the laws of the State of Colorado.

13. **Scope of Benefits.** Except as otherwise stated herein, this Agreement is intended to describe the rights and responsibilities of and between the named Parties and is not intended to, and shall not be deemed to confer any rights upon any persons or entities not named as parties, nor to limit in any ways the powers and responsibilities of the Town, the Districts, or any other entity not a Party hereto.

14. **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.

15. **Assignment.** No Party hereto shall assign any of its rights nor delegate any of its duties hereunder to any person or entity without having first obtained the prior written consent of all other Parties, which consent will not be unreasonably withheld, delayed, or conditioned. Any purported assignment or delegation in violation of the provisions hereof shall be void and ineffectual. The rights and obligations created hereby shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and permitted assigns.

16. **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.

17. **Interpretation.** Paragraph headings are used for convenience of reference only. Capitalized terms used herein and not otherwise defined shall have the meanings ascribed to them in the Service Plan.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the Districts and the Town have caused this Agreement to be duly executed as of the day first above written.

RESORT AREA DEVELOPMENT METROPOLITAN DISTRICT NOS. 1-10

Jennifer Ingrassia (Feb 2, 2024 12:39 MST)

By: Jennifer Brownlie

Its: President

ATTEST:

Heather Ruth

By: Heather Ruth

TOWN OF WINTER PARK

By:____________________________

Its:____________________________

ATTEST:

By:____________________________

MEMO

TO	Town Council
FROM	Jamie Wolter, Public Works Director
CC	Town Manager Keith Riesberg
DATE	April 16, 2024
RE	Transit Maintenance Building Landscape Proposal

As outlined in the County issued Special Use Permit for the new Transit Maintenance Facility, the Town of Winter Park (TOWP) is required to establish landscaping along County Road 5, in front of the Maintenance Facility to block or shield the view of the facility from vehicle and pedestrian traffic along County Road 5. The original plans for the facility showed extensive landscaping around the perimeter of the entire property. A compromise was agreed on by the Winter Park Town Manager and the County Manager, to provide shielding landscaping along County Road 5 only.

Per the Towns contract policy and guidelines 3 bids for the project were received. The proposal by Alpine Landscape Service is the lowest and best bid for this project, with a total price of. A deposit in the amount of $21,655.87 is due on April 25, 2024.

Staff recommends moving forward with this proposal by Alpine Landscaping.

TOWN OF WINTER PARK

RESOLUTION NO. 2132
SERIES OF 2024

A RESOLUTION APPROVING LANDSCAPING FOR TRANSIT MAINTENANCE FACILITY

WHEREAS, The Town is required to install landscape screening in the form of shrubs and trees at the Transit Maintenance facility on County Road 5, under conditions outlined in the Special Use Permit issued by Grand County.

WHEREAS, We received 3 quotes for the landscape proposal and Alpine Landscape Service provided the lowest and best bid of $43,311.57. A deposit of $21,655.87 is due on April 25, 2024.

WHEREAS, Town staff recommends accepting the quote and proposal from Alpine Landscape Service.

NOW THEREFORE, BE IT RESOLVED that the Town Council of Winter Park, Colorado hereby

APPROVED AND PASSED this 16th day of April, 2024 by a vote of _________to ____.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

New payment request from Alpine Landscape Service - invoice 3911

Alpine Landscape Service <quickbooks@notification.intuit.com>

Tue 3/26/2024 10:26 AM

To:Jamie Wolter <jwolter@wpgov.com>

Caution! This message was sent from outside your organization.

INVOICE 3911 DETAILS

Alpine Landscape Service

DUE 04/25/2024

$21,655.87

Review and pay

Powered by QuickBooks

Dear Jamie Wolter,

We appreciate your business. Please find your invoice details here. Feel free to contact us if you have any questions.

Have a great day!
Alpine Landscape Service

Bill to	Jamie Wolter P.O. Box 3327 Winter Park, CO 80482 US

Ship to	Jamie Wolter 350 county Road 5101 Fraser, CO 80442 US
Terms	Net 30

03/26/2024

upfront deposit $21,655.87

Contract 4427798 Bus Barn

1 X $21,655.87

Balance due $21,655.87

Review and pay

Alpine Landscape Service

P.O. Box 1517 Winter Park, CO 80482 US

970-887-9445 myproject@alpinelandscapeservice.com

www.alpinelandscapeservice.com

Proposal

Alpine Landscape Service

Client Name:	Town of Winter Park		
Project Name:	Bus Barn		
Jobsite Address:	350 county Road 5101 Fraser, CO 80442	**Billing Address:**	P.O. Box 3327 Winter Park, CO 80482
Estimate ID:	EST4427798		
Date:	Mar 06, 2024		

County Road 5 Planting

Install 13 2 inch aspen 16 6-8ft spruce 23 #1 chokecherry shrubs These will all be installed per landscape design. There is no water on site so there is no guarantee with any of these plantings.

Subtotal	$43,311.57
Taxes	$0.00
Estimate Total	**$43,311.57**

1. The Contractor shall perform the work and services described in this Agreement and in Drawings and Specifications issued by the Contractor and accepted in writing by the Owner (the "Work") at the lands and premises municipally known as the bus barn. Once accepted by the Owner, the Drawings and Specifications are to be read into and form part of this Agreement.

2. Copyright for the Drawings and Specifications belong to the Contractor and shall not be used on any other project. The Owner may retain copies of the Drawings and Specifications for information and reference provided the Contractor has been paid in full for services rendered under this Agreement. The order of priority of documents, from highest to lowest, shall be this Agreement, followed by the Drawings, followed by the Specifications.

3. Prior to the commencement of the Work the Owner will provide the Contractor with information as to the location of property lines and all subsurface utility and service lines, including but not limited to electrical, telephone and gas lines and water and irrigation pipelines and conduits. The Contractor may rely on the accuracy and completeness of all such information and shall not be liable for damages or costs resulting from any errors or omissions in that regard. Unless otherwise provided for herein, the Contractor will be responsible for obtaining any municipal building permits required in relation to the performance of the Work.

4. Unless otherwise specified, all building materials provided shall be new. The Contractor shall have total control of the Work and shall be solely responsible for construction means, methods, techniques, sequences, and procedures. The Contractor shall comply with all laws, rules, regulations and building and fire codes which relate to the Work including applicable health and safety legislation and shall obtain any permits or licenses necessary for its performance as at the date hereof. The Contractor will also be responsible for and shall restore at its expense all damage to the property of the Owner caused by the Contractor in the performance of the Work.

5. The Contractor shall submit to the Owner, prior to its commencement, a schedule for the performance of the Work. If the Contractor is delayed in the performance of the Work by an action or omission of the Owner or by circumstances beyond the control of

P.O Box 1517 p. 970-887-9445 www.alpinelandscapeservice.com
Winter Park, CO 80482 email: Matt@alpinelandscapeservice.com

TOWN OF WINTER PARK
RESOLUTION NO. 2133
SERIES OF 2024

A RESOLUTION APPROVING A DEVELOPMENT IMPROVEMENTS AGREEMENT STANDARD FORM FOR RIVERWALK AT WINTER PARK FILING 2

WHEREAS, Riverwalk, LLC is the current owner of certain real property described in the Agreement (herein known as the "Property");

WHEREAS, Riverwalk, LLC is required to complete certain improvements associated with the development known as Riverwalk at Winter Park Filing 2 (the "Development");

WHEREAS, the Town staff has reviewed the attached Development Improvements Agreement (DIA) and recommends conditional approval to the Town Council; and

WHEREAS, Section 9-1-3 of the Winter Park Town Code requires the Town Council approve DIAs by resolution.

NOW THEREFORE, BE IT RESOLVED by the Town Council of the Town of Winter Park, Colorado as follows:

1. Findings. The Town Council hereby finds and determines that the attached Development Improvements Agreement Standard Form and Exhibits (attached hereto as Exhibit A) meet all of the applicable criteria set forth in Title 9 of the Winter Park Town Code.

2. Decision. Based on the foregoing findings, the Town Council hereby approves the Development Improvements Agreement, subject to the following conditions, all of which shall be satisfied prior to beginning site improvements:

   a. Applicant shall provide surety to the Town.
   b. Applicant shall receive approved stamped construction plans and site plan from the Town.

APPROVED AND PASSED this 16th day of April 2024 by a vote of _____ to ______.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

DEVELOPMENT IMPROVEMENTS AGREEMENT

THIS DEVELOPMENT IMPROVEMENTS AGREEMENT ("Agreement") is made and entered into this _____ day of ____________, 20__, by and between the TOWN OF WINTER PARK, a Colorado municipal corporation having an address of P.O. Box 3327, 50 Vasquez Road, Winter Park, Colorado 80482 (the "Town"), and Riverwalk LLC, a Colorado LLC, having an address of 3000 Airport Dr. Unit 203, Erie, CO 80516 ("Developer") (collectively the "Parties").

WHEREAS, Developer is the owner of certain real property located in the Town, more particularly described in **Exhibit A** attached hereto and incorporated herein by reference (the "Property");

WHEREAS, the Town has approved Developer's development plan for the Property, which is attached hereto as **Exhibit B**, and incorporated herein by reference; and

WHEREAS, the Town's approval of the Developer's proposed development on the Property is contingent upon the express condition that all duties created by this Agreement are faithfully performed by Developer.

NOW, THEREFORE, for and in consideration of the mutual promises and covenants contained herein, the sufficiency of which is mutually acknowledged, the Parties hereto agree as follows:

1. Purpose. The purpose of this Agreement is to set forth the terms, conditions and fees to be paid by Developer in connection with the improvements for development of the Property. All conditions in this Agreement are in addition to any requirements of the Winter Park Town Code, state statutes and other Town ordinances, and are not intended to supersede any requirements contained therein.

2. Public Improvements. Developer agrees to complete or pay for, as described herein, the public improvements set forth in **Exhibit C**, attached hereto and incorporated herein by this reference ("Public Improvements") subject to this Agreement and in accordance with the approved development plan.

3. Construction.

a. All Public Improvements shall be installed and completed at the expense of Developer and dedicated or conveyed to the Town upon the Town's acceptance thereof or dedicated or conveyed and accepted by an agency, association, or district as required by law or as acceptable to the Town. The estimated cost of the Public Improvements is set forth in **Exhibit C**.

b. The Town may make reasonable engineering observations at Developer's expense. Observation, acquiescence in or approval by any inspector shall not constitute the approval by the Town of any portion of such Public Improvements.

c. Developer shall provide all necessary engineering designs, surveys, field surveys and incidental services related to the construction of the Public Improvements at its sole cost and expense, including reproducible "as-built" drawings certified accurate by a professional engineer registered in the State of Colorado.

4. Completion and Preliminary Acceptance. Except as otherwise provided above, the obligations of Developer in Section 3 hereof shall be performed within 2 years. A certificate of occupancy shall not be issued until such obligations have been satisfied unless expressly agreed to otherwise. Proper application to the Town for preliminary acceptance of Public Improvements shall be made by Developer in advance. Upon completion of construction of the Public Improvements, the Town or a Town-accepted agency, association, or district shall inspect the Public Improvements and certify with specificity their conformity or lack thereof to the Town's specifications. Developer shall make all corrections necessary to bring the Public Improvements into conformity with the Town's specifications. Upon determination by the Town that the Public Improvements conform with all of the Town's specifications, the Town shall preliminarily accept the Public Improvements and the two-year warranty period set forth in Section 5, below, shall commence.

5. Warranty. Upon preliminary acceptance of the Public Improvements by the Town, Developer shall warrant any and all Public Improvements for a period of two (2) years from the date the Town grants preliminary acceptance of the Public Improvements. Developer shall be responsible for scheduling the necessary inspections for preliminary acceptance. Specifically, but not by way of limitation, Developer shall warrant that all Public Improvements are free of defects in materials or workmanship for a period of two (2) years, as stated above. Developer shall be responsible, at Developer’s cost to maintain all Public Improvements until such improvements are finally accepted and conveyed by the Town. The Town or a Town-accepted agency, association, or district will accept for maintenance all Public Improvements after the warranty period has expired, provided all warranty work has been completed. The Town shall accept for snow removal purposes only all dedicated public streets after preliminary acceptance has been granted in writing by the Town.

6. Final Acceptance of Public Improvements. Upon completion of the two (2) year warranty period set forth in Section 5, above, the Town shall inspect the Public Improvements and certify with specificity their conformity or lack thereof to the Town's specifications. Developer shall make all corrections necessary to bring the Public Improvements into conformity with the Town's specifications. Upon determination by the Town that the Public Improvements conform with all of the Town's specifications, the Town shall accept the Public Improvements. Developer shall convey the Public Improvements to the Town by bill of sale or warranty deed as determined acceptable by the Town in its sole judgment. Upon conveyance of the Public Improvements Developer shall warrant that the title conveyed is marketable and its transfer rightful.

7. Ownership. All Public Improvements shall be conveyed to the Town upon final acceptance.

8. Performance Guarantee.

a. To secure the construction and installation of the Public Improvements, Developer shall furnish the Town, at Developer's expense and prior to commencement of construction, cash or an irrevocable letter (or letters) of credit in which the Town is designated as beneficiary in an amount equal to one hundred and twenty percent (120%) of the total Estimated Costs of development (the "Performance Guarantee").

b. The Performance Guarantee shall be in a form approved by the Town in its sole discretion.

c. The purpose of the Estimated Costs is solely to determine the amount of security. No representations are made as to the accuracy of these estimates, and Developer agrees to pay all costs of the Public Improvements for which it is legally obligated, regardless of the Estimated Costs.

d. The Estimated Costs may increase in the future. Accordingly, the Town reserves the right to review and adjust the Estimated Costs at the time a building permit is issued and annually if the Public Improvements have not been completed. Adjustments shall be made according to changes in the Construction Costs Index as published by the Engineering News Record. If the Town adjusts the Estimated Costs, the Town shall give written notice to Developer. Developer shall, within thirty (30) days after receipt of said written notice, provide the Town with a new or amended Performance Guarantee in the amount of the adjusted Estimated Costs. If Developer fails to provide a new or amended Performance Guarantee, the Town may exercise the remedies provided for in Section 12 hereof; provided, however, that prior to increasing the amount of the Performance Guarantee, the Town shall give credit to Developer for all Public Improvements which have actually been completed and accepted, so that the amount of the Performance Guarantee relates to the cost of required Public Improvements not yet constructed.

e. If the Public Improvements are not constructed or completed within the period of time specified by Section 4 hereof, the Town may draw on the Performance Guarantee to complete the Public Improvements. If the Performance Guarantee is to expire within fourteen (14) calendar days and Developer has not yet provided a satisfactory replacement, the Town may draw on the Performance Guarantee and either hold such funds as security for performance of this Agreement or spend such funds to finish the Public Improvements or correct problems with the Public Improvements as the Town deems appropriate.

f. Upon preliminary acceptance, the Performance Guarantee shall be reduced to the amount of twenty percent (20%) of the total actual cost of construction and installation of such phase of Public Improvements. The reduced Performance Guarantee shall be held by the Town until expiration of the two (2) year warranty period.

9. Land Dedication; Fee in Lieu. To the extent it does not conflict with this Agreement, land dedications and fees-in-lieu shall be provided as stated in Winter Park Town Code. In the case of a conflict between the Winter Park Town Code and this Agreement, the terms of this Agreement shall apply.

10. Nuisance Conditions. Developer shall prevent the existence of any nuisances by way of its construction activities, as nuisances are defined by the Winter Park Town Code. If the Town determines that a nuisance exists, Developer shall be subject to the provisions of the Winter Park Town Code regarding the abatement of nuisances and the cost assessed therefor. If the nuisance is not abated or an abatement plan is not submitted to the satisfaction of the Town, the Town may, upon thirty (30) days' notice under this Agreement, draw upon the Performance Guarantee to pay the cost of abating the nuisance, including any expenses and penalties incurred under the Winter Park

Town Code. The Town may exercise this right in addition to, or in lieu of, the withholding of permits or certificates of occupancy. The decision to draw on the Performance Guarantee shall be within the sole discretion of the Town.

11. Indemnification.

a. Developer hereby agrees to indemnify and hold harmless the Town, its officers, employees, agents or servants from any and all suits, actions and claims of every nature and description caused by, arising from or on account of any act or omission of Developer, or of any other person or entity for whose act or omission Developer is liable, with respect to construction of the Public Improvements; and Developer shall pay any and all judgments rendered against the Town as the result of any suit, action or claim within the scope of the indemnification provision contained in the prior clause, together with all reasonable expenses and attorney fees incurred by the Town in defending any such suit, action or claim.

b. Developer shall pay all property taxes on the Property dedicated to the Town accrued as of the date of dedication, and shall indemnify and hold harmless the Town for any property tax liability.

12. Breach.

a. If Developer breaches this Agreement, the Town may take such action as permitted or authorized by law, this Agreement or the ordinances of the Town, as the Town deems necessary to protect the public health, safety and welfare. The remedies include, but are not limited to:

i. The refusal to issue any building permit or certificate of occupancy;

ii. The revocation of any building permit previously issued under which construction directly related to such building permit has not commenced, except a building permit previously issued to a third party;

iii. A demand that the security given for the completion of the public improvements be paid or honored; and

iv. Any other remedy available at law or in equity.

b. Unless necessary to protect the immediate health, safety and welfare of the Town, or to protect the interest of the Town with regard to security given for the completion of the public improvements, the Town shall provide Developer thirty (30) days' written notice of its intent to take any action under this Section, during which Developer may cure the breach and prevent further action by the Town.

c. The rights and remedies of the Town under this Agreement are in addition to any other rights and remedies provided by law. The expiration of this Agreement shall in no way limit the Town's legal or equitable remedies, or the period in which such remedies may be asserted, for Public Improvement work negligently or defectively performed.

d. Should this Agreement become the subject of litigation to resolve a claim of breach by Developer and a court of competent jurisdiction determines that Developer was in breach of this Agreement, Developer shall pay the attorney fees, expenses and court costs of the Town.

13. Waiver. In executing this Agreement, Developer waives all objections it may have concerning defects, if any, in the formalities whereby it is executed, or concerning the power of the Town to impose conditions on Developer as set forth herein, and concerning the procedure, substance and form of the resolution adopting this Agreement. Developer expressly agrees that the Town cannot be legally bound by the representations of any of its officers or agents or their designees, except in accordance with the Winter Park Town Code and the laws of the State of Colorado.

14. Modification. This Agreement shall not be modified, except by subsequent written agreement of the parties hereto.

15. Integration; Annexation Agreement. This Agreement and any attached exhibits constitute the entire agreement between Developer and the Town.

16. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and assigns.

17. Severability. If any provision of this Agreement is determined to be void by any court of competent jurisdiction, such determination shall not affect any other provision hereof, and all of the other provisions shall remain in full force and effect. It is the intention of the parties hereto that if any provision of this Agreement is capable of two constructions, one of which would render the provision void, and the other which would render the provision valid, then the provision shall have the meaning which renders it valid.

18. Governing Law and Venue. This Agreement shall be governed by the laws of the State of Colorado, and any legal action concerning the provisions hereof shall be brought in Grand County, Colorado.

19. Assignment. There shall be no transfer or assignment of any of the rights or obligations of Developer under this Agreement without the prior written approval of the Town, which may be withheld in the Town's sole discretion; except that this Agreement and Developer's rights hereunder may be assigned by Developer in whole, but not in part, to a company wholly owned by Developer. In the event of an assignment as permitted herein, the assignee shall assume full responsibility for fulfilling the remaining obligations of Developer under this Agreement, and shall execute an acknowledgement of this responsibility in the Town's favor. Failure of the assignee to execute such an acknowledgement shall result in Developer being jointly and severally liable with the assignee for the remaining obligations under this Agreement.

20. Recordation. This Agreement shall be recorded in the real estate records of Grand County and shall be a covenant running with the Property.

21. Title and Authority. Developer expressly warrants and represents to the Town that, together with the undersigned individuals, that the undersigned individuals have full power and

authority to enter into this Agreement. Developer and the undersigned individuals understand that the Town is relying on such representations and warranties in entering into this Agreement.

22. Third Parties. There are no intended third-party beneficiaries to this Agreement.

WHEREFORE, the parties hereto have executed this Agreement on the day and year first above written.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

DEVELOPER

____
Print Name Zachary Nassar
Title Agent, Riverwalk LLC

STATE OF _______________)
) SS.
COUNTY OF _________________)

This instrument was acknowledged before me on this___ day of __________, 20__, by _________________________, as ____________________________ of _________________________.

____
Notary Public; Commission No.__________

My Commission Expires:
____
(SEAL)

EXHIBIT A

LEGAL DESCRIPTION

Riverwalk at Winter Park Filing 2
A Replat of Tract F-1,
Idlewild Minor Subdivision

EXHIBIT B

DEVELOPMENT PLAN

To be added prior to recordation

Exhibit C

ENGINEER'S OPINION OF PROBABLE COST

RIVERWALK Tract F

TKE ENGINEERING

By:	TK	Prepared:	4/15/2022
Checked:		Revised:	7/31/2023
		JN:	22002

A. GRADING & EROSION CONTROL		QUANTITY	UNIT	UNIT PRICE	TOTAL
A1	Clearing and grubbing	5.0	AC	$ 3,200.00	$ 16,000
A2	Strip and store topsoil (assume 4" depth)	2420	CY	$ 1.00	$ 2,420
A3	Cut to Fill onsite	4657	CY	$ 12.00	$ 55,884
A4	Import Material	2283	CY	$ 40.00	$ 91,320
A5	Inlet Protection	1	EA	$ 600.00	$ 600
A6	Stabilized Staging Area	1	EA	$ 5,000.00	$ 5,000
A7	Vehicle Tracking Control	2	EA	$ 2,500.00	$ 5,000
A8	Concrete Washout Area	1	EA	$ 1,000.00	$ 1,000
A9	Seed and Mulch	5.0	AC	$ 3,000.00	$ 15,000
A10	Silt Fence	850	LF	$ 6.00	$ 5,100
	SUBTOTAL - "A. GRADING & EROSION CONTROL"				***$ 197,324***
B. ROADWAY CONSTRUCTION		QUANTITY	UNIT	UNIT PRICE	
B1	Saw Cut Existing Asphalt	150	LF	$ 10.00	$ 1,500
B2	Aggregate Base Course (Class 6) 8" depth	1440	TONS	$ 25.00	$ 35,994
B3	8" ABC Shoulder	10	TONS	$ 26.00	$ 260
B4	5" Asphalt	506	TONS	$ 95.00	$ 48,069
B5	Concrete paving stamped	176	CY	$ 400.00	$ 70,459
B6	Concrete Roadway Aprons	326	SY	$ 55.00	$ 17,942
B7	2' wide Concrete Pan/2' Concrete Ribbon Curb	2073	LF	$ 25.00	$ 51,825
B8	6" Vertical Curb & 2' Gutter	245	LF	$ 25.00	$ 6,125
B9	Concrete Sidewalk	333	SY	$ 55.00	$ 18,333
B10	Curb Ramps	2	EA	$ 1,500.00	$ 3,000
B11	Street Signs	8	EA	$ 300.00	$ 2,400
B12	Retaining Wall	0	FF	$ 75.00	$ -
B13	Storm Inlets	1	EA	$ 3,500.00	$ 3,500
B14	24" Flared End Section	1	EA	$ 1,200.00	$ 1,200
B15	24" Storm Sewer	303	LF	$ 120.00	$ 36,360
B16	5' storm manhole	1	EA	$ 4,500.00	$ 4,500
B17	Type M Riprap	50	TONS	$ 80.00	$ 4,000
B18	Storm Water Quality Vault	1	EA	$ 30,000.00	$ 30,000
	SUBTOTAL - "B. ROADWAY CONSTRUCTION"				***$ 335,468***

ENGINEER'S OPINION OF PROBABLE COST

RIVERWALK Tract F

TKE ENGINEERING

By: TK Prepared: 4/15/2022
Checked: Revised: 7/31/2023
JN: 22002

C. UTILITY CONSTRUCTION		QUANTITY	UNIT	UNIT PRICE	
WATER - ONSITE					
C1	Connection to existing system (Include Pothole, Valve, Coord W/District)	1	EA	$ 5,000	$ 5,000
C2	8" Ductile Iron Main	982	LF	$ 100	$ 98,200
C3	8" Gate Valves	7	EA	$ 850	$ 5,950
C4	8" Tees w/Thrustblock	7	EA	$ 850	$ 5,950
C5	8" Bends w/Thrustblock	9	EA	$ 850	$ 7,650
C6	12" Tees w/Thrustblock	1	EA	$ 1,200	$ 1,200
C7	12" Gate Valves	1	EA	$ 1,200	$ 1,200
C8	Fire Hydrants (Include 6" DIP, 6" Valve, & Swivle tee + fire line)	4	EA	$ 12,000	$ 48,000
C9	Water services (1")	33	EA	$ 1,200	$ 39,600
C10	Existing Utility Crossing	1	EA	$ 1,200	$ 1,200
	SUBTOTAL - "WATER - ONSITE"				***$ 213,950***
SANITARY SEWER					
C11	Connection to existing system (Include Pothole, Valve, Coord W/District)	1	EA	$ 5,000	$ 5,000
C12	12" Sanitary Sewer Main	444	LF	$ 85	$ 37,740
C13	8" Sanitary Sewer Main	510	LF	$ 75	$ 38,250
C14	4' S.S. Manholes	7	EA	$ 6,000	$ 42,000
C15	4" Sanitary Sewer Services (Include Wye & Cleanout)	33	EA	$ 1,200	$ 39,600
C16	Existing Utility Crossing	0	EA	$ 1,200	$ -
	SUBTOTAL - "SANITARY SEWER"				***$ 162,590***
	SUBTOTAL - "C. UTILITY CONSTRUCTION "				***$ 376,540***

D. MISCELLANEOUS		QUANTITY	UNIT	UNIT PRICE	TOTAL
D1	Mobilization	1	EA	$ 15,000	$ 15,000
D2	Traffic Control	1	LS	$ 5,000	$ 5,000
	SUBTOTAL - "D. MISCELLANEOUS"				***$ 20,000***
				SUBTOTAL	*$ 929,332*
	Contingency (does not include Mobilization)			*20%*	*$ 182,866*
				TOTAL RIVERWALK	*$ 1,112,198*

ENGINEER'S OPINION OF PROBABLE COST

RIVERWALK Tract F

By:	TK	Prepared:	4/15/2022
Checked:		Revised:	7/31/2023
		JN:	22002

OFFSITE UTILITIES (SPLIT BY RIVERWALK, SOJOURN, AND REND)					
OS1	12" Sanitary Sewer Main + EXTRAS	693	LF	$ 200	$ 138,600
OS2	8" Water Main + EXTRAS	120	LF	$ 160	$ 19,200
OS3	12" Water Main + EXTRAS	330	LF	$ 200	$ 66,000
OS4	Fire Hydrants (Include 6" DIP, 6" Valve, & Swivle tee + fire line)	1	EA	$ 12,000	$ 12,000
OS5	4' S.S. Manholes	4	EA	$ 5,000	$ 20,000
OS6	inverted siphon + river crossing	1	EA	$ 150,000	$ 150,000
OS7	Mobilization	1	EA	$ 15,000	$ 15,000
OS8	Traffic Control	1	LS	$ 5,000	$ 5,000
OS9					$ -
	SUBTOTAL - "OFFSITE UTILITIES (SPLIT BY RIVERWALK, SOJOURN, AND REND)"				***$ 425,800***
	Contingency (does not include Mobilization)			*20%*	*$ 85,160*
				TOTAL OFF-SITE	*$ 510,960*

TOWN OF WINTER PARK
TOWN COUNCIL
April 16, 2024

SPECIAL EVENT PERMIT –PUBLIC HEARING

Applicant: Winter Park Resort/Janel Jordy

Staff Contact: Dani Jardee, Town Clerk

Event Description: This is a Special Event Permit to use the Fraser River Trail for daily E-bike Tours hosted by Winter Park Resort. The tours would start June 14th and would go through to September 29th with three different time options, 9:30 a.m., 12:00 p.m., & 2:00 p.m. Maximum number of people on each tour would be 9. The Tours would turn around in Hideaway Park.

Staff Comments: The Special Event Permit application was received, reviewed, and approved by Town staff. Notification of the Public Hearing on the permit was published in the Sky Hi News and Middle Park Times on March 27, 2024. No comments have been received.

Attachments: Application, Operations Plan, and Map.

Staff Recommendation

Staff recommends the Town Council grant the Special Event Permit.

Special Event Permit Application

Please complete each section; additional sheets may be used if necessary. If your group will be serving alcohol, please complete Form DR 8439 also. Alcohol served in bottles or cans are never permitted at events.

Name of Applicant: Janel Jordy

Mailing Address of Applicant: 85 Parsenn Rd, Winter Park CO 80482

Contact Name: Janel Jordy

Contact Number:

Contact Email:

Type of Special Event (i.e. fundraiser, concert): Bike Tour

Address of Special Event: 85 Parsenn Rd. Winter Park CO

Do you have written permission to use the premises? ☑ Yes ☐ No

Exact dates and times of the event:

June 14, 2024 - September 29, 2024

Explain the nature of your organization, its function, and who/what benefits from its operations:

Winter Park Resort, connecting people with outdoor experiences.

Who or what organization will be the recipient of the funds derived from this event?

Winter Park Resort

Number of expected attendees: 500 for the season

Describe the premises where the event will take place:

Along the Fraser River Trail from Winter Park Resort to Hideaway Park

What type of security will be provided? None. We will have a guide for each tour

Number of security personnel: NA

How will they be identified? NA

If the event is being held outdoors, how will the exterior boundaries of the premises be marked?

Trail and roads

What type of entertainment will be provided at the event?

Guided interpretation

How will attendees be checked for proper age (i.e. at the door, at the bar)?
How will underage attendees be identified so they are not served alcohol (i.e. wristbands)?

No alcohol involved

How will the conduct of attendees be monitored and by whom?

By Winter Park resort staff

What type of beverages and food or snacks will be available?

None

Organization State Sales Tax Number: (

Organization Town Sales Tax Number: (

Explain how the event will be marketed; what kinds of advertising material will be distributed and who are the targeted recipients?

Online, Social media, paid ads, to resort, town, and county visitors and potential visitors.

Thereby certify, under penalty of perjury, that the information provided to the Town of Winter Park contained in this application is true and accurate to the best of my knowledge.

Applicant's Signature

3.7.2024
Date

Applicant's Email Address

PO BOX 36 Winter Park CO 80482
Applicant's Mailing Address

Applicant's Physical Address

Applicant's Main Phone Number

Applicant's Alternate Phone Number

STATE OF COLORADO
COUNTY OF GRAND
TOWN OF WINTER PARK

Subscribed and sworn to me this ______ day of __________________ 20____

Witness my head and official seal:

Notary Public

My commission expires

Winter Park Resort - Cruiser Ebike Tour on the Fraser River Trail

Overview: Tours will run from June 14th, 2024 to September 29th, 2024. Tours will be offered daily at 9:30, 12:00 and 2:00.

Max number of guests per tour will be 9. Winter Park will supply one guide per tour.

Tour will depart from Winter Park Resort and travel on the Fraser River Trail to Hideaway Park. Tours will return the same way.

Emergency response: All Winter Park guides will be first aid and CPR trained. They will carry a first aid kit and a resort radio. For any non-medical situations (bike malfunctions) guides will contact WPR for a pick-up. For any serious medical emergencies, guides will utilize local emergency (911).

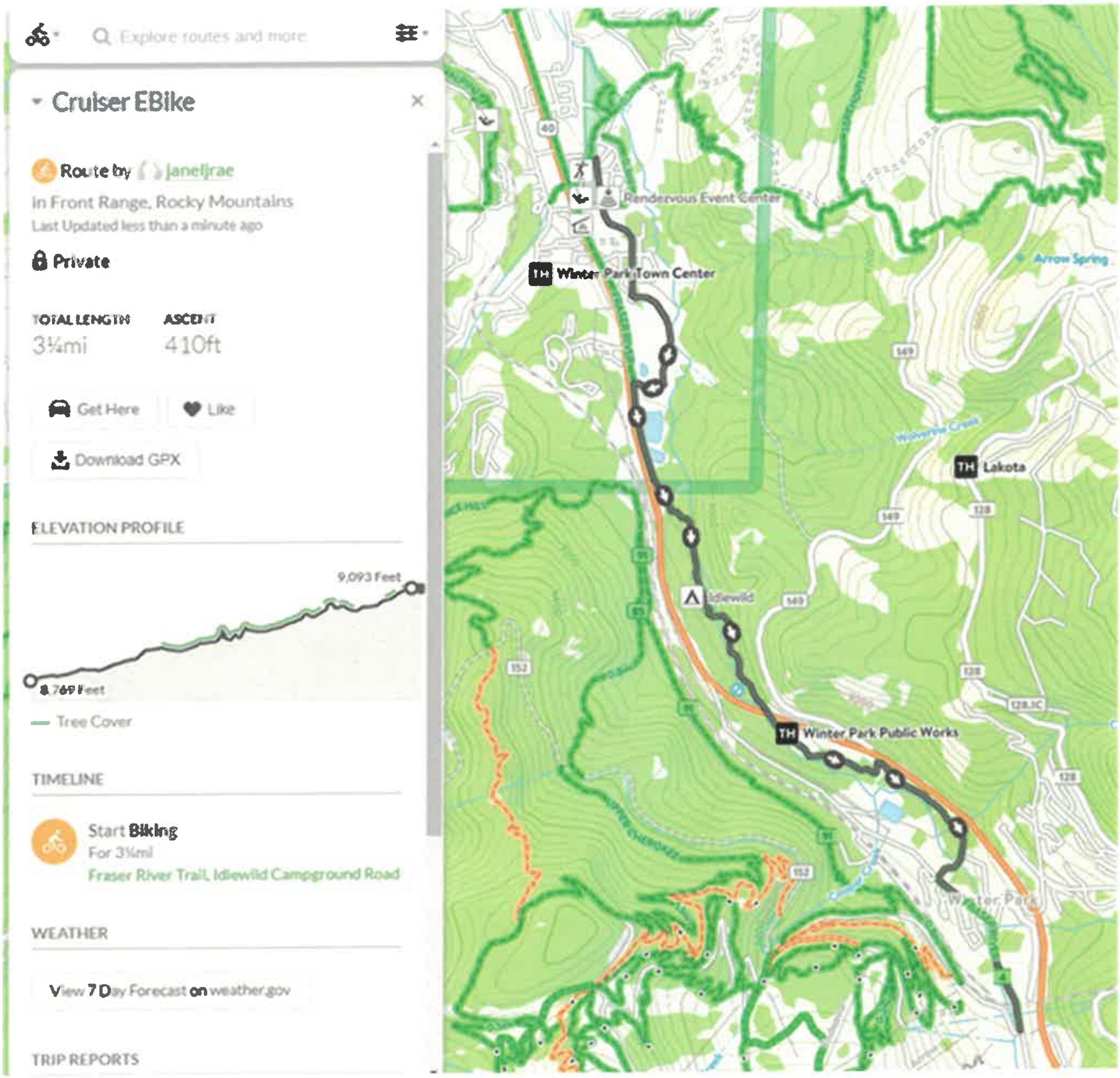
Safety: All town walking zones and speed limits will be obeyed. Guests and guides will wear half-shell bike helmets. Moose, altitude, speed, and bike safety will be discussed before each tour.

Tour managers:

For general questions wpguides@winterparkresort.com or 970-726-1606

Manager, Sara Zappone szappone@winterparkresort.com or 970-726-1607

Director, Janel Jordy jjordy@winterparkresort.com or 970-726-1474



Explore routes and more
Cruiser EBike
Route by janeljrae
in Front Range, Rocky Mountains
Last Updated less than a minute ago
Private
TOTAL LENGTH
3¼mi
ASCENT
410ft
Get Here
Like
Download GPX
ELEVATION PROFILE
9,093 Feet
8,769 Feet
Tree Cover
TIMELINE
Start Biking
For 3¼mi
Fraser River Trail, Idlewild Campground Road
WEATHER
View 7 Day Forecast on weather.gov
TRIP REPORTS
Rendezvous Event Center
Winter Park Town Center
Arrow Spring
Lakota
Idlewild
Winter Park Public Works
Winter Park

Danielle Jardee

From: Janel Jordy (WP) <JJordy@winterparkresort.com>
Sent: Saturday, March 16, 2024 8:04 AM
To: Danielle Jardee
Subject: RE: WPR Cruiser Ebike Tour

Caution! This message was sent from outside your organization.

Dani,

Thanks for sending this. Happy to discuss more with Jamie personally as well. Here are my thoughts on his comments – in blue. Ultimately our goal is to provide these guests with an easy 'entry-level' recreational option from WPR. We see the tour as a way to educate guests on the FRT (speed limits, wildlife, etc.) in a controlled manor with our guides overseeing. We also see this as an opportunity to expose guests to the town and town businesses who otherwise might not stop there.

I am concerned about additional traffic on the FRT between the resort and Hideaway Park. Does the resort have any thoughts on total guests we might see taking these tours? Should we limit the number of users per day? At max capacity we would see an additional 30 people on the trail per day (9 guests, 1 guide, 3 times a day).

I would like to know how the Lion's Club feels about this type of traffic / tour going through the campground. I have not discussed with the Lion's club but I am happy to do so. We have discussed with Devon from the USFS and put in for a SUP with them. We would be happy to walk or slow down in the campground and probably will anyway to avoid any user conflicts in the zone.

If we approve this what happens when someone wants to start doing Longboard Skateboard tours on the same path? Would anyone feel differently about a tour in this area using a different mode of transportation? This is a fair consideration especially for the town. I would say that our ability to teach our guests about the ebikes will help them use the bikes in a safer way than say, renting them in town and taking them on the FRT. I would also say since bikes have brakes and potentially bell's we would be able to use them in a safe and responsible manner.

I do think a guided tour following speed limit / recommendations and respecting other users, is better than a free for all. However, if folks that are taking this type of tour are uncomfortable on a gravel / dirt road will they have the ability to avoid other users? I think these users are looking for a different experience than those on the mountain. We will also do a skills check before we leave the resort and will not allow anyone to ride that is unable to maneuver the bike in a safely.

I know each tour is limited to 9 guests, how many tours are possible or proposed on any given day? What are the time's of the tours? 3 tours per day. Start times are 9:30, 12, and 2.

Thank you very much for the time and consideration.

Janel Jordy
Director | Outdoor Adventure
Winter Park Resort
O | 970.726.1474
C | 307.760.8613

Inspire and Welcome Everyone to Venture Out

From: Danielle Jardee <djardee@wpgov.com>
Sent: Friday, March 15, 2024 9:41 AM
To: Janel Jordy (WP) <JJordy@winterparkresort.com>
Subject: FW: WPR Cruiser Ebike Tour

Good morning Janel,
Before we take special event applications to Council for approval, I do run them by our Department Heads from Public Works and the Police Department to see if they have any issues or concerns, since their departments are affected by events the most. Jamie our Public Works Director had some thoughts and concerns about the e-bike tours, please see below, and told me I was allowed to share the below email with you. Are you able to address any concerns or respond to some of the thoughts he has below, so that when we take it to Council everyone feels good and supportive about the special event permit? And just FYI I told him the respective time frames of the daily tours so you don't need to answer that one.

Thank you,

Danielle Jardee, CMC
Town Clerk | Town of Winter Park, CO
50 Vasquez Rd. | P.O. Box 3327
Winter Park, CO 80482
970.726.8081 ext. 208

From: Jamie Wolter <jwolter@wpgov.com>
Sent: Wednesday, March 13, 2024 1:12 PM
To: Danielle Jardee <djardee@wpgov.com>; Keith Riesberg <kriesberg@wpgov.com>; Glen Trainor

FRASER WINTER PARK POLICE DEPARTMENT

Memo

To: Winter Park Town Council

From: Glen Trainor, Chief of Police

CC: Keith Riesberg, Town Manager

Date: April 10, 2024

Re: **Appointment of the Combined Municipal Court Judge**

BACKGROUND:

Pursuant to Section 1-7-2 of the Winter Park Town Code, Judge Ron Carlson was initially appointed as the Combined Municipal Court Judge in January 2019. He was subsequently re-appointed in April 2022 (Resolution 1962). In October 2023, Stephen O'Conner was appointed as an alternate judge for the combined municipal court.

MATTER BEFORE THE COUNCIL

If approved, Resolution 2134 will reappoint Ron Carlson as the Combined Municipal Court Judge and Stephen O'Conner as the alternate judge to serve in the absence of Judge Carlson. Both parties are willing to serve in this capacity.

RECOMMENDATION

Staff recommends approval of Resolution 2134.

TOWN OF WINTER PARK
RESOLUTION NO. 2134
SERIES OF 2024

A RESOLUTION RE-APPOINTING RONALD W. CARLSON AS PRESIDING MUNICIPAL JUDGE

WHEREAS, pursuant to Section 7.2(a) of the Town of Winter Park Home Rule Charter, the Municipal Court shall be presided over and its functions exercised by an appointed judge who shall hold a term of two (2) years;

WHEREAS, pursuant to Section 1-7-2(a) of the Winter Park Municipal Code, the Presiding Municipal Judge may be re-appointed for terms of two (2) years;

WHEREAS, Ronald W. Carlson has served as Presiding Municipal Judge since January 2019;

WHEREAS, the Town Council now desires to re-appoint Ronald W. Carlson as Presiding Municipal Judge for a term of two (2) years;

WHEREAS, Ronald W. Carlson designates Steven O'Connor as his alternate Municipal Judges for a term of two (2) years.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF WINTER PARK, COLORADO, AS FOLLOWS:

1. Ronald W. Carlson is hereby appointed as Presiding Municipal Judge for a two (2) year term commencing today, April 16, 2024, and ending on April 16, 2026.

2. Steven O'Connor is hereby designated as Ronald W. Carlson's alternate for a two (year) term commencing April 16, 2024

3. The Presiding Municipal Judge shall be compensated at a rate of nine hundred dollars $900.00 per month, beginning April 16, 2024.

PASSED, ADOPTED AND APPROVED this 16th day of April 2024, by a vote of _____ to ______.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

MEMO

To:	Town Council
From:	James Shockey, Community Development Director
Date:	March 19, 2024
Re:	Consideration to amend UDC Sec. 3-C-3-4, *Wetlands* (PLN23-075)

Overview:

The Unified Development Code (the "UDC") Sec. 5-C-1 states an amendment to the text of this UDC may be initiated by Town staff, a citizen of the Town, the Planning Commission, or by the Town Council. Town staff is requesting to amend UDC Sec. 3-C-3-4, *Wetlands* to establish a required setback from wetlands, require mitigation for wetland disturbance, and mitigation procedures for developing within or adjacent to wetland areas.

Staff Analysis:

The Planning Commission held two study sessions on this topic in January and provided direction to staff for drafting the regulations. The Town Council held a workshop in February to review the regulations and agreed conceptually with them.

Below is an overview of the proposed regulations; the full text can be found in the attached document.

Five-foot absolute setback

The regulations state that a five-foot setback must be maintained and can't be encroached upon. This includes 1) buildings or structures, including but not limited to driplines, bay windows, chimneys, cantilevered construction and decks; or 2) other development or disturbance activities, including but not limited to fences, gazebos, play equipment, lawns, formal landscaped areas, wells, roadways, driveways, utilities, other infrastructure and site development activities, including but not limited to clearing, storage or materials, grading, filling, retaining, etc.

25' wetland setback

The regulations state that a 25' setback must be maintained unless an activity is exempt from the wetland setback regulations or a Wetland Disturbance Plan is approved by the Planning Commission.

Disturbance Plan

A disturbance of wetland areas or the wetland setback may be approved by the Planning Commission if the disturbance activity to the wetland area and the associated setback meets all of the following criteria:

1. A wetland or the associated setback cannot have soil disturbance unless there is no practicable alternative to avoiding a wetland or the wetland setback, and such activity is to either:
   a. Meet a comprehensive plan strategy;
   b. Meet a policy of this UDC; or
   c. Allow reasonable use of the property, after considering all other practicable alternatives.

2. The project will limit the degree of impact on the wetland area and the associated setback to the greatest extent practical using the mitigation procedures outlined in Subsection H.
3. The loss of a wetland area will be compensated for by replacing or substituting the wetland area lost in terms of quantity and quality at a 2:1 ratio. The mitigation locations shall be considered in the following priorities, from highest to lowest:
   a. Onsite
   b. Within the same minor drainage basin
   c. Within the Town limits

The mitigation locations were updated after the study session. The Commission expressed concern with allowing mitigation outside of the town limits and therefore it was revised to require mitigation within town limits. The Commission also expressed concern about future maintenance of structures located within five feet of a wetland. Under Section G, *Submittal Requirements for a Wetlands Disturbance Permit*, staff added a requirement to describe how the wetland setback or wetland area will be protected in the future during maintenance to encroachments in the setback/area.

Wetland Definition

The UDC currently defines a wetland as:

> **Wetland** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of different wetland types include swamps, marshes, bogs, seeps, fens, carrs, sloughs, wet meadows, and similar areas.

Staff and the Commission are recommending the definition be revised to state:

> **Wetland** means 1) areas including lakes, rivers, streams, intermittent streams, ponds, sloughs areas of seasonal standing water, or 2) those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as such areas are specifically delineated as provided for in the 1987 edition of the Corps of Engineers Wetlands Delineation Manual. Wetlands generally include fens, swamps, marshes, bogs, and similar areas. Manmade lakes or ponds built for the purpose of detaining runoff are not considered wetlands in the context of the UDC. Wetlands do not need to have a connection to waters of the United States, as defined by 33 Code of Federal Regulations (CFR) parts 328 and 329 (as amended) or U.S. Environmental Protection Agency 40 CFR part 230 (as amended) to fall under Town jurisdiction.

§ 5-B-8 Public Notice Requirements:
This Text Amendment Application has had proper public notification pursuant to § 5-B-8 of the UDC. A Newspaper Publication (PUB) was published in the Middle Park Times on February 22 providing notification of the hearing and requesting comments.

One comment has been received as of March 14, and it is included in your materials.

Planning Commission Recommendation:
At the March 12 Planning Commission meeting, the Commission provided a favorable recommendation. The Commission requested a summary of their discussion be provided so the Council could understand the concerns raised at the meeting. Despite these concerns, Planning Commission did recommend approval. Below is a summary of their discussion, which may be items Town Council wishes to address:

- The Commission added language to Sec. C, *Independent Survey Requirements*, that requires Town approval of the selected consultant and allows the Town to hire an independent third-party consultant to validate a report submitted to the Town.
- The 2:1 ratio for mitigation is appropriate. It was discussed that the reasoning for the 2:1 ratio was to deter disturbance of the wetlands.
- Should there be an exemption added for existing subdivided lots in the Town that have wetlands. The Commission had concerns that it could create an undue burden on those properties.
- Should there be a grace period to allow existing subdivided lots time to submit a development plan to be exempted from the regulations.
- Should the Town allow for a 1/10 acre disturbance prior to requiring mitigation, similar to what the Corps of Engineers allows for jurisdictional wetlands.
- Should the regulations permit enhancements to existing wetlands as a mitigation tool instead of requiring replacement of wetlands at a 2:1 ratio.

There were two public comments made at the meeting. Both comments were concerned with the overall cost the regulations could add to development if developers are required to mitigate wetlands.

Staff Recommendation:
Staff recommends the Town Council approve Ordinance 618, an ordinance of the Town of Winter Park amending Title7, Article 3, within the Unified Development Code.

However, this is a decision for the Council to make, and the Council may choose to approve or deny based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Council can rely on or the decision the Council makes.

Sample Motion for Approval:
I move to approve Ordinance 618, an ordinance of the Town of Winter Park amending Title7, Article 3, within the Unified Development Code.

Sample Motion for Denial:
I move to deny Ordinance 618, an ordinance of the Town of Winter Park amending Title7, Article 3, within the Unified Development Code, specifically: *[articulate specific reasons for denial].*

TOWN OF WINTER PARK
ORDINANCE NO. 618
SERIES OF 2024

AN ORDINANCE OF THE TOWN COUNCIL OF WINTER PARK AMENDING TITLE 7 ARTICLE 3 OF THE WINTER PARK MUNICIPAL CODE

WHEREAS, the Town Council wishes to amend the Unified Development Code (the "UDC") to provide additional protection for wetlands in Town;

WHEREAS, the Planning Commission reviewed the proposed amendments and recommended approval at a public hearing on March 12, 2024; and

WHEREAS, proper notice of the amendment was given pursuant to § 5-B-8 of the UDC.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL FOR THE TOWN OF WINTER PARK, COLORADO, THAT:

Section 1. UDC, Subsec. 3-C-3-4, Wetlands, is hereby repealed in its entirety and replaced with the language attached hereto as Exhibit A

Section 2. Appendix B is created and appended to the UDC as attached hereto containing the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual and 2012 Supplement for Western Mountain and Valleys.

Section 3. The Wetland definition in Article 7.C of the UDC is hereby repealed and replaced with the following definition:

> **Wetland** means 1) areas including lakes, rivers, streams, intermittent streams, ponds, sloughs areas of seasonal standing water, or 2) those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as such areas are specifically delineated as provided for in the 1987 edition of the Corps of Engineers Wetlands Delineation Manual. Wetlands generally include fens, swamps, marshes, bogs, and similar areas. Manmade lakes or ponds built for the purpose of detaining runoff are not considered wetlands in the context of the UDC. Wetlands do not need to have a connection to waters of the United States, as defined by 33 Code of Federal Regulations (CFR) parts 328 and 329 (as amended) or U.S. Environmental Protection Agency 40 CFR part 230 (as amended) to fall under Town jurisdiction.

INTRODUCED, APPROVED ON FIRST READING, AND ORDERED PUBLISHED IN FULL this ___ day of __________, 2024. A public hearing shall be held at the regular meeting of the Winter Park Town Council on the ___ day of ___________, 2024 at 5:30 p.m., or as soon thereafter as possible, at the Winter Park Town Hall.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

READ, ADOPTED AND ORDERED PUBLISHED on second and final reading by a vote of ______ to ______ on the ___ day of ____________, 2024.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

Subsec. 3-C-3-4 Wetlands

A. **Purpose and Intent.** This Section establishes minimum acceptable standards for wetland development. The wetland regulations set forth in this section are intended to complement, enhance, and operate in conjunction with the Federal Clean Water Act (CWA). The wetland disturbance provisions of this Code apply notwithstanding any Federal jurisdictional determination on waters or wetlands within Winter Park by the U.S. Army Corps of Engineers or U.S. Environmental Protection Agency.

B. **Applicability.** This Section applies to all areas within the Town containing a wetland, as defined by this UDC.

C. **Independent Survey Requirements.** In light of the purpose and intent of this section, if there is any evidence that a site subject to disturbance may contain wetlands as such term is defined in Article 7.C of this UDC, the Town may require the developer to obtain and submit a wetlands survey by an independent third-party consultant specializing in wetlands delineations. The Town may require validation of the report through an independent third-party consultant retained by the Town.

D. **Disturbance of Wetlands and Wetland Setback.**

1. **Soil Disturbance Prohibited.** Soil disturbance and wetland fill within wetland areas is prohibited unless such soil disturbance is associated with the exemptions listed in Subsection D(5). Notwithstanding the foregoing, if a Wetland Disturbance Permit is requested, any approval of such permit may require mitigation of wetland fill at a 2:1 ratio.
2. **5-foot Absolute Setback to Wetlands.** In no event shall soil disturbance, development activity or other formal activities be allowed within five (5) feet of a wetland area, including but not limited to: 1) buildings or structures, including but not limited to driplines, bay windows, chimneys, cantilevered construction and decks; or 2) other development or disturbance activities, including but not limited to fences, gazebos, play equipment, lawns, formal landscaped areas, wells, roadways, driveways, utilities, other infrastructure and site development activities, including but not limited to clearing, storage or materials, grading, filling, retaining, etc. The five (5) foot wetland setback areas shall only be left in, or restored back to, a natural state.
3. **25-foot Wetland Setback.** No soil disturbance, development activity or other formal activities shall occur within twenty-five (25) feet of a wetland area, including but not limited to fences, gazebos, play equipment, wells, roadways, driveways, utilities, other infrastructure and site development activities (including but not limited to clearing, storage or materials, grading, filling, retaining, etc.) unless an activity in the wetland setback is approved by the Planning Commission per the criteria in Subsection F. Unless an activity is exempt from the wetland setback regulations as provided for in this Section, the wetland setback impacts and/or other relevant concerns shall be evaluated concurrently with each type of development review as provided for in this UDC, including but not limited to rezoning, subdivision, site plan, final development plan, or a building permit on property containing a wetland or watercourse.
4. **Subsurface Soil Disturbance Prohibited.** Subsurface soil disturbance is also prohibited within five (5) feet of a wetland area, including but not limited to soil nailing and other similar building devices.
5. **Exemptions to Wetland Setback Regulations.**
   a. *Exemptions:* Work in a wetland setback is exempt from the wetland setback requirement if the proposed activity is to:
      1. Revegetate and/or landscape the setback to a natural, weed-free state without extensive grading;
      2. The work is water dependent such as docks and piers;
      3. The work involves construction of an at-grade, natural surface trail in a buffer under the supervision of the Town;
      4. Install or maintain Town-wide water quality protection ponds and drainage features related thereto;
      5. U.S. Geological Survey or other governmental water gauges;

6. Necessary to achieve either vehicular or utility access to property, and no other access route avoiding the wetland areas or the associated setbacks is technically feasible, provided the impacts of such access shall be mitigated in conformance with the standards contained in Subsection H of this Section, *Mitigation Procedures for Developing Within or Adjacent to Wetlands Areas*;
7. The purpose of the work is to restore the wildlife habitat, wetland restoration, implementation of a compensatory wetland mitigation plan approved by the Town and/or U.S. Army Corps of Engineers, or aquatic or stream restoration activities;
8. The work is limited to routine maintenance performed on stormwater facilities (e.g. detention ponds; ditches) where wetlands have developed incidentally to the construction of such facility and were not established for the purpose of wetland mitigation.

b. ***Written Approval of Exemption and Potential Mitigation.*** For an activity to qualify as exempt, the Director must issue an exemption letter for such an activity prior to commencement of the same. An applicant for an exempt activity shall be required to submit a narrative explaining the activity, and the Director may require the submission of a site plan showing a wetland delineation, the proposed activities and the proposed disturbance. Even if an activity is determined to be exempt, the Director may require a mitigation plan as provided for in Subsection H and a development improvements agreement and financial guarantee in accordance with Subsection I to ensure that wetlands and the associated wetland setback are not adversely impacted.

E. **Compliance with Permit Requirements.** Prior to final approval of a subdivision, site plan, building permit or grading permit, the applicant shall submit a plan to meet the standards set forth in Subsections G and H of this Section. If the site contains areas deemed a jurisdictional wetland by the U.S. Army Corps of Engineers, the applicant must present evidence of compliance with Section 404 of the CWA. Areas that contain wetlands that are determined to be nonjurisdictional by the U.S. Army Corps of Engineers or the Environmental Protection Agency per the CWA may still be considered wetlands of the Town. Moreover, if the site contains what are delineated as wetlands under the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual and 2012 Supplement for Western Mountain and Valleys, attached hereto and incorporated herein as Appendix B, or areas that would meet the definition wetlands per these manuals, then those wetland areas are wetlands of the Town and subject to these regulations. Documentation and compliance with all potential wetlands matters shall remain the sole and ongoing responsibility of the project proponent, and any failure to maintain such compliance may lead to suspension or revocation of any approvals provided under this UDC.

F. **Criteria for Approval of a Wetland Disturbance Permit.** The Planning Commission may allow disturbance of wetland areas or the wetland setback if the disturbance activity to the wetland area and the associated setback meet all of the following criteria:

1. A wetland or the associated setback cannot have soil disturbance unless there is no practicable alternative to avoiding a wetland or the wetland setback, and such activity is to either:
   a. Meet a comprehensive plan strategy;
   b. Meet a policy of this UDC; or
   c. Allow reasonable use of the property, after considering all other practicable alternatives.
2. The project will limit the degree of impact on the wetland area and the associated setback to the greatest extent practical using the mitigation procedures outlined in Subsection H.
3. The loss of a wetland area will be compensated for by replacing or substituting the wetland area lost in terms of quantity and quality at a 2:1 ratio. The mitigation locations shall be considered in the following priorities, from highest to lowest:

a. Onsite

b. Within the same minor drainage basin

c. Within the Town limits

4. The project's discharges will not violate other applicable regulations and laws (e.g., state water quality standards, the Endangered Species Act, the National Environmental Policy Act), or significantly degrade the waters of the United States or any other wetland.

G. **Submittal Requirements for a Wetlands Disturbance Permit.** Where all or part of a wetland area or the associated setback is proposed to be disturbed or substantially altered by development, an applicant for development review shall submit a wetlands disturbance plan which shows:

1. A site survey performed by a licensed surveyor showing the wetland areas and setback and the amount, location and acreage of wetland fill, removal or other alteration proposed;
2. A proposed wetland mitigation plan designed by a qualified wetland consultant identifying the proposed mitigation improvements, including those wetland areas to be restored or created in accordance with Subsection H;
3. A grading and erosion control plan, including plant material to be used for revegetation and soil stabilization measures; and
4. A narrative explaining how a proposed activity in the wetland setback or a wetland area will meet the criteria contained in Subsection F.
5. A description of how the wetland setback or wetland area will be protected in the future during maintenance to encroachments in the setback/area.

H. **Mitigation Procedures for Developing Within or Adjacent to Wetlands Areas.** A mitigation plan shall be required for any unavoidable earth disturbing activities within wetland areas or the associated setbacks. Any earth disturbance within any wetland areas or the associated setbacks shall use the following mitigation procedures:

1. Time grading and construction to minimize soil exposure during periods of snowmelt and rainy periods;
2. Retain and protect natural vegetation; strip only the area required for construction in stages;
3. Infiltrate runoff from impervious surfaces by locating infiltration trenches below driplines, walkways, parking areas and driveways;
4. Minimize length and steepness of exposed slopes by designing with the natural topography; prevent erosion on exposed slopes by placing barriers, such as straw bale dikes;
5. Keep runoff velocities low to prevent high erosive powers by using flow barriers (vegetation, rip-rap, etc.);
6. Protect drainage ways and outlets from increased flows by using rip-rap;
7. Trap sediment on-site by using straw bales, filter fences and sand bags;
8. Any disturbed areas must be replanted with native vegetation;
9. Natural hydrologic flows will be maintained through the site;
10. Minimize earth movement by avoiding cut and fill slopes;
11. Foundations shall be stepped down the slope to minimize cut and fill;
12. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety;
13. Appropriate erosion and sedimentation prevention measures must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date;
14. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activities primary purpose is to impound water;

15. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance; and
16. Any other appropriate measure as deemed necessary by the Town Engineer, the Planning Division, the Planning Commission, or the Town Council.

I. **Financial Guarantee.** A development improvements agreement and associated financial guarantee to ensure the requirements of this Section are met shall be posted in accordance with Section 4-B-4, *Development Improvements Agreement* or as otherwise provided for in this UDC. Notwithstanding the forgoing, the term of the financial guarantee for the period following installation shall be a minimum of two (2) growing seasons in order to ensure that successful, stable plant establishment is achieved for all wetland plantings.

J. **Penalties:** Documentation and compliance with the CWA and these UDC standards shall remain the sole and ongoing responsibility of the applicant, and any failure to maintain such compliance may lead to suspension or revocation of any approvals provided under this UDC.

US Army Corps
of Engineers
Waterways Experiment
Station

Wetlands Research Program Technical Report Y-87-1 (on-line edition)

Corps of Engineers Wetlands Delineation Manual

by Environmental Laboratory

January 1987 - Final Report

The following two letters used as part of the number designating technical reports of research published under the Wetlands Research Program identify the area under which the report was prepared:

	Task		Task
CP	Critical Processes	RE	Restoration & Establishment
DE	Delineation & Evaluation	SM	Stewardship & Management

Wetlands Research Program

Technical Report Y-87-1
January 1987

Corps of Engineers Wetlands Delineation Manual

by Environmental Laboratory

U.S. Army Corps of Engineers
Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Final report

Approved for public release; distribution is unlimited

Prepared for U.S. Army Corps of Engineers
Washington, DC 20314-1000

Contents

List of Figures

List of Tables

Preface to the On-Line Edition

This is an electronic version of the 1987 *Corps of Engineers Wetlands Delineation Manual* (the 1987 Manual). The 1987 Manual is the current Federal delineation manual used in the Clean Water Act Section 404 regulatory program for the identification and delineation of wetlands. Except where noted in the manual, the approach requires positive evidence of hydrophytic vegetation, hydric soils, and wetland hydrology for a determination that an area is a wetland.

The original manual and this on-line edition were prepared by the Environmental Laboratory (EL) of the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi. The work was sponsored by Headquarters, U.S. Army Corps of Engineers (HQUSACE), through the Wetlands Research Program.

The manual was originally published in January 1987, following several years of development and testing of draft versions. Since that time, the use and interpretation of the 1987 Manual have been clarified and updated through a series of guidance documents and memoranda from HQUSACE. This electronic edition does not change the intent or jurisdictional area of the 1987 Manual. It does, however, attempt to clarify the manual and current guidance by including a number of boxed "USER NOTES" indicating where the original manual has been augmented by more recent information or guidance. USER NOTES were written by Dr. James S. Wakeley, EL, WES. Due to re-formatting of the text and insertion of the USER NOTES, page numbers in this edition do not match those in the original edition. Some obsolete material appears in this document as struck-out text (e.g., ~~obsolete material~~), and hypertext links are provided to sources of important supplementary information (e.g., hydric soils lists, wetland plant lists). References cited in the USER NOTES refer to the following guidance documents from HQUSACE:

"Clarification of the Phrase "Normal Circumstances" as it pertains to Cropped Wetlands," Regulatory Guidance Letter (RGL) 90-7 dated 26 September 1990.

"Implementation of the 1987 Corps Wetland Delineation Manual," memorandum from John P. Elmore dated 27 August 1991.

"Questions & Answers on the 1987 Manual," memorandum from John F. Studt dated 7 October 1991.

"Clarification and Interpretation of the 1987 Manual," memorandum from Major General Arthur E. Williams dated 6 March 1992.

"Revisions to National Plant Lists," memorandum from Michael L. Davis dated 17 January 1996.

"NRCS Field Indicators of Hydric Soils," memorandum from John F. Studt dated 21 March 1997.

Copies of the original published manual are available through the National Technical Information Service (phone 703-487-4650, NTIS document number ADA 176734/2INE). The report should be cited as follows:

> Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Useful supplementary information for making wetland determinations can also be found at the following sites on the World Wide Web:

- Hydric soils definition, criteria, and lists
- National list of plant species that occur in wetlands
- Analyses of normal precipitation ranges and growing season limits
- National Wetlands Inventory maps and databases

Preface to the Original Edition

This manual is a product of the Wetlands Research Program (WRP) of the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, MS. The work was sponsored by the Office, Chief of Engineers (OCE), U.S. Army. OCE Technical monitors for the WRP were Drs. John R. Hall and Robert J. Pierce, and Mr. Phillip C. Pierce.

The manual has been reviewed and concurred in by the Office of the Chief of Engineers and the Office of the Assistant Secretary of the Army (Civil Works) ~~as a method approved for voluntary use in the field for a trial period of 1 year~~.

~~This manual is not intended to change appreciably the jurisdiction of the Clean Water Act (CWA) as it is currently implemented. Should any District find that use of this method appreciably contracts or expands jurisdiction in their District as the District currently interprets CWA authority, the District should immediately discontinue use of this method and furnish a full report of the circumstances to the Office of the Chief of Engineers~~.

USER NOTES: Use of the 1987 Manual to identify and delineate wetlands potentially subject to regulation under Section 404 is now mandatory. (HQUSACE, 27 Aug 91)

This manual describes technical guidelines and methods using a multiparameter approach to identify and delineate wetlands for purposes of Section 404 of the Clean Water Act. Appendices of supporting technical information are also provided.

The manual is presented in four parts. Part II was prepared by Dr. Robert T. Huffman, formerly of the Environmental Laboratory (EL), WES, and Dr. Dana R. Sanders, Sr., of the Wetland and Terrestrial Habitat Group (WTHG), Environmental Resources Division (ERD), EL. Dr. Huffman prepared the original version of Part II in 1980, entitled "Multiple Parameter Approach to the Field Identification and Delineation of Wetlands." The original version was distributed to all Corps field elements, as well as other Federal resource and environmental regulatory agencies, for review and comments. Dr. Sanders revised the original version in 1982, incorporating review comments. Parts I, III, and IV

were prepared by Dr. Sanders, Mr. William B. Parker (formerly detailed to WES by the U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS)) and Mr. Stephen W. Forsythe (formerly detailed to WES by the U.S. Department of the Interior, Fish and Wildlife Service (FWS)). Dr. Sanders also served as overall technical editor of the manual. The manual was edited by Ms. Jamie W. Leach of the WES Information Products Division.

The authors acknowledge technical assistance provided by: Mr. Russell F. Theriot, Mr. Ellis J. Clairain, Jr., and Mr. Charles J. Newling, all of WTHG, ERD; Mr. Phillip Jones, former SCS detail to WES; Mr. Porter B. Reed, FWS, National Wetland Inventory, St. Petersburg, Fla.; Dr. Dan K. Evans, Marshall University, Huntington, W. Va.; and the USDA-SCS. The authors also express gratitude to Corps personnel who assisted in developing the regional lists of species that commonly occur in wetlands, including Mr. Richard Macomber, Bureau of Rivers and Harbors; Ms. Kathy Mulder, Kansas City District; Mr. Michael Gilbert, Omaha District; Ms. Vicki Goodnight, Southwestern Division; Dr. Fred Weinmann, Seattle District; and Mr. Michael Lee, Pacific Ocean Division. Special thanks are offered to the CE personnel who reviewed and commented on the draft manual, and to those who participated in a workshop that consolidated the field comments.

The work was monitored at WES under the direct supervision of Dr. Hanley K. Smith, Chief, WTHG, and under the general supervision of Dr. Conrad J. Kirby, Jr., Chief, ERD. Dr. Smith, Dr. Sanders, and Mr. Theriot were Managers of the WRP. Dr. John Harrison was Chief, EL.

Director of WES during the preparation of this report was COL Allen F. Grum, USA. During publication, COL Dwayne G. Lee, CE, was Commander and Director. Technical Director was Dr. Robert W. Whalin.

This report should be cited as follows:

> Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	0.4047	hectares
Fahrenheit degrees	5/9	Celsius degrees[1]
feet	0.3048	metres
inches	2.54	centimetres
miles (U.S. statute)	1.6093	kilometres
square inches	6.4516	square centimetres

[1] To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: C = (5/9) (F - 32).

Part I: Introduction

Background

1. Recognizing the potential for continued or accelerated degradation of the Nation's waters, the U.S. Congress enacted the Clean Water Act (hereafter referred to as the Act), formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344). The objective of the Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. Section 404 of the Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands.

Purpose and Objectives

Purpose

2. The purpose of this manual is to provide users with guidelines and methods to determine whether an area is a wetland for purposes of Section 404 of the Act.

Objectives

3. Specific objectives of the manual are to:

a. Present technical guidelines for identifying wetlands and distinguishing them from aquatic habitats and other nonwetlands.[1]

b. Provide methods for applying the technical guidelines.

c. Provide supporting information useful in applying the technical guidelines.

---

[1] Definitions of terms used in this manual are presented in the Glossary, Appendix A.

Scope

4. This manual is limited in scope to wetlands that are a subset of "waters of the United States" and thus subject to Section 404. The term "waters of the United States" has broad meaning and incorporates both deep-water aquatic habitats and special aquatic sites, including wetlands (*Federal Register* 1982), as follows:

a. The territorial seas with respect to the discharge of fill material.

b. Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including their adjacent wetlands.

c. Tributaries to navigable waters of the United States, including adjacent wetlands.

d. Interstate waters and their tributaries, including adjacent wetlands.

e. All others waters of the United States not identified above, such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

Determination that a water body or wetland is subject to interstate commerce and therefore is a "water of the United States" shall be made independently of procedures described in this manual.

Special aquatic sites

5. The Environmental Protection Agency (EPA) identifies six categories of special aquatic sites in their Section 404 b.(l) guidelines (*Federal Register* 1980), including:

a. Sanctuaries and refuges.

b. Wetlands.

c. Mudflats.

d. Vegetated shallows.

e. Coral reefs.

f. Riffle and pool complexes.

Although all of these special aquatic sites are subject to provisions of the Clean Water Act, this manual considers only wetlands. By definition, wetlands are vegetated. Thus, unvegetated special aquatic sites (e.g., mudflats lacking macrophytic vegetation) are not covered in this manual.

Relationship to wetland classification systems

6. The technical guideline for wetlands does not constitute a classification system. It only provides a basis for determining whether a given area is a wetland for purposes of Section 404, without attempting to classify it by wetland type.

7. Consideration should be given to the relationship between the technical guideline for wetlands and the classification system developed for the Fish and Wildlife Service (FWS), U.S. Department of the Interior, by Cowardin et al. (1979). The FWS classification system was developed as a basis for identifying, classifying, and mapping wetlands, other special aquatic sites, and deepwater aquatic habitats. Using this classification system, the National Wetland Inventory (NWI) is mapping the wetlands, other special aquatic sites, and deepwater aquatic habitats of the United States, and is also developing both a list of plant species that occur in wetlands and an associated plant database. These products should contribute significantly to application of the technical guideline for wetlands. The technical guideline for wetlands as presented in the manual includes most, but not all, wetlands identified in the FWS system. The difference is due to two principal factors:

a. The FWS system includes all categories of special aquatic sites identified in the EPA Section 404 b.(l) guidelines. All other special aquatic sites are clearly within the purview of Section 404; thus, special methods for their delineation are unnecessary.

b. The FWS system requires that a positive indicator of wetlands be present for any one of the three parameters, while the technical guideline for wetlands requires that a positive wetland indicator be present for each parameter (vegetation, soils, and hydrology), except in limited instances identified in the manual.

Organization

8. This manual consists of four parts and four appendices. Part I presents the background, purpose and objectives, scope, organization, and use of the manual.

9. Part II focuses on the technical guideline for wetlands, and stresses the need for considering all three parameters (vegetation, soils, and hydrology) when making wetland determinations. Since wetlands occur in an intermediate posi-

tion along the hydrologic gradient, comparative technical guidelines are also presented for deepwater aquatic sites and nonwetlands.

10. Part III contains general information on hydrophytic vegetation, hydric soils, and wetland hydrology. Positive wetland indicators of each parameter are included.

11. Part IV, which presents methods for applying the technical guideline for wetlands, is arranged in a format that leads to a logical determination of whether a given area is a wetland. Section A contains general information related to application of methods. Section B outlines preliminary data-gathering efforts. Section C discusses two approaches (routine and comprehensive) for making wetland determinations and presents criteria for deciding the correct approach to use. Sections D and E describe detailed procedures for making routine and comprehensive determinations, respectively. The basic procedures are described in a series of steps that lead to a wetland determination.

12. The manual also describes (Part IV, Section F) methods for delineating wetlands in which the vegetation, soils, and/or hydrology have been altered by recent human activities or natural events, as discussed below:

a. The definition of wetlands contains the phrase "under normal circumstances," which was included because there are instances in which the vegetation in a wetland has been inadvertently or purposely removed or altered as a result of recent natural events or human activities. Other examples of human alterations that may affect wetlands are draining, ditching, levees, deposition of fill, irrigation, and impoundments. When such activities occur, an area may fail to meet the diagnostic criteria for a wetland. Likewise, positive hydric soil indicators may be absent in some recently created wetlands. In such cases, an alternative method must be employed in making wetland determinations.

> USER NOTES: "Normal circumstances" has been further defined as "the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed." The determination of whether normal circumstances exist in a disturbed area "involves an evaluation of the extent and relative permanence of the physical alteration of wetlands hydrology and hydrophytic vegetation" and consideration of the "purpose and cause of the physical alterations to hydrology and vegetation." (RGL 90-7, 26 Sep 90; HQUSACE, 7 Oct 91)

b. Natural events may also result in sufficient modification of an area that indicators of one or more wetland parameters are absent. For example, changes in river course may significantly alter hydrology, or beaver dams may create new wetland areas that lack hydric soil conditions. Catastrophic events (e.g., fires, avalanches, mudslides, and volcanic activities) may also alter or destroy wetland indicators on a site.

Such atypical situations occur throughout the United States, and all of these cannot be identified in this manual.

13. Certain wetland types, under the extremes of normal circumstances, may not always meet all the wetland criteria defined in the manual. Examples include prairie potholes during drought years and seasonal wetlands that may lack hydrophytic vegetation during the dry season. Such areas are discussed in Part IV, Section G, and guidance is provided for making wetland determinations in these areas. However, such wetland areas may warrant additional research to refine methods for their delineation.

14. Appendix A is a glossary of technical terms used in the manual. Definitions of some terms were taken from other technical sources, but most terms are defined according to the manner in which they are used in the manual.

15. Data forms for methods presented in Part IV are included in Appendix B. Examples of completed data forms are also provided.

16. Supporting information is presented in Appendices C and D. ~~Appendix C contains lists of plant species that occur in wetlands. Section 1 consists of regional lists developed by a Federal interagency panel. Section 2 consists of shorter lists of plant species that commonly occur in wetlands of each region.~~

USER NOTES: CE-supplied plant lists are obsolete and have been superseded by the May 1988 version of the "National List of Plant Species that Occur in Wetlands" published by the U.S. Fish and Wildlife Service and available on the World Wide Web. (HQUSACE, 27 Aug 91)

Section 3 describes morphological, physiological, and reproductive adaptations associated with hydrophytic species, as well as a list of some species exhibiting such adaptations. Appendix D discusses procedures for examining soils for hydric soil indicators, ~~and also contains a list of hydric soils of the United States~~.

USER NOTES: The hydric soil list published in the 1987 Corps Manual is obsolete. Current hydric soil definition, criteria, and lists are available over the World Wide Web from the U.S.D.A. Natural Resources Conservation Service (NRCS). (HQUSACE, 27 Aug 91, 6 Mar 92)

Use

17. Although this manual was prepared primarily for use by Corps of Engineers (CE) field inspectors, it should be useful to anyone who makes wetland determinations for purposes of Section 404 of the Clean Water Act. The user is

directed through a series of steps that involve gathering of information and decisionmaking, ultimately leading to a wetland determination. A general flow diagram of activities leading to a determination is presented in Figure 1. However, not all activities identified in Figure 1 will be required for each wetland determination. For example, if a decision is made to use a routine determination procedure, comprehensive determination procedures will not be employed.

Premise for use of the manual

18. Three key provisions of the CE/EPA definition of wetlands include:

a. Inundated or saturated soil conditions resulting from permanent or periodic inundation by ground water or surface water.

b. A prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation).

c. The presence of "normal circumstances."

19. Explicit in the definition is the consideration of three environmental parameters: hydrology, soil, and vegetation. Positive wetland indicators of all three parameters are normally present in wetlands. Although vegetation is often the most readily observed parameter, sole reliance on vegetation or either of the other parameters as the determinant of wetlands can sometimes be misleading. Many plant species can grow successfully in both wetlands and nonwetlands, and hydrophytic vegetation and hydric soils may persist for decades following alteration of hydrology that will render an area a nonwetland. The presence of hydric soils and wetland hydrology indicators in addition to vegetation indicators will provide a logical, easily defensible, and technical basis for the presence of wetlands. The combined use of indicators for all three parameters will enhance the technical accuracy, consistency, and credibility of wetland determinations. Therefore, all three parameters were used in developing the technical guideline for wetlands and all approaches for applying the technical guideline embody the multiparameter concept.

Approaches

20. The approach used for wetland delineations will vary, based primarily on the complexity of the area in question. Two basic approaches described in the manual are (a) routine and (b) comprehensive.

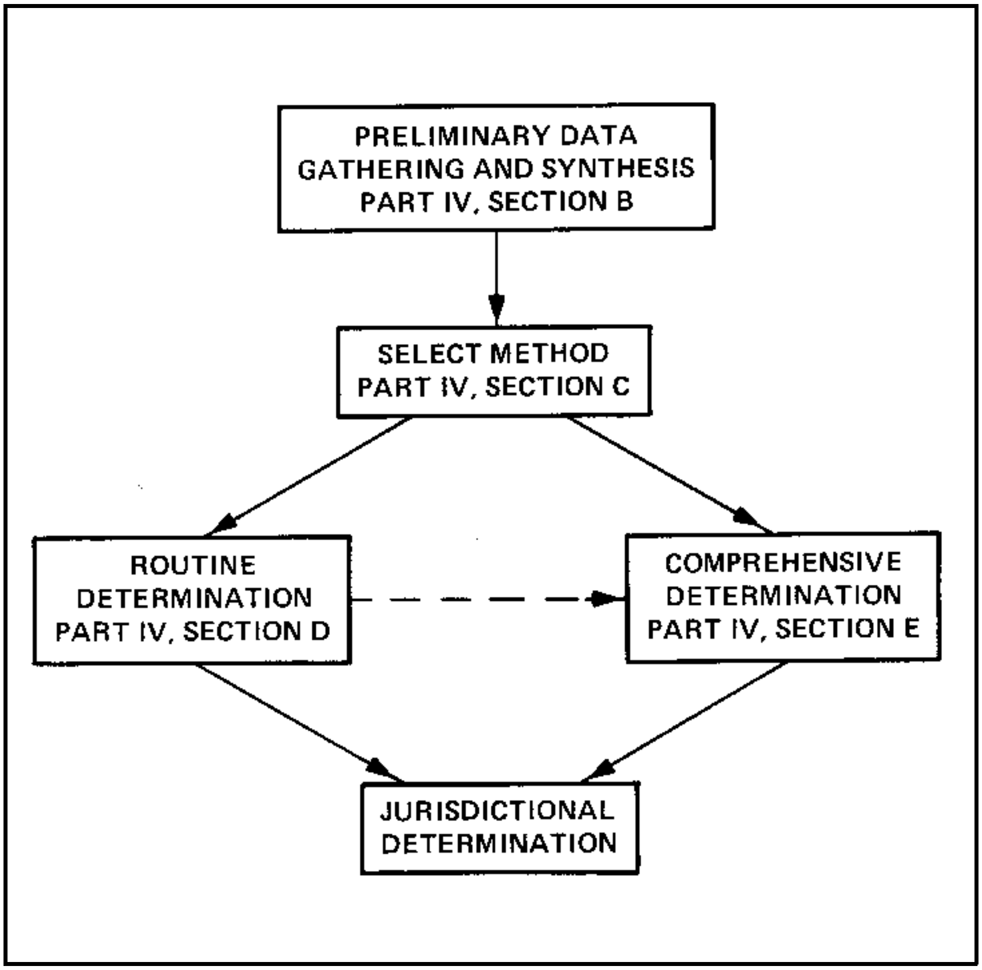


Figure 1. General schematic diagram of activities leading to a wetland/non-wetland determination

21. **Routine approach.** The routine approach normally will be used in the vast majority of determinations. The routine approach requires minimal level of effort, using primarily qualitative procedures. This approach can be further subdivided into three levels of required effort, depending on the complexity of the area and the amount and quality of preliminary data available. The following levels of effort may be used for routine determinations:

a. *Level 1 - Onsite inspection unnecessary.* (Part IV, Section D, Subsection 1).

b. *Level 2 - Onsite inspection necessary.* (Part IV, Section D, Subsection 2).

c. *Level 3 - Combination of Levels 1 and 2.* (Part IV, Section D, Subsection 3).

22. **Comprehensive approach.** The comprehensive approach requires application of quantitative procedures for making wetland determinations. It should

seldom be necessary, and its use should be restricted to situations in which the wetland is very complex and/or is the subject of likely or pending litigation. Application of the comprehensive approach (Part IV, Section E) requires a greater level of expertise than application of the routine approach, and only experienced field personnel with sufficient training should use this approach.

Flexibility

23. Procedures described for both routine and comprehensive wetland determinations have been tested and found to be reliable. However, site-specific conditions may require modification of field procedures. For example, slope configuration in a complex area may necessitate modification of the baseline and transect positions. Since specific characteristics (e.g., plant density) of a given plant community may necessitate the use of alternate methods for determining the dominant species, the user has the flexibility to employ sampling procedures other than those described. However, the basic approach for making wetland determinations should not be altered (i.e., the determination should be based on the dominant plant species, soil characteristics, and hydrologic characteristics of the area in question). The user should document reasons for using a different characterization procedure than described in the manual. *CAUTION: Application of methods described in the manual or the modified sampling procedures requires that the user be familiar with wetlands of the area and use his or her training, experience, and good judgment in making wetland determinations.*

Part II: Technical Guidelines

24. The interaction of hydrology, vegetation, and soil results in the development of characteristics unique to wetlands. Therefore, the following technical guideline for wetlands is based on these three parameters, and diagnostic environmental characteristics used in applying the technical guideline are represented by various indicators of these parameters.

25. Because wetlands may be bordered by both wetter areas (aquatic habitats) and by drier areas (nonwetlands), guidelines are presented for wetlands, deepwater aquatic habitats, and nonwetlands. However, procedures for applying the technical guidelines for deepwater aquatic habitats and nonwetlands are not included in the manual.

Wetlands

26. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of wetlands:

a. *Definition.* The CE (*Federal Register* 1982) and the EPA (*Federal Register* 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

b. *Diagnostic environmental characteristics.* Wetlands have the following general diagnostic environmental characteristics:

(1) *Vegetation.* The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in *a* above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic

soil conditions.[1] Indicators of vegetation associated with wetlands are listed in paragraph 35.

(2) *Soil.* Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions. Indicators of soils developed under reducing conditions are listed in paragraphs 44 and 45.

(3) *Hydrology.* The area is inundated either permanently or periodically at mean water depths ≤6.6 ft, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.[2] Indicators of hydrologic conditions that occur in wetlands are listed in paragraph 49.

c. *Technical approach for the identification and delineation of wetlands.* Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.

Deepwater Aquatic Habitats

27. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for deepwater aquatic habitats:

a. *Definition.* Deepwater aquatic habitats are areas that are permanently inundated at mean annual water depths >6.6 ft or permanently inundated areas ≤6.6 ft in depth that do not support rooted-emergent or woody plant species.[3]

b. *Diagnostic environmental characteristics.* Deepwater aquatic habitats have the following diagnostic environmental characteristics:

(1) *Vegetation.* No rooted-emergent or woody plant species are present in these permanently inundated areas.

(2) *Soil.* The substrate technically is not defined as a soil if the mean water depth is >6.6 ft or if it will not support rooted emergent or woody plants.

---

[1] Species (e.g., *Acer rubrum*) having broad ecological tolerances occur in both wetlands and nonwetlands.

[2] The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations.

[3] Areas ≤6.6 ft mean annual depth that support only submergent aquatic plants are vegetated shallows, not wetlands.

(3) *Hydrology.* The area is permanently inundated at mean water depths >6.6 ft.

c. *Technical approach for the identification and delineation of deepwater aquatic habitats.* When any one of the diagnostic characteristics identified in *b* above is present, the area is a deepwater aquatic habitat.

Nonwetlands

28. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of nonwetlands:

a. *Definition.* Nonwetlands include uplands and lowland areas that are neither deepwater aquatic habitats, wetlands, nor other special aquatic sites. They are seldom or never inundated, or if frequently inundated, they have saturated soils for only brief periods during the growing season, and, if vegetated, they normally support a prevalence of vegetation typically adapted for life only in aerobic soil conditions.

b. *Diagnostic environmental characteristics.* Nonwetlands have the following general diagnostic environmental characteristics:

(1) *Vegetation.* The prevalent vegetation consists of plant species that are typically adapted for life only in aerobic soils. These mesophytic and/or xerophytic macrophytes cannot persist in predominantly anaerobic soil conditions.[1]

(2) *Soil.* Soils, when present, are not classified as hydric, and possess characteristics associated with aerobic conditions.

(3) *Hydrology.* Although the soil may be inundated or saturated by surface water or ground water periodically during the growing season of the prevalent vegetation, the average annual duration of inundation or soil saturation does not preclude the occurrence of plant species typically adapted for life in aerobic soil conditions.

c. *Technical approach for the identification and delineation of nonwetlands.* When any one of the diagnostic characteristics identified in *b* above is present, the area is a nonwetland.

---

[1] Some species, due to their broad ecological tolerances, occur in both wetlands and nonwetlands (e.g., *Acer rubrum).*

Part III: Characteristics and Indicators of Hydrophytic Vegetation, Hydric Soils, and Wetland Hydrology

Hydrophytic Vegetation

Definition

29. **Hydrophytic vegetation.** Hydrophytic vegetation is defined herein as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. The vegetation occurring in a wetland may consist of more than one plant community (species association). The plant community concept is followed throughout the manual. Emphasis is placed on the assemblage of plant species that exert a controlling influence on the character of the plant community, rather than on indicator species. Thus, the presence of scattered individuals of an upland plant species in a community dominated by hydrophytic species is not a sufficient basis for concluding that the area is an upland community. Likewise, the presence of a few individuals of a hydrophytic species in a community dominated by upland species is not a sufficient basis for concluding that the area has hydrophytic vegetation. *CAUTION: In determining whether an area is "vegetated" for the purpose of Section 404 jurisdiction, users must consider the density of vegetation at the site being evaluated. While it is not possible to develop a numerical method to determine how many plants or how much biomass is needed to establish an area as being vegetated or unvegetated, it is intended that the predominant condition of the site be used to make that characterization. This concept applies to areas grading from wetland to upland, and from wetland to other waters. This limitation would not necessarily apply to areas which have been disturbed by man or recent natural events.*

30. **Prevalence of vegetation.** The definition of wetlands includes the phrase "prevalence of vegetation." Prevalence, as applied to vegetation, is an imprecise, seldom-used ecological term. As used in the wetlands definition, prevalence refers to the plant community or communities that occur in an area at some point in time. Prevalent vegetation is characterized by the dominant species comprising the plant community or communities. Dominant plant species are those that contribute more to the character of a plant community than other species present, as estimated or measured in terms of some ecological parameter or parameters. The two most commonly used estimates of dominance are basal area (trees) and percent areal cover (herbs). Hydrophytic vegetation is prevalent in an area when the dominant species comprising the plant community or communities are typically adapted for life in saturated soil conditions.

USER NOTES: The "50/20 rule" is the recommended method for selecting dominant species from a plant community when quantitative data are available. The rule states that for each stratum in the plant community, dominant species are the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50% of the total dominance measure for the stratum, plus any additional species that individually comprise 20% or more of the total dominance measure for the stratum. The list of dominant species is then combined across strata. (HQUSACE, 6 Mar 92)

31. **Typically adapted.** The term "typically adapted" refers to a species being normally or commonly suited to a given set of environmental conditions, due to some morphological, physiological, or reproductive adaptation (Appendix C, Section 3). As used in the CE wetlands definition, the governing environmental conditions for hydrophytic vegetation are saturated soils resulting from periodic inundation or saturation by surface or ground water. These periodic events must occur for sufficient duration to result in anaerobic soil conditions. When the dominant species in a plant community are typically adapted for life in anaerobic soil conditions, hydrophytic vegetation is present. Species ~~listed in Appendix C, Section 1 or 2,~~ that have an indicator status of OBL, FACW, or FAC[1] (Table 1) are considered to be typically adapted for life in anaerobic soil conditions (see paragraph 35*a*).

Influencing factors

32. Many factors (e.g., light, temperature, soil texture and permeability, man-induced disturbance, etc.) influence the character of hydrophytic vegetation. However, hydrologic factors exert an overriding influence on species that can occur in wetlands. Plants lacking morphological, physiological, and/or reproductive adaptations cannot grow, effectively compete, reproduce, and/or persist in areas that are subject to prolonged inundation or saturated soil conditions.

---

[1] Species having a FAC- indicator status are not considered to be typically adapted for life in anaerobic soil conditions.

Table 1
Plant Indicator Status Categories[1]

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	OBL	Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1 percent) in nonwetlands. Examples: *Spartina alterniflora, Taxodium distichum*.
Facultative Wetland Plants	FACW	Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands, but also occur (estimated probability 1 percent to 33 percent) in nonwetlands. Examples: *Fraxinus pennsylvanica, Cornus stolonifera.*
Facultative Plants	FAC	Plants with a similar likelihood (estimated probability 33 percent to 67 percent) of occurring in both wetlands and nonwetlands. Examples: *Gleditsia triacanthos, Smilax rotundifolia.*
Facultative Upland Plants	FACU	Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in nonwetlands. Examples: *Quercus rubra, Potentilla arguta.*
Obligate Upland Plants	UPL	Plants that occur rarely (estimated probability <1 percent) in wetlands, but occur almost always (estimated probability >99 percent) in nonwetlands under natural conditions. Examples: *Pinus echinata, Bromus mollis.*

[1] Categories were originally developed and defined by the USFWS National Wetlands Inventory and subsequently modified by the National Plant List Panel. The three facultative categories are subdivided by (+) and (−) modifiers ~~(see Appendix C, Section 1)~~.

Geographic diversity

33. Many hydrophytic vegetation types occur in the United States due to the diversity of interactions among various factors that influence the distribution of hydrophytic species. General climate and flora contribute greatly to regional variations in hydrophytic vegetation. Consequently, the same associations of hydrophytic species occurring in the southeastern United States are not found in the Pacific Northwest. In addition, local environmental conditions (e.g., local climate, hydrologic regimes, soil series, salinity, etc.) may result in broad variations in hydrophytic associations within a given region. For example, a coastal saltwater marsh will consist of different species than an inland freshwater marsh in the same region. An overview of hydrophytic vegetation occurring in each region of the Nation has been published by the CE in a series of eight preliminary wetland guides (Table 2), and a group of wetland and estuarine ecological profiles (Table 3) has been published by FWS.

Classification

34. Numerous efforts have been made to classify hydrophytic vegetation. Most systems are based on general characteristics of the dominant species occurring in each vegetation type. These range from the use of general physiognomic categories (e.g., overstory, subcanopy, ground cover, vines) to specific vegetation types (e.g., forest type numbers as developed by the Society of American Foresters). In other cases, vegetational characteristics are combined with hydrologic features to produce more elaborate systems. The most recent example of such a system was developed for the FWS by Cowardin et al. (1979).

Table 2
List of CE Preliminary Wetland Guides

Region	Publication Date	WES Report No.
Peninsular Florida	February 1978	TR Y-78-2
Puerto Rico	April 1978	TR Y-78-3
West Coast States	April 1978	TR-Y-78-4
Gulf Coastal Plain	May 1978	TR Y-78-5
Interior	May 1982	TR Y-78-6
South Atlantic States	May 1982	TR Y-78-7
North Atlantic States	May 1982	TR Y-78-8
Alaska	February 1984	TR Y-78-9

Table 3
List of Ecological Profiles Produced by the FWS Biological Services Program

Title	Publication Date	FWS Publication No.
"The Ecology of Intertidal Flats of North Carolina"	1979	79/39
"The Ecology of New England Tidal Flats"	1982	81/01
"The Ecology of the Mangroves of South Florida"	1982	81/24
"The Ecology of Bottomland Hardwood Swamps of the Southeast"	1982	81/37
"The Ecology of Southern California Coastal Salt Marshes"	1982	81/54
"The Ecology of New England High Salt Marshes"	1982	81/55
"The Ecology of Southeastern Shrub Bogs (Pocosins) and Carolina Bays"	1982	82/04
"The Ecology of the Apalachicola Bay System"	1984	82/05
"The Ecology of the Pamlico River, North Carolina"	1984	82/06
"The Ecology of the South Florida Coral Reefs"	1984	82/08
"The Ecology of the Sea Grasses of South Florida"	1982	82/25
"The Ecology of Tidal Marshes of the Pacific Northwest Coast"	1983	82/32
"The Ecology of Tidal Freshwater Marshes of the U.S. East Coast"	1984	83/17
"The Ecology of San Francisco Bay Tidal Marshes"	1983	82/23
"The Ecology of Tundra Ponds of the Arctic Coastal Plain"	1984	83/25
"The Ecology of Eelgrass Meadows of the Atlantic Coast"	1984	84/02
"The Ecology of Delta Marshes of Louisiana"	1984	84/09
"The Ecology of Eelgrass Meadows in the Pacific Northwest"	1984	84/24
"The Ecology of Irregularly Flooded Marshes of North-eastern Gulf of Mexico"	(In press)	85(7.1)
"The Ecology of Giant Kelp Forests in California"	1985	85(7.2)

Indicators of hydrophytic vegetation

35. Several indicators may be used to determine whether hydrophytic vegetation is present on a site. However, the presence of a single individual of a hydrophytic species does not mean that hydrophytic vegetation is present. The strongest case for the presence of hydrophytic vegetation can be made when

several indicators, such as those in the following list, are present. However, any one of the following is indicative that hydrophytic vegetation is present:[1]

a. *More than 50 percent of the dominant species are OBL, FACW, or FAC*[2] *(Table 1) on lists of plant species that occur in wetlands.* A national interagency panel has prepared a National List of Plant Species that occur in wetlands. This list categorizes species according to their affinity for occurrence in wetlands. ~~Regional subset lists of the national list, including only species having an indicator status of OBL, FACW, or FAC, are presented in Appendix C, Section 1. The CE has also developed regional lists of plant species that commonly occur in wetlands (Appendix C, Section 2). Either list may be used.~~

USER NOTES: CE-supplied plant lists are obsolete and have been superseded by the May 1988 version of the "National List of Plant Species that Occur in Wetlands" published by the U.S. Fish and Wildlife Service and available on the World Wide Web. Subsequent changes to the May 1988 national plant list, or regional versions of the national list, should not be used until they receive official review and approval. (HQUSACE, 27 Aug 91 and 17 Jan 96)

Note: A District that, on a subregional basis, questions the indicator status of FAC species may use the following option: When FAC species occur as dominants along with other dominants that are not FAC (either wetter or drier than FAC), the FAC species can be considered as neutral, and the vegetation decision can be based on the number of dominant species wetter than FAC as compared to the number of dominant species drier than FAC. When a tie occurs or all dominant species are FAC, the nondominant species must be considered. The area has hydrophytic vegetation when more than 50 percent of all considered species are wetter than FAC. When either all considered species are FAC or the number of species wetter than FAC equals the number of species drier than FAC, the wetland determination will be based on the soil and hydrology parameters. Districts adopting this option should provide documented support to the Corps representative on the regional plant list panel, so that a change in indicator status of FAC species of concern can be pursued. Corps representatives on the regional and national plant list panels will continually strive to ensure that plant species are properly designated on both a regional and subregional basis.

---

[1] Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.

[2] FAC+ species are considered to be wetter (i.e., have a greater estimated probability of occurring in wetlands) than FAC species, while FAC- species are considered to be drier (i.e., have a lesser estimated probability of occurring in wetlands) than FAC species.

USER NOTES: The FAC-neutral option can <u>not</u> be used to exclude areas as wetlands that meet the basic vegetation rule (i.e., more than 50% of dominant species are FAC, FACW, or OBL) and meet wetland hydrology and hydric soil requirements. Presence of a plant community that satisfies the FAC-neutral option may be used as a secondary indicator of wetland hydrology. (HQUSACE, 6 Mar 92)

b. *Other indicators.* Although there are several other indicators of hydrophytic vegetation, it will seldom be necessary to use them. However, they may provide additional useful information to strengthen a case for the presence of hydrophytic vegetation. Additional training and/or experience may be required to employ these indicators.

(1) *Visual observation of plant species growing in areas of prolonged inundation and/or soil saturation.* This indicator can only be applied by experienced personnel who have accumulated information through several years of field experience and written documentation (field notes) that certain species commonly occur in areas of prolonged (>10 percent) inundation and/or soil saturation during the growing season. Species such as *Taxodium distichum, Typha latifolia,* and *Spartina alterniflora* normally occur in such areas. Thus, occurrence of species commonly observed in other wetland areas provides a strong indication that hydrophytic vegetation is present. *CAUTION: The presence of standing water or saturated soil on a site is insufficient evidence that the species present are able to tolerate long periods of inundation. The user must relate the observed species to other similar situations and determine whether they are normally found in wet areas, taking into consideration the season and immediately preceding weather conditions.*

(2) *Morphological adaptations.* Some hydrophytic species have easily recognized physical characteristics that indicate their ability to occur in wetlands. A given species may exhibit several of these characteristics, but not all hydrophytic species have evident morphological adaptations. A list of such morphological adaptations and a partial list of plant species with known morphological adaptations for occurrence in wetlands are provided in Appendix C, Section 3.

(3) *Technical literature.* The technical literature may provide a strong indication that plant species comprising the prevalent vegetation are commonly found in areas where soils are periodically saturated for long periods. Sources of available literature include:

(a) *Taxonomic references.* Such references usually contain at least a general description of the habitat in which a species occurs. A habitat description such as, "Occurs in water of streams and lakes and in alluvial floodplains subject to periodic flooding," supports a conclusion that the species typically occurs in wetlands. Examples of some useful taxonomic references are provided in Table 4.

Table 4
List of Some Useful Taxonomic References

Title	Author(s)
Manual of Vascular Plants of Northeastern United States and Adjacent Canada	Gleason and Cronquist (1963)
Gray's Manual of Botany, 8th edition	Fernald (1950)
Manual of the Southeastern Flora	Small (1933)
Manual of the Vascular Flora of the Carolinas	Radford, Ahles, and Bell (1968)
A Flora of Tropical Florida	Long and Lakela (1976)
Aquatic and Wetland Plants of the Southwestern United States	Correll and Correll (1972)
Arizona Flora	Kearney and Peebles (1960)
Flora of the Pacific Northwest	Hitchcock and Cronquist (1973)
A California Flora	Munz and Keck (1959)
Flora of Missouri	Steyermark (1963)
Manual of the Plants of Colorado	Harrington (1979)
Intermountain Flora - Vascular Plants of the Intermountain West, USA - Vols I and II	Cronquist et al. (1972)
Flora of Idaho	Davis (1952)
Aquatic and Wetland Plants of the Southeastern United States - Vols I and II	Godfrey and Wooten (1979)
Manual of Grasses of the U.S.	Hitchcock (1950)

(b) *Botanical journals.* Some botanical journals contain studies that define species occurrence in various hydrologic regimes. Examples of such journals include: *Ecology, Ecological Monographs, American Journal of Botany, Journal of American Forestry, and Wetlands: The Journal of the Society of Wetland Scientists.*

(c) *Technical reports.* Governmental agencies periodically publish reports (e.g., literature reviews) that contain information on plant species occurrence in relation to hydrologic regimes. Examples of such publications include the CE preliminary regional wetland guides (Table 2) published by the U.S. Army Engineer Waterways Experiment Station (WES) and the wetland community and estuarine profiles of various habitat types (Table 3) published by the FWS.

(d) *Technical workshops, conferences, and symposia.* Publications resulting from periodic scientific meetings contain valuable information that can be used to support a decision regarding the presence of hydrophytic vegetation. These usually address specific regions or wetland types. For example, distribution of bottomland hardwood forest species in relation to hydrologic regimes was examined at a workshop on bottomland hardwood forest wetlands of the Southeastern United States (Clark and Benforado 1981).

(e) *Wetland plant database.* The NWI is producing a Plant Database that contains habitat information on approximately 5,200 plant species that occur at some estimated probability in wetlands, as compiled from the technical literature. When completed, this computerized database will be available to all governmental agencies.

(4) *Physiological adaptations.* Physiological adaptations include any features of the metabolic processes of plants that make them particularly fitted for life in saturated soil conditions. *NOTE: It is impossible to detect the presence of physiological adaptations in plant species during onsite visits.* Physiological adaptations known for hydrophytic species and species known to exhibit these adaptations are listed and discussed in Appendix C, Section 3.

(5) *Reproductive adaptations.* Some plant species have reproductive features that enable them to become established and grow in saturated soil conditions. Reproductive adaptations known for hydrophytic species are presented in Appendix C, Section 3.

Hydric Soils

Definition

36. ~~A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) 1985, as amended by the National Technical Committee for Hydric Soils (NTCHS) in December 1986).~~

Criteria for hydric soils

37. ~~Based on the above definition, the NTCHS developed the following criteria for hydric soils:~~

a. ~~All Histosols[1] except Folists;~~

b. ~~Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:~~

(1) ~~Somewhat poorly drained and have a water table less than 0.5 ft[2] from the surface for a significant period (usually a week or more) during the growing season, or~~

(2) ~~Poorly drained or very poorly drained and have either:~~

(a) ~~A water table at less than 1.0 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within 20 inches; or~~

(b) ~~A water table at less than 1.5 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 in/hr in any layer within 20 inches; or~~

c. ~~Soils that are ponded for long or very long duration during the growing season; or~~

d. ~~Soils that are frequently flooded for long duration or very long duration during the growing season.~~

USER NOTES: The hydric soil definition and criteria published in the 1987 Corps Manual are obsolete. Current hydric soil definition, criteria, and lists are available over the World Wide Web from the U.S.D.A. Natural Resources Conservation Service (NRCS). (HQUSACE, 27 Aug 91, 6 Mar 92)

A hydric soil may be either drained or undrained, and a drained hydric soil may not continue to support hydrophytic vegetation. Therefore, not all areas having hydric soils will qualify as wetlands. Only when a hydric soil supports hydrophytic vegetation and the area has indicators of wetland hydrology may the soil be referred to as a "wetland" soil.

38. A drained hydric soil is one in which sufficient ground or surface water has been removed by artificial means such that the area will no longer support hydrophyte vegetation. Onsite evidence of drained soils includes:

---

[1] Soil nomenclature follows USDA-SCS (1975).

[2] A table of factors for converting Non-SI Units of Measurement to SI (metric) units is presented on page x.

a. Presence of ditches or canals of sufficient depth to lower the water table below the major portion of the root zone of the prevalent vegetation.

b. Presence of dikes, levees, or similar structures that obstruct normal inundation of an area.

c. Presence of a tile system to promote subsurface drainage.

d. Diversion of upland surface runoff from an area.

Although it is important to record such evidence of drainage of an area, a hydric soil that has been drained or partially drained still allows the soil parameter to be met. However, the area will not qualify as a wetland if the degree of drainage has been sufficient to preclude the presence of either hydrophytic vegetation or a hydrologic regime that occurs in wetlands. *NOTE: The mere presence of drainage structures in an area is not sufficient basis for concluding that a hydric soil has been drained; such areas may continue to have wetland hydrology.*

General information

39. Soils consist of unconsolidated, natural material that supports, or is capable of supporting, plant life. The upper limit is air and the lower limit is either bedrock or the limit of biological activity. Some soils have very little organic matter (mineral soils), while others are composed primarily of organic matter (Histosols). The relative proportions of particles (sand, silt, clay, and organic matter) in a soil are influenced by many interacting environmental factors. As normally defined, a soil must support plant life. The concept is expanded to include substrates that could support plant life. For various reasons, plants may be absent from areas that have well-defined soils.

40. A soil profile (Figure 2) consists of various soil layers described from the surface downward. Most soils have two or more identifiable horizons. A soil horizon is a layer oriented approximately parallel to the soil surface, and usually is differentiated from contiguous horizons by characteristics that can be seen or measured in the field (e.g., color, structure, texture, etc.). Most mineral soils have A-, B-, and C-horizons, and many have surficial organic layers (O-horizon). The A-horizon, the surface soil or topsoil, is a zone in which organic matter is usually being added to the mineral soil. It is also the zone from which both mineral and organic matter are being moved slowly downward. The next major horizon is the B-horizon, often referred to as the subsoil. The B-horizon is the zone of maximum accumulation of materials. It is usually characterized by higher clay content and/or more pronounced soil structure development and lower organic matter than the A-horizon. The next major horizon is usually the C-horizon, which consists of unconsolidated parent material that has not been sufficiently weathered to exhibit characteristics of the B-horizon. Clay content and degree of soil structure development in the C-horizon are usually less than in the B-horizon. The lowest major horizon, the R-horizon, consists of consoli-

dated bedrock. In many situations, this horizon occurs at such depths that it has no significant influence on soil characteristics.

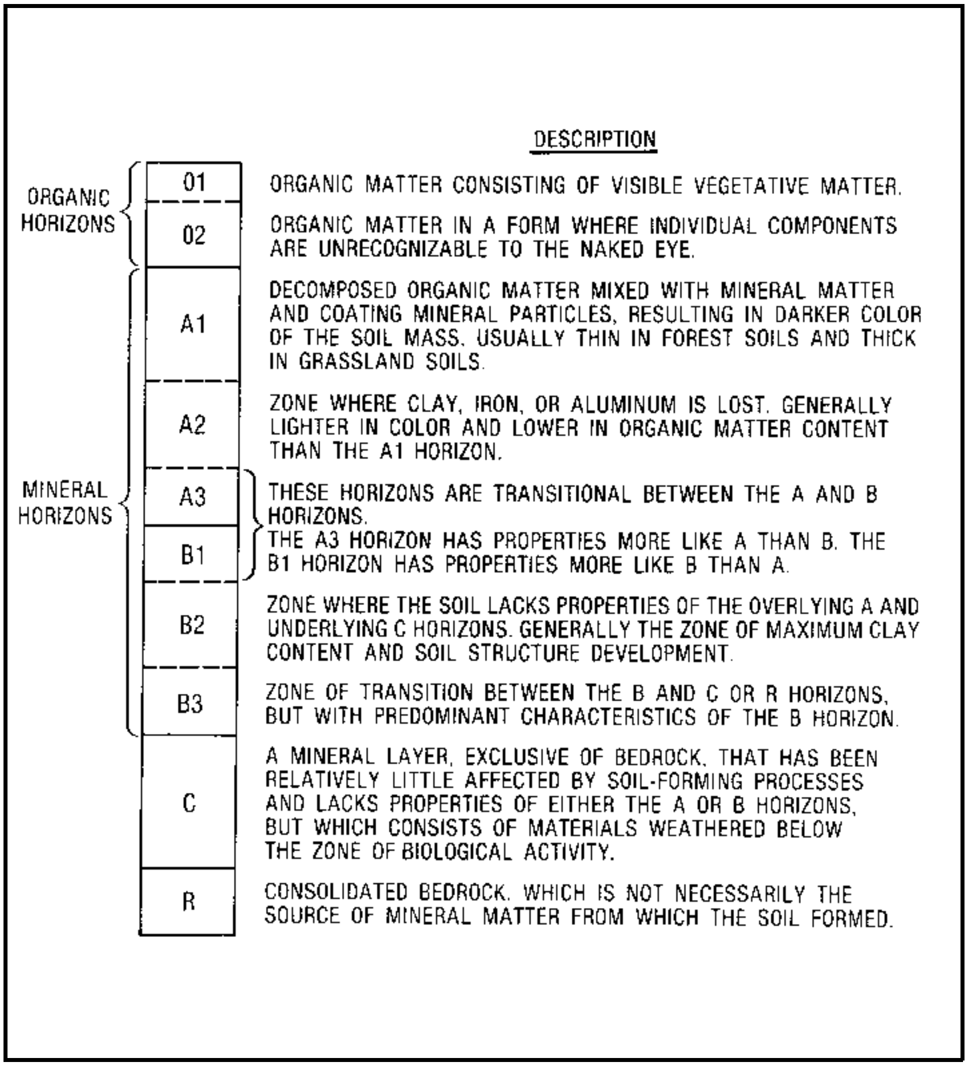


Figure 2. Generalized soil profile

Influencing factors

41. Although all soil-forming factors (climate, parent material, relief, organisms, and time) affect the characteristics of a hydric soil, the overriding influence is the hydrologic regime. The unique characteristics of hydric soils result from the influence of periodic or permanent inundation or soil saturation for sufficient duration to effect anaerobic conditions. Prolonged anaerobic soil conditions lead to a reducing environment, thereby lowering the soil redox potential. This results in chemical reduction of some soil components (e.g., iron and manganese oxides), which leads to development of soil colors and other physical characteristics that usually are indicative of hydric soils.

Classification

42. Hydric soils occur in several categories of the current soil classification system, which is published in *Soil Taxonomy* (USDA-SCS 1975). This classification system is based on physical and chemical properties of soils that can be seen, felt, or measured. Lower taxonomic categories of the system (e.g., soil series and soil phases) remain relatively unchanged from earlier classification systems.

43. Hydric soils may be classified into two broad categories: organic and mineral. Organic soils (Histosols) develop under conditions of nearly continuous saturation and/or inundation. All organic soils are hydric soils except Folists, which are freely drained soils occurring on dry slopes where excess litter accumulates over bedrock. Organic hydric soils are commonly known as peats and mucks. All other hydric soils are mineral soils. Mineral soils have a wide range of textures (sandy to clayey) and colors (red to gray). Mineral hydric soils are those periodically saturated for sufficient duration to produce chemical and physical soil properties associated with a reducing environment. They are usually gray and/or mottled immediately below the surface horizon (see paragraph 44*d*), or they have thick, dark-colored surface layers overlying gray or mottled subsurface horizons.

Wetland indicators (nonsandy soils)

44. Several indicators are available for determining whether a given soil meets the definition and criteria for hydric soils. Any one of the following indicates that hydric soils are present:[1]

Figure 3. Organic soil

a. *Organic soils (Histosols).* A soil is an organic soil when: (1) more than 50 percent (by volume) of the upper 32 inches of soil is composed of organic soil material;[2] or (2) organic soil material of any thickness rests on bedrock. Organic soils (Figure 3) are saturated for long periods and are commonly called peats or mucks.

b. *Histic epipedons.* A histic epipedon is an 8- to 16-inch layer at or near the surface of a mineral hydric soil that is saturated with

[1] Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger indicators than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.

[2] A detailed definition of organic soil material is available in USDA-SCS (1975).

water for 30 consecutive days or more in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent organic matter when clay content is 60 percent or greater. Soils with histic epipedons are inundated or saturated for sufficient periods to greatly retard aerobic decomposition of the organic surface, and are considered to be hydric soils.

c. *Sulfidic material.* When mineral soils emit an odor of rotten eggs, hydrogen sulfide is present. Such odors are only detected in waterlogged soils that are permanently saturated and have sulfidic material within a few centimeters of the soil surface. Sulfides are produced only in a reducing environment.

d. *Aquic or peraquic moisture regime.* An aquic moisture regime is a reducing one; i.e., it is virtually free of dissolved oxygen because the soil is saturated by ground water or by water of the capillary fringe (USDA-SCS 1975). Because dissolved oxygen is removed from ground water by respiration of microorganisms, roots, and soil fauna, it is also implicit that the soil temperature is above biologic zero (5° C) at some time while the soil is saturated. Soils with *peraquic* moisture regimes are characterized by the presence of ground water always at or near the soil surface. Examples include soils of tidal marshes and soils of closed, landlocked depressions that are fed by permanent streams.

e. *Reducing soil conditions.* Soils saturated for long or very long duration will usually exhibit reducing conditions. Under such conditions, ions of iron are transformed from a ferric valence state to a ferrous valence state. This condition can often be detected in the field by a ferrous iron test. A simple colorimetric field test kit has been developed for this purpose. When a soil extract changes to a pink color upon addition of α,α'-dipyridyl, ferrous iron is present, which indicates a reducing soil environment. *NOTE: This test cannot be used in mineral hydric soils having low iron content, organic soils, and soils that have been desaturated for significant periods of the growing season.*

f. *Soil colors.* The colors of various soil components are often the most diagnostic indicator of hydric soils. Colors of these components are strongly influenced by the frequency and duration of soil saturation, which leads to reducing soil conditions. Mineral hydric soils will be either gleyed or will have bright mottles and/or low matrix chroma. These are discussed below:

(1) *Gleyed soils (gray colors).* Gleyed soils develop when anaerobic soil conditions result in pronounced chemical reduction of iron, manganese, and other elements, thereby producing gray soil colors. Anaerobic conditions that occur in waterlogged soils result in the predominance of reduction processes, and such soils are greatly reduced. Iron is one of the most abundant elements in soils. Under anaerobic conditions, iron in converted from the oxidized (ferric)

Figure 4. Gleyed soil

Figure 5. Soil showing matrix (brown) and mottles (reddish-brown)

state to the reduced (ferrous) state, which results in the bluish, greenish, or grayish colors associated with the gleying effect (Figure 4). Gleying immediately below the A-horizon or 10 inches (whichever is shallower) is an indication of a markedly reduced soil, and gleyed soils are hydric soils. Gleyed soil conditions can be determined by using the gley page of the Munsell Color Book (Munsell Color 1975).

(2) *Soils with bright mottles and/or low matrix chroma.* Mineral hydric soils that are saturated for substantial periods of the growing season (but not long enough to produce gleyed soils) will either have bright mottles and a low matrix chroma or will lack mottles but have a low matrix chroma (see Appendix D, Section 1, for a definition and discussion of "chroma" and other components of soil color). *Mottled* means "marked with spots of contrasting color." Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table. The soil *matrix* is the portion (usually more than 50 percent) of a given soil layer that has the predominant color (Figure 5). Mineral hydric soils usually have one of the following color features in the horizon immediately below the A-horizon or 10 inches (whichever is shallower):

(a) Matrix chroma of 2 or less[1] in mottled soils.

(b) Matrix chroma of 1 or less[1] in unmottled soils.

NOTE: The matrix chroma of some dark (black) mineral hydric soils will not conform to the criteria described in (a) and (b) above; in such soils, gray mottles occurring at 10 inches or less are indicative of hydric conditions.

---

[1] Colors should be determined in soils that have been moistened; otherwise, state that colors are for dry soils.

CAUTION: Soils with significant coloration due to the nature of the parent material (e.g., red soils of the Red River Valley) may not exhibit the above characteristics. In such cases, this indicator cannot be used.

g. *Soil appearing on hydric soils list.* Using the criteria for hydric soils (paragraph 37), the NTCHS has developed a list of hydric soils.

USER NOTES: The NRCS has developed local lists of hydric soil mapping units that are available from NRCS county and area offices. These local lists are the preferred hydric soil lists to use in making wetland determinations. (HQUSACE, 6 Mar 92)

Listed soils have reducing conditions for a significant portion of the growing season in a major portion of the root zone and are frequently saturated within 12 inches of the soil surface. ~~The NTCHS list of hydric soils is presented in Appendix D, Section 2.~~ *CAUTION: Be sure that the profile description of the mapping unit conforms to that of the sampled soil.*

h. *Iron and manganese concretions.* During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses (Figure 6). These accumulations are usually black or dark brown. Concretions >2 mm in diameter occurring within 7.5 cm of the surface are evidence that the soil is saturated for long periods near the surface.

Figure 6. Iron and manganese concretions

Wetland indicators (sandy soils)

45. Not all indicators listed in paragraph 44 can be applied to sandy soils. *In particular, soil color should not be used as an indicator in most sandy soils.* However, three additional soil features may be used as indicators of sandy hydric soils, including:

a. *High organic matter content in the surface horizon.* Organic matter tends to accumulate above or in the surface horizon of sandy soils that are inundated or saturated to the surface for a significant portion of the growing season. Prolonged inundation or saturation creates anaerobic conditions that greatly reduce oxidation of organic matter.

b. *Streaking of subsurface horizons by organic matter.* Organic matter is moved downward through sand as the water table fluctuates. This often occurs more rapidly and to a greater degree in some vertical sections of a sandy soil containing high content of organic matter than in others. Thus, the sandy soil appears vertically streaked with darker areas. When soil from a darker area is rubbed between the fingers, the organic matter stains the fingers.

c. *Organic pans.* As organic matter is moved downward through sandy soils, it tends to accumulate at the point representing the most commonly occurring depth to the water table. This organic matter tends to become slightly cemented with aluminum, forming a thin layer of hardened soil (spodic horizon). These horizons often occur at depths of 12 to 30 inches below the mineral surface. Wet spodic soils usually have thick dark surface horizons that are high in organic matter with dull, gray horizons above the spodic horizon.

USER NOTES: The NRCS has developed regional lists of "Field Indicators of Hydric Soils in the United States" (Version 3.2, July 1996, or later). Until approved, these indicators do not supersede those given in the 1987 Corps Manual and supplemental guidance but may be used as supplementary information. Several of the NRCS indicators were developed specifically to help in identifying hydric soils in certain problem soil types (e.g., sandy soils, soils derived from red parent materials, soils with thick, dark surfaces). These indicators may be used under procedures given in the Problem Area section of the 1987 Manual. (HQUSACE, 21 Mar 97)

CAUTION: In recently deposited sandy material (e.g., accreting sandbars), it may be impossible to find any of these indicators. In such cases, consider this as a natural atypical situation.

Wetland Hydrology

Definition

46. The term "wetland hydrology" encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. Such characteristics are usually present in areas that

are inundated or have soils that are saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions. Hydrology is often the least exact of the parameters, and indicators of wetland hydrology are sometimes difficult to find in the field. However, it is essential to establish that a wetland area is periodically inundated or has saturated soils during the growing season.

USER NOTES: The 1987 Manual (see glossary, Appendix A) defines "growing season" as the portion of the year when soil temperature (measured 20 inches below the surface) is above biological zero (5° C or 41° F). This period "can be approximated by the number of frost-free days." Estimated starting and ending dates for the growing season are based on 28° F air temperature thresholds at a frequency of 5 years in 10 (HQUSACE, 6 Mar 92). This information is available in NRCS county soil survey reports or from the NRCS Water and Climate Center in Portland, Oregon, for most weather stations in the country.

Influencing factors

47. Numerous factors (e.g., precipitation, stratigraphy, topography, soil permeability, and plant cover) influence the wetness of an area. Regardless, the characteristic common to all wetlands is the presence of an abundant supply of water. The water source may be runoff from direct precipitation, headwater or backwater flooding, tidal influence, ground water, or some combination of these sources. The frequency and duration of inundation or soil saturation varies from nearly permanently inundated or saturated to irregularly inundated or saturated. Topographic position, stratigraphy, and soil permeability influence both the frequency and duration of inundation and soil saturation. Areas of lower elevation in a floodplain or marsh have more frequent periods of inundation and/or greater duration than most areas at higher elevations. Floodplain configuration may significantly affect duration of inundation. When the floodplain configuration is conducive to rapid runoff, the influence of frequent periods of inundation on vegetation and soils may be reduced. Soil permeability also influences duration of inundation and soil saturation. For example, clayey soils absorb water more slowly than sandy or loamy soils, and therefore have slower permeability and remain saturated much longer. Type and amount of plant cover affect both degree of inundation and duration of saturated soil conditions. Excess water drains more slowly in areas of abundant plant cover, thereby increasing frequency and duration of inundation and/or soil saturation. On the other hand, transpiration rates are higher in areas of abundant plant cover, which may reduce the duration of soil saturation.

Classification

48. Although the interactive effects of all hydrologic factors produce a continuum of wetland hydrologic regimes, efforts have been made to classify wet-

land hydrologic regimes into functional categories. These efforts have focused on the use of frequency, timing, and duration of inundation or soil saturation as a basis for classification. A classification system developed for nontidal areas is presented in Table 5. This classification system was slightly modified from the system developed by the Workshop on Bottomland Hardwood Forest Wetlands of the Southeastern United States (Clark and Benforado 1981). Recent research indicates that duration of inundation and/or soil saturation during the growing season is more influential on the plant community than frequency of inundation/saturation during the growing season (Theriot, in press). Thus, frequency of inundation and soil saturation are not included in Table 5. ~~The WES has developed a computer program that can be used to transform stream gage data to mean sea level elevations representing the upper limit of each hydrologic zone shown in Table 5. This program is available upon request.~~[1]

> USER NOTES: Based on Table 5 and on paragraph 55, Step 8.i., an area has wetland hydrology if it is inundated or saturated to the surface continuously for at least 5% of the growing season in most years (50% probability of recurrence). These areas are wetlands if they also meet hydrophytic vegetation and hydric soil requirements. (HQUSACE, 7 Oct 91 and 6 Mar 92)

Table 5
Hydrologic Zones[1] - Nontidal Areas

Zone	Name	Duration[2]	Comments
I[3]	Permanently inundated	100 percent	Inundation >6.6 ft mean water depth
II	Semipermanently to nearly permanently inundated or saturated	>75 - <100 percent	Inundation defined as ≤6.6 ft mean water depth
III	Regularly inundated or saturated	>25 - 75 percent	
IV	Seasonally inundated or saturated	>12.5 - 25 percent	
V	Irregularly inundated or saturated	≥5 - 12.5 percent	Many areas having these hydrologic characteristics are not wetlands
VI	Intermittently or never inundated or saturated	<5 percent	Areas with these hydrologic characteristics are not wetlands

[1] Zones adapted from Clark and Benforado (1981).
[2] Refers to duration of inundation and/or soil saturation during the growing season.
[3] This defines an aquatic habitat zone.

Wetland indicators

49. Indicators of wetland hydrology may include, but are not necessarily limited to: drainage patterns, drift lines, sediment deposition, watermarks,

[1] ~~R. F. Theriot, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, P.O. Box 631, Vicksburg, MS 39180.~~

stream gage data and flood predictions, historic records, visual observation of saturated soils, and visual observation of inundation. Any of these indicators may be evidence of wetland hydrologic characteristics. Methods for determining hydrologic indicators can be categorized according to the type of indicator. Recorded data include stream gage data, lake gage data, tidal gage data, flood predictions, and historical records. Use of these data is commonly limited to areas adjacent to streams or other similar areas. Recorded data usually provide both short- and long-term information about frequency and duration of inundation, but contain little or no information about soil saturation, which must be gained from soil surveys or other similar sources. The remaining indicators require field observations. Field indicators are evidence of present or past hydrologic events (e.g., location and height of flooding). Indicators for recorded data and field observations include:[1]

a. *Recorded data.* Stream gage data, lake gage data, tidal gage data, flood predictions, and historical data may be available from the following sources:

(1) *CE District Offices.* Most CE Districts maintain stream, lake, and tidal gage records for major water bodies in their area. In addition, CE planning and design documents often contain valuable hydrologic information. For example, a General Design Memorandum (GDM) usually describes flooding frequencies and durations for a project area. Furthermore, the extent of flooding within a project area is sometimes indicated in the GDM according to elevation (height) of certain flood frequencies (1-, 2-, 5-, 10-year, etc.).

(2) *U.S. Geological Survey (USGS).* Stream and tidal gage data are available from the USGS offices throughout the Nation, and the latter are also available from the National Oceanic and Atmospheric Administration. CE Districts often have such records.

(3) *State, county, and local agencies.* These agencies often have responsibility for flood control/relief and flood insurance.

(4) *Soil Conservation Service Small Watershed Projects.* Planning documents from this agency are often helpful, and can be obtained from the SCS district office in the county.

(5) *Planning documents of developers.*

b. *Field data.* The following field hydrologic indicators can be assessed quickly, and although some of them are not necessarily indicative of hydrologic events that occur only during the growing season, they do provide evidence that inundation and/or soil saturation has occurred:

---

[1] Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger indicators than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.

(1) *Visual observation of inundation.* The most obvious and revealing hydrologic indicator may be simply observing the areal extent of inundation. However, because seasonal conditions and recent weather conditions can contribute to surface water being present on a nonwetland site, both should be considered when applying this indicator.

(2) *Visual observation of soil saturation.* Examination of this indicator requires digging a soil pit (Appendix D, Section 1) to a depth of 16 inches and observing the level at which water stands in the hole after sufficient time has been allowed for water to drain into the hole. The required time will vary depending on soil texture. In some cases, the upper level at which water is flowing into the pit can be observed by examining the wall of the hole. This level represents the depth to the water table. The depth to saturated soils will always be nearer the surface due to the capillary fringe.

For soil saturation to impact vegetation, it must occur within a *major portion of the root zone* (usually within 12 inches of the surface) of the prevalent vegetation. The major portion of the root zone is that portion of the soil profile in which more than one half of the plant roots occur. *CAUTION: In some heavy clay soils, water may not rapidly accumulate in the hole even when the soil is saturated. If water is observed at the bottom of the hole but has not filled to the 12-inch depth, examine the sides of the hole and determine the shallowest depth at which water is entering the hole. When applying this indicator, both the season of the year and preceding weather conditions must be considered.*

Figure 7. Watermark on trees

(3) *Watermarks.* Watermarks are most common on woody vegetation. They occur as stains on bark (Figure 7) or other fixed objects (e.g., bridge pillars, buildings, fences, etc.). When several watermarks are present, the highest reflects the maximum extent of recent inundation.

(4) *Drift lines.* This indicator is most likely to be found adjacent to streams or other

sources of water flow in wetlands, but also often occurs in tidal marshes. Evidence consists of deposition of debris in a line on the surface (Figure 8) or debris entangled in aboveground vegetation or other fixed objects. Debris usually consists of remnants of vegetation (branches, stems, and leaves), sediment, litter, and other waterborne materials deposited parallel to the direction of water flow. Drift lines provide an indication of the minimum portion of the area inundated during a flooding event; the maximum level of inundation is generally at a higher elevation than that indicated by a drift line.

Figure 8. Absence of leaf litter

(5) *Sediment deposits.* Plants and other vertical objects often have thin layers, coatings, or depositions of mineral or organic matter on them after inundation (Figure 9). This evidence may remain for a considerable period before it is removed by precipitation or subsequent inundation. Sediment deposition on vegetation and other objects provides an indication of the minimum inundation level. When sediments are primarily organic (e.g., fine organic material, algae), the detritus may become encrusted on or slightly above the soil surface after dewatering occurs (Figure 10).

Figure 9. Sediment deposit on plants

Figure 10. Encrusted detritus

(6) *Drainage patterns within wetlands.* This indicator, which occurs primarily in wetlands

adjacent to streams, consists of surface evidence of drainage flow into or through an area (Figure 11). In some wetlands, this evidence may exist as a drainage pattern eroded into the soil, vegetative matter (debris) piled against thick vegetation or woody stems oriented perpendicular to the direction of water flow, or the absence of leaf litter (Figure 8). Scouring is often evident around roots of persistent vegetation. Debris may be deposited in or along the drainage pattern (Figure 12).

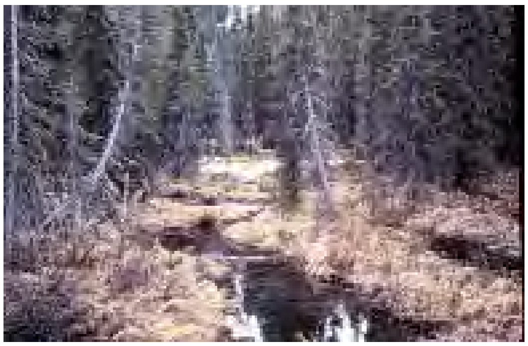


Figure 11. Drainage pattern

Figure 12. Debris deposited in stream channel

CAUTION: Drainage patterns also occur in upland areas after periods of considerable precipitation; therefore, topographic position must also be considered when applying this indicator.

USER NOTES: The hydrology indicators described above are considered to be "primary indicators", any one of which is sufficient evidence that wetland hydrology is present when combined with a hydrophytic plant community and hydric soils. In addition, the following "secondary indicators" may also be used to determine whether wetland hydrology is present. In the absence of a primary indicator, any two secondary indicators must be present to conclude that wetland hydrology is present. Secondary indicators are: presence of oxidized rhizospheres associated with living plant roots in the upper 12 inches of the soil, presence of water-stained leaves, local soil survey hydrology data for identified soils, and the FAC-neutral test of the vegetation. (HQUSACE, 6 Mar 92)

Part IV: Methods

Section A. Introduction

50. Part IV contains sections on preliminary data gathering, method selection, routine determination procedures, comprehensive determination procedures, methods for determinations in atypical situations, and guidance for wetland determinations in natural situations where the three-parameter approach may not always apply.

51. Significant flexibility has been incorporated into Part IV. The user is presented in Section B with various potential sources of information that may be helpful in making a determination, but not all identified sources of information may be applicable to a given situation. *NOTE: The user is not required to obtain information from all identified sources.* Flexibility is also provided in method selection (Section C). Three levels of routine determinations are available, depending on the complexity of the required determination and the quantity and quality of existing information. Application of methods presented in both Section D (routine determinations) and Section E (comprehensive determinations) may be tailored to meet site-specific requirements, especially with respect to sampling design.

52. Methods presented in Sections D and E vary with respect to the required level of technical knowledge and experience of the user. Application of the qualitative methods presented in Section D (routine determinations) requires considerably less technical knowledge and experience than does application of the quantitative methods presented in Section E (comprehensive determinations). The user must at least be able to identify the dominant plant species in the project area when making a routine determination (Section D), and should have some basic knowledge of hydric soils when employing routine methods that require soils examination. Comprehensive determinations require a basic understanding of sampling principles and the ability to identify all commonly occurring plant species in a project area, as well as a good understanding of indicators of hydric soils and wetland hydrology. The comprehensive method should only be employed by experienced field inspectors.

Section B. Preliminary Data Gathering and Synthesis

53. This section discusses potential sources of information that may be helpful in making a wetland determination. When the routine approach is used, it may often be possible to make a wetland determination based on available vegetation, soils, and hydrology data for the area. However, this section deals only with identifying potential information sources, extracting pertinent data, and synthesizing the data for use in making a determination. Based on the quantity and quality of available information and the approach selected for use (Section C), the user is referred to either Section D or Section E for the actual determination. Completion of Section B is not required, but is recommended because the available information may reduce or eliminate the need for field effort and decrease the time and cost of making a determination. However, there are instances in small project areas in which the time required to obtain the information may be prohibitive. In such cases PROCEED to paragraph 55, complete STEPS 1 through 3, and PROCEED to Section D or E.

Data sources

54. Obtain the following information, when available and applicable:

a. *USGS quadrangle maps.* USGS quadrangle maps are available at different scales. When possible, obtain maps at a scale of 1:24,000; otherwise, use maps at a scale of 1:62,500. Such maps are available from USGS in Reston, VA, and Menlo Park, CA, but they may already be available in the CE District Office. These maps provide several types of information:

(1) Assistance in locating field sites. Towns, minor roads, bridges, streams, and other landmark features (e.g., buildings, cemeteries, water bodies, etc.) not commonly found on road maps are shown on these maps.

(2) Topographic details, including contour lines (usually at 5- or 10-ft contour intervals).

(3) General delineation of wet areas (swamps and marshes). *NOTE: The actual wet area may be greater than that shown on the map because USGS generally maps these areas based on the driest season of the year.*

(4) Latitude, longitude, townships, ranges, and sections. These provide legal descriptions of the area.

(5) Directions, including both true and magnetic north.

(6) Drainage patterns.

(7) General land uses, such as cleared (agriculture or pasture), forested, or urban.

CAUTION: Obtain the most recent USGS maps. Older maps may show features that no longer exist and will not show new features that have developed since the map was constructed. Also, USGS is currently changing the mapping scale from 1:24,000 to 1:25,000.

b. National Wetlands Inventory products.

(1) *Wetland maps.* The standard NWI maps are at a scale of 1:24,000 or, where USGS base maps at this scale are not available, they are at 1:62,500 (1:63,350 in Alaska). Smaller scale maps ranging from 1:100,000 to 1:500,000 are also available for certain areas. Wetlands on NWI maps are classified in accordance with Cowardin et al. (1979). *CAUTION: Since not all delineated areas on NWI maps are wetlands under Department of Army jurisdiction, NWI maps should not be used as the sole basis for determining whether wetland vegetation is present.* NWI "User Notes" are available that correlate the classification system with local wetland community types. An important feature of this classification system is the water regime modifier, which describes the flooding or soil saturation characteristics. Wetlands classified as having a temporarily flooded or intermittently flooded water regime should be viewed with particular caution since this designation is indicative of plant communities that are transitional between wetland and nonwetland. These are among the most difficult plant communities to map accurately from aerial photography. For wetlands "wetter" than temporarily flooded and intermittently flooded, the probability of a designated map unit on recent NWI maps being a wetland (according to Cowardin et al. 1979) at the time of the photography is in excess of 90 percent. *CAUTION: Due to the scale of aerial photography used and other factors, all NWI map boundaries are approximate.* The optimum use of NWI maps is to plan field review (i.e., how wet, big, or diverse is the area?) and to assist during field review, particularly by showing the approximate areal extent of the wetland and its association with other communities. NWI maps are available either as a composite with, or an overlay for, USGS base maps and may be obtained from the NWI Central Office in St. Petersburg, FL, the Wetland Coordinator at each FWS regional office, or the USGS.

USER NOTES: NWI products and information are available over the World Wide Web.

(2) *Plant database.* This database of approximately 5,200 plant species that occur in wetlands provides information (e.g., ranges, habitat, etc.) about each plant species from the technical literature. The database served as a focal point for development of a national list of plants that occur in wetlands (~~Appendix C, Section 1~~).

c. *Soil Surveys.* Soil surveys are prepared by the SCS for political units (county, parish, etc.) in a state. Soil surveys contain several types of information:

(1) General information (e.g., climate, settlement, natural resources, farming, geology, general vegetation types).

(2) Soil maps for general and detailed planning purposes. These maps are usually generated from fairly recent aerial photography. *CAUTION: The smallest mapping unit is 3 acres, and a given soil series as mapped may contain small inclusions of other series.*

(3) Uses and management of soils. Any wetness characteristics of soils will be mentioned here.

(4) Soil properties. Soil and water features are provided that may be very helpful for wetland investigations. Frequency, duration, and timing of inundation (when present) are described for each soil type. Water table characteristics that provide valuable information about soil saturation are also described. Soil permeability coefficients may also be available.

(5) Soil classification. Soil series and phases are usually provided. Published soil surveys will not always be available for the area. If not, contact the county SCS office and determine whether the soils have been mapped.

d. *Stream and tidal gage data.* These documents provide records of tidal and stream flow events. They are available from either the USGS or CE District office.

e. *Environmental impact assessments (EIAs), environmental impact statements (EISs), general design memoranda (GDM), and other similar publications.* These documents may be available from Federal agencies for an area that includes the project area. They may contain some indication of the location and characteristics of wetlands consistent with the required criteria (vegetation, soils, and hydrology), and often contain flood frequency and duration data.

f. *Documents and maps from State, county, or local governments.* Regional maps that characterize certain areas (e.g., potholes, coastal areas, or basins) may be helpful because they indicate the type and character of wetlands.

g. *Remote sensing.* Remote sensing is one of the most useful information sources available for wetland identification and delineation. Recent aerial photography, particularly color infrared, provides a detailed view of an area; thus, recent land use and other features (e.g., general type and areal extent of plant communities and degree of inundation of the area when the photography was taken) can be determined. The multiagency cooperative National High Altitude Aerial Photography Program (HAP) has 1:59,000-scale color infrared photography for approximately 85 percent (December 1985) of the coterminous United States from 1980 to 1985. This photography has excellent resolution and can be ordered enlarged to 1:24,000 scale from USGS. Satellite images provide similar information as aerial photography, although the much smaller scale makes observation of detail more difficult without sophisticated equipment and extensive training. Satellite images provide more recent coverage than aerial photography (usually at 18-day intervals). Individual satellite images are more expensive than aerial photography, but are not as expensive as having an area flown and photographed at low altitudes. However, better resolution imagery is now available with remote sensing equipment mounted on fixed-wing aircraft.

h. *Local individuals and experts.* Individuals having personal knowledge of an area may sometimes provide a reliable and readily available source of information about the area, particularly information on the wetness of the area.

i. *USGS land use and land cover maps.* Maps created by USGS using remotely sensed data and a geographical information system provide a systematic and comprehensive collection and analysis of land use and land cover on a national basis. Maps at a scale of 1:250,000 are available as overlays that show land use and land cover according to nine basic levels. One level is wetlands (as determined by the FWS), which is further subdivided into forested and nonforested areas. Five other sets of maps show political units, hydrologic units, census subdivisions of counties, Federal land ownership, and State land ownership. These maps can be obtained from any USGS mapping center.

j. *Applicant's survey plans and engineering designs.* In many cases, the permit applicant will already have had the area surveyed (often at 1-ft contours or less) and will also have engineering designs for the proposed activity.

Data synthesis

55. When employing Section B procedures, use the above sources of information to complete the following steps:

- *STEP 1 - Identify the project area on a map.* Obtain a USGS quadrangle map (1:24,000) or other appropriate map, and locate the area identified in the permit application. PROCEED TO STEP 2.

- *STEP 2 - Prepare a base map.* Mark the project area boundaries on the map. Either use the selected map as the base map or trace the area on a mylar overlay, including prominent landscape features (e.g., roads, buildings, drainage patterns, etc.). If possible, obtain diazo copies of the resulting base map. PROCEED TO STEP 3.

- *STEP 3 - Determine size of the project area.* Measure the area boundaries and calculate the size of the area. PROCEED TO STEP 4 OR TO SECTION D OR E IF SECTION B IS NOT USED.

- *STEP 4 - Summarize available information on vegetation.* Examine available sources that contain information about the area vegetation. Consider the following:

  a. USGS quadrangle maps. Is the area shown as a marsh or swamp? *CAUTION: Do not use this as the sole basis for determining that hydrophytic vegetation is present.*

  b. NWI overlays or maps. Do the overlays or maps indicate that hydrophytic vegetation occurs in the area? If so, identify the vegetation type(s).

  c. EIAs, EISs, or GDMs that include the project area. Extract any vegetation data that pertain to the area.

  d. Federal, State, or local government documents that contain information about the area vegetation. Extract appropriate data.

  e. Recent (within last 5 years) aerial photography of the area. Can the area plant community type(s) be determined from the photography? Extract appropriate data.

  f. Individuals or experts having knowledge of the area vegetation. Contact them and obtain any appropriate information. *CAUTION: Ensure that the individual providing the information has firsthand knowledge of the area.*

  g. Any published scientific studies of the area plant communities. Extract any appropriate data.

  h. Previous wetland determinations made for the area. Extract any pertinent vegetation data.

When the above have been considered, PROCEED TO STEP 5.

- *STEP 5 - Determine whether the vegetation in the project area is adequately characterized.* Examine the summarized data (STEP 4) and determine whether the area plant communities are adequately characterized. For routine determinations, the plant community type(s) and the dominant species in each vegetation layer of each community type must be known. Dominant species are those that have the largest relative basal area (overstory),[1] height (woody understory), number of stems (woody vines), or greatest areal cover (herbaceous understory). For comprehensive determinations, each plant community type present in the project area must have been quantitatively described within the past 5 years using accepted sampling and analytical procedures, and boundaries between community types must be known. Record information on DATA FORM 1.[2] In either case, PROCEED TO Section F if there is evidence of recent significant vegetation alteration due to human activities or natural events. Otherwise, PROCEED TO STEP 6.

- *STEP 6 - Summarize available information on area soils.* Examine available information and describe the area soils. Consider the following:

  a. County soil surveys. Determine the soil series present and extract characteristics for each. *CAUTION: Soil mapping units sometimes include more than one soil series.*

  b. Unpublished county soil maps. Contact the local SCS office and determine whether soil maps are available for the area. Determine the soil series of the area, and obtain any available information about possible hydric soil indicators (paragraph 44 or 45) for each soil series.

  c. Published EIAs, EISs, or GDMs that include soils information. Extract any pertinent information.

  d. Federal, State, and/or local government documents that contain descriptions of the area soils. Summarize these data.

  e. Published scientific studies that include area soils data. Summarize these data.

  f. Previous wetland determinations for the area. Extract any pertinent soils data.

  When the above have been considered, PROCEED TO STEP 7.

---

[1] This term is used because species having the largest individuals may not be dominant when only a few are present. To use relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.
[2] A separate DATA FORM 1 must be used for each plant community type.

- *STEP 7 - Determine whether soils of the project area have been adequately characterized.* Examine the summarized soils data and determine whether the soils have been adequately characterized. For routine determinations, the soil series must be known. For comprehensive determinations, both the soil series and the boundary of each soil series must be known. Record information on DATA FORM 1. In either case, if there is evidence of recent significant soils alteration due to human activities or natural events, PROCEED TO Section F. Otherwise, PROCEED TO STEP 8.

- *STEP 8 - Summarize available hydrology data.* Examine available information and describe the area hydrology. Consider the following:

  a. USGS quadrangle maps. Is there a significant, well-defined drainage through the area? Is the area within a major floodplain or tidal area? What range of elevations occur in the area, especially in relation to the elevation of the nearest perennial watercourse?

  b. NWI overlays or maps. Is the area shown as a wetland or deepwater aquatic habitat? What is the water regime modifier?

  c. EIAs, EISs, or GDMs that describe the project area. Extract any pertinent hydrologic data.

  d. Floodplain management maps. These maps may be used to extrapolate elevations that can be expected to be inundated on a l-, 2-, 3-year, etc., basis. Compare the elevations of these features with the elevation range of the project area to determine the frequency of inundation.

  e. Federal, State, and local government documents (e.g., CE floodplain management maps and profiles) that contain hydrologic data. Summarize these data.

  f. Recent (within past 5 years) aerial photography that shows the area to be inundated. Record the date of the photographic mission.

  g. Newspaper accounts of flooding events that indicate periodic inundation of the area.

  h. SCS County Soil Surveys that indicate the frequency and duration of inundation and soil saturation for area soils. *CAUTION: Data provided only represent average conditions for a particular soil series in its natural undrained state, and cannot be used as a positive hydrologic indicator in areas that have significantly altered hydrology.*

i. Tidal or stream gage data for a nearby water body that apparently influences the area. Obtain the gage data and complete (1) below if the routine approach is used, or (2) below if the comprehensive approach is used (OMIT IF GAGING STATION DATA ARE UNAVAILABLE):

(1) *Routine approach.* Determine the highest water level elevation reached during the growing season for each of the most recent 10 years of gage data. Rank these elevations in descending order and select the fifth highest elevation. Combine this elevation with the mean sea level elevation of the gaging station to produce a mean sea level elevation for the highest water level reached every other year. *NOTE: Stream gage data are often presented as flow rates in cubic feet per second. In these cases, ask the CE District's Hydrology Branch to convert flow rates to corresponding mean sea level elevations and adjust gage data to the site.* Compare the resulting elevations reached biennially with the project area elevations. If the water level elevation exceeds the area elevation, the area is inundated during the growing season on average at least biennially.

(2) *Comprehensive approach.* Complete the following:

(a) *Decide whether hydrologic data reflect the apparent hydrology.* Data available from the gaging station may or may not accurately reflect the area hydrology. Answer the following questions:

- Does the water level of the area appear to fluctuate in a manner that differs from that of the water body on which the gaging station is located? (In ponded situations, the water level of the area is usually higher than the water level at the gaging station.)

- Are less than 10 years of daily readings available for the gaging station?

- Do other water sources that would not be reflected by readings at the gaging station appear to significantly affect the area? For example, do major tributaries enter the stream or tidal area between the area and gaging station?

If the answer to any of the above questions is YES, the area hydrology cannot be determined from the gaging station data. If the answer to all of the above questions is NO, PROCEED TO (b).

(b) *Analyze hydrologic data.* Subject the hydrologic data to appropriate analytical procedures. Either use duration curves or a computer program developed by WES (available from the Environmental Laboratory upon request) for determining the mean sea level elevation representing the upper limits of wetland hydrology. In the latter case, when the site elevation is lower than the mean sea level elevation representing a 5-percent duration of inundation and saturation during the growing season, the area has a hydrologic regime that may occur in wetlands. *NOTE: Duration curves do not reflect the period of soil saturation following dewatering.*

When all of the above have been considered, PROCEED TO STEP 9.

- *STEP 9 - Determine whether hydrology is adequately characterized.* Examine the summarized data and determine whether the hydrology of the project area is adequately characterized. For routine determinations, there must be documented evidence of frequent inundation or soil saturation during the growing season. For comprehensive determinations, there must be documented quantitative evidence of frequent inundation or soil saturation during the growing season, based on at least 10 years of stream or tidal gage data. Record information on DATA FORM 1. In either case, if there is evidence of recent significant hydrologic alteration due to human activities or natural events, PROCEED TO Section F. Otherwise, PROCEED TO Section C.

Section C. Selection of Method

56. All wetland delineation methods described in this manual can be grouped into two general types: routine and comprehensive. Routine determinations (Section D) involve simple, rapidly applied methods that result in sufficient qualitative data for making a determination. Comprehensive methods (Section E) usually require significant time and effort to obtain the needed quantitative data. The primary factor influencing method selection will usually be the complexity of the required determination. However, comprehensive methods may sometimes be selected for use in relatively simple determinations when rigorous documentation is required.

57. Three levels of routine wetland determinations are described below. Complexity of the project area and the quality and quantity of available information will influence the level selected for use.

a. *Level 1 - Onsite Inspection Unnecessary.* This level may be employed when the information already obtained (Section B) is sufficient for making a determination for the entire project area (see Section D, Subsection 1).

b. *Level 2 - Onsite Inspection Necessary.* This level must be employed when there is insufficient information already available to characterize the vegetation, soils, and hydrology of the entire project area (see Section D, Subsection 2).

c. *Level 3 - Combination of Levels 1 and 2.* This level should be used when there is sufficient information already available to characterize the vegetation, soils, and hydrology of a portion, but not all, of the project area. Methods described for Level 1 may be applied to portions of the area for which adequate information already exists, and onsite methods (Level 2) must be applied to the remainder of the area (see Section D, Subsection 3).

58. After considering all available information, select a tentative method (see above) for use, and PROCEED TO EITHER Section D or E, as appropriate. *NOTE: Sometimes it may be necessary to change to another method described in the manual, depending on the quality of available information and/or recent changes in the project area.*

Section D. Routine Determinations

59. This section describes general procedures for making routine wetland determinations. It is assumed that the user has already completed all applicable steps in Section B,[1] and a routine method has been tentatively selected for use (Section C). Subsections 1 through 3 describe steps to be followed when making a routine determination using one of the three levels described in Section C. Each subsection contains a flowchart that defines the relationship of steps to be used for that level of routine determinations. *NOTE: The selected method must be considered tentative because the user may be required to change methods during the determination.*

Subsection 1 - Onsite Inspection Unnecessary

60. This subsection describes procedures for making wetland determinations when sufficient information is already available (Section B) on which to base

---

[1] If it has been determined that it is more expedient to conduct an onsite inspection than to search for available information, complete STEPS 1 through 3 of Section B, and PROCEED TO Subsection 2.

the determination. A flowchart of required steps to be completed is presented in Figure 13, and each step is described below.

Equipment and materials

61. No special equipment is needed for applying this method. The following materials will be needed:

a. Map of project area (Section B, STEP 2).

b. Copies of DATA FORM 1 (Appendix B).

c. Appendices C and D to this manual.

Procedure

62. Complete the following steps, as necessary:

- *STEP 1* - *Determine whether available data are sufficient for entire project area.* Examine the summarized data (Section B, STEPS 5, 7, and 9) and determine whether the vegetation, soils, and hydrology of the entire project area are adequately characterized. If so, PROCEED TO STEP 2. If all three parameters are adequately characterized for a portion, but not all, of the project area, PROCEED TO Subsection 3. If the vegetation, soils, and hydrology are not adequately characterized for any portion of the area, PROCEED TO Subsection 2.

- *STEP 2* - *Determine whether hydrophytic vegetation is present.* Examine the vegetation data and list on DATA FORM 1 the dominant plant species found in each vegetation layer of each community type. *NOTE: A separate DATA FORM 1 will be required for each community type.* Record the indicator status for each dominant species ~~(Appendix C, Section 1 or 2)~~. When more than 50 percent of the dominant species in a plant community have an indicator status of OBL, FACW, and/or FAC,[1] hydrophytic vegetation is present. If one or more plant communities comprise hydrophytic vegetation, PROCEED TO STEP 3. If none of the plant communities comprise hydrophytic vegetation, none of the area is a wetland. Complete the vegetation section for each DATA FORM 1.

---

[1] For the FAC-neutral option, see paragraph 35*a*.

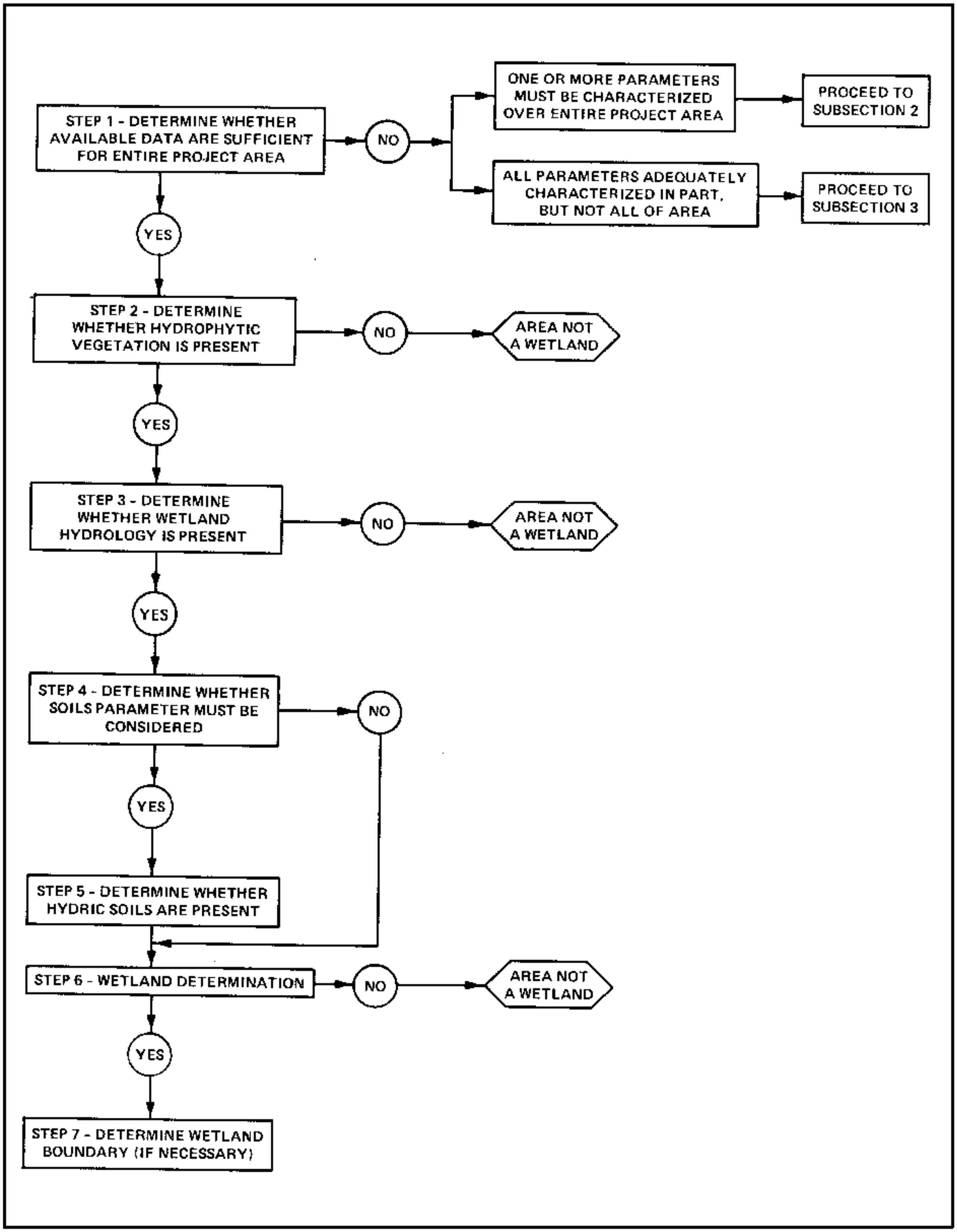


Figure 13. Flowchart of steps involved in making a wetland determination when an onsite inspection is unnecessary

- *STEP 3 - Determine whether wetland hydrology is present.* When one of the following conditions applies (STEP 2), it is only necessary to confirm that there has been no recent hydrologic alteration of the area:

  a. The entire project area is occupied by a plant community or communities in which all dominant species are OBL ~~(Appendix C, Section 1 or 2)~~.

  b. The project area contains two or more plant communities, all of which are dominated by OBL and/or FACW species, and the wetland-nonwetland boundary is abrupt[1] (e.g., a *Spartina alterniflora* marsh bordered by a road embankment).

  If either *a* or *b* applies, look for recorded evidence of recently constructed dikes, levees, impoundments, and drainage systems, or recent avalanches, mudslides, beaver dams, etc., that have significantly altered the area hydrology. If any significant hydrologic alteration is found, determine whether the area is still periodically inundated or has saturated soils for sufficient duration to support the documented vegetation (*a* or *b* above). When *a* or *b* applies and there is no evidence of recent hydrologic alteration, or when *a* or *b* do not apply and there is documented evidence that the area is periodically inundated or has saturated soils, wetland hydrology is present. Otherwise, wetland hydrology does not occur on the area. Complete the hydrology section of DATA FORM 1 and PROCEED TO STEP 4.

- *STEP 4 - Determine whether the soils parameter must be considered.* When either *a* or *b* of STEP 3 applies *and* there is either no evidence of recent hydrologic alteration of the project area or if wetland hydrology presently occurs on the area, hydric soils can be assumed to be present. If so, PROCEED TO STEP 6. Otherwise PROCEED TO STEP 5.

- *STEP 5 - Determine whether hydric soils are present.* Examine the soils data (Section B, STEP 7) and record the soil series or soil phase on DATA FORM 1 for each community type. Determine whether the soil is listed as a hydric soil ~~(Appendix D, Section 2)~~. If all community types have hydric soils, the entire project area has hydric soils. *(CAUTION: If the soil series description makes reference to inclusions of other soil types, data must be field verified).* Any portion of the area that lacks hydric soils is a nonwetland. Complete the soils section of each DATA FORM 1 and PROCEED TO STEP 6.

---

[1] There must be documented evidence of periodic inundation or saturated soils when the project area: (a) has plant communities dominated by one or more FAC species; (b) has vegetation dominated by FACW species but no adjacent community dominated by OBL species; (c) has a gradual, nondistinct boundary between wetlands and nonwetlands; and/or (d) is known to have or is suspected of having significantly altered hydrology.

- *STEP 6 - Wetland determination.* Examine the DATA FORM 1 for each community type. Any portion of the project area is a wetland that has:

  a. Hydrophytic vegetation that conforms to one of the conditions identified in STEP 3*a* or 3*b* and has either no evidence of altered hydrology or confirmed wetland hydrology.

  b. Hydrophytic vegetation that does not conform to STEP 3*a* or 3*b*, has hydric soils, and has confirmed wetland hydrology.

  If STEP 6*a* or 6*b* applies to the entire project area, the entire area is a wetland. Complete a DATA FORM 1 for all plant community types. Portions of the area not qualifying as a wetland based on an office determination might or might not be wetlands. If the data used for the determination are considered to be highly reliable, portions of the area not qualifying as wetlands may properly be considered nonwetlands. PROCEED TO STEP 7. If the available data are incomplete or questionable, an onsite inspection (Subsection 2) will be required.

- *STEP 7 - Determine wetland boundary.* Mark on the base map all community types determined to be wetlands with a W and those determined to be nonwetlands with an N. Combine all wetland community types into a single mapping unit. The boundary of these community types is the interface between wetlands and nonwetlands.

Subsection 2 - Onsite Inspection Necessary

63. This subsection describes procedures for routine determinations in which the available information (Section B) is insufficient for one or more parameters. If only one or two parameters must be characterized, apply the appropriate steps and return to Subsection 1 and complete the determination. A flowchart of steps required for using this method is presented in Figure 14, and each step is described below.

Equipment and materials

64. The following equipment and materials will be needed:

a. Base map (Section B, STEP 2).

b. Copies of DATA FORM 1 (one for each community type and additional copies for boundary determinations).

c. Appendices C and D.

d. Compass.

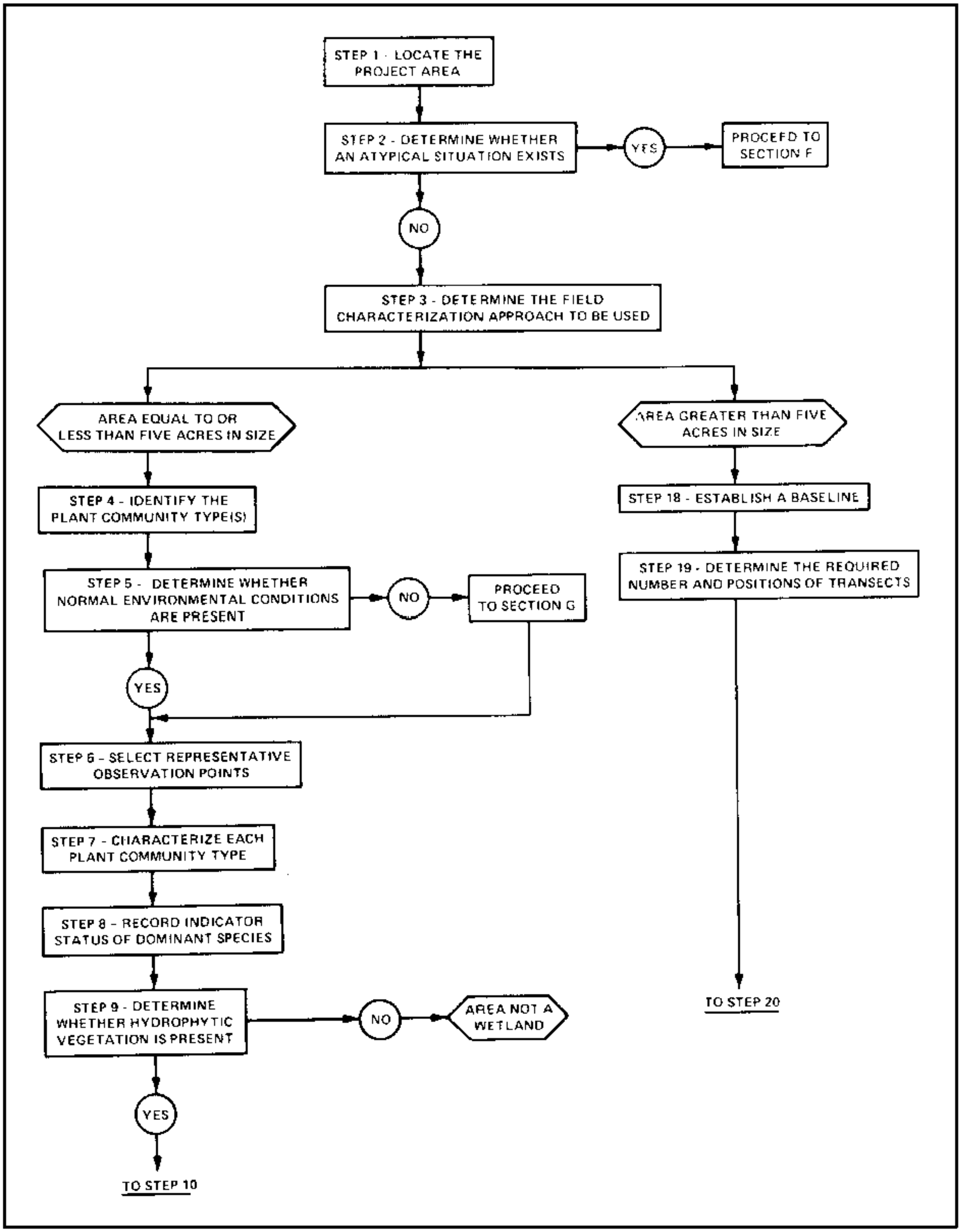


Figure 14. Flowchart of steps involved in making a routine wetland determination when an onsite visit is necessary (Continued)

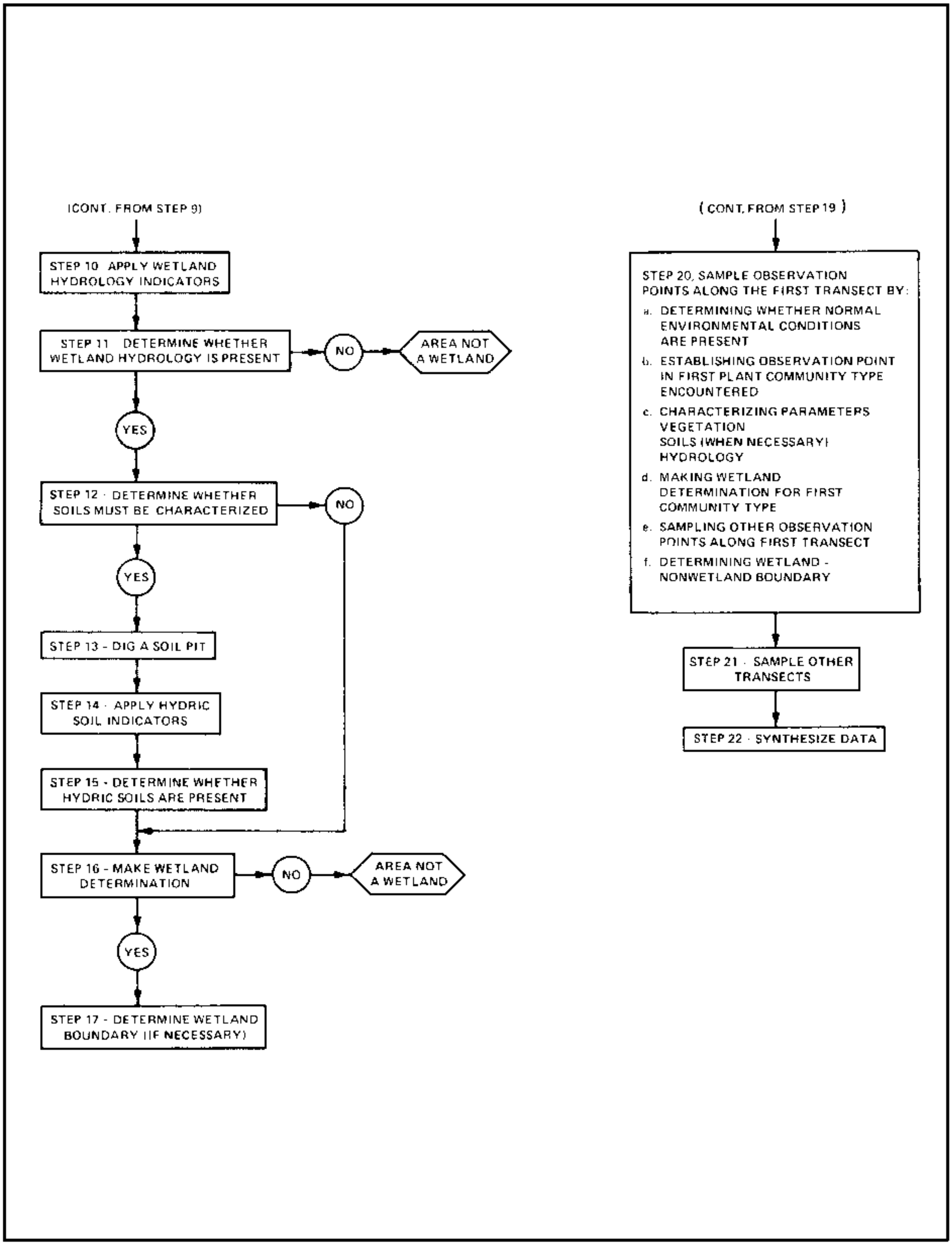


Figure 14. (Concluded)

e. Soil auger or spade (soils only).

f. Tape (300 ft).

g. Munsell Color Charts (Munsell Color 1975) (soils only).

Procedure

65. Complete the following steps, as necessary:

- *STEP 1 - Locate the project area.* Determine the spatial boundaries of the project area using information from a USGS quadrangle map or other appropriate map, aerial photography, and/or the project survey plan (when available). PROCEED TO STEP 2.

- *STEP 2 - Determine whether an atypical situation exists.* Examine the area and determine whether there is evidence of sufficient natural or human-induced alteration to significantly alter the area vegetation, soils, and/or hydrology. *NOTE: Include possible offsite modifications that may affect the area hydrology.* If not, PROCEED TO STEP 3.

  If one or more parameters have been significantly altered by an activity that would normally require a permit, PROCEED TO Section F and determine whether there is sufficient evidence that hydrophytic vegetation, hydric soils, and/or wetland hydrology were present prior to this alteration. Then, return to this subsection and characterize parameters not significantly influenced by human activities. PROCEED TO STEP 3.

- *STEP 3 - Determine the field characterization approach to be used.* Considering the size and complexity of the area, determine the field characterization approach to be used. When the area is equal to or less than 5 acres in size (Section B, STEP 3) and the area is thought to be relatively homogeneous with respect to vegetation, soils, and/or hydrologic regime, PROCEED TO STEP 4. When the area is greater than 5 acres in size (Section B, STEP 3) or appears to be highly diverse with respect to vegetation, PROCEED TO STEP 18.

Areas Equal To or Less Than 5 Acres in Size

- *STEP 4 - Identify the plant community type(s).* Traverse the area and determine the number and locations of plant community types. Sketch the location of each on the base map (Section B, STEP 2), and give each community type a name. PROCEED TO STEP 5.

- *STEP 5 - Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present by considering the following:

  a. Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels?

  b. Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

  If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 6.

- *STEP 6 - Select representative observation points.* Select a representative observation point in each community type. A representative observation point is one in which the apparent characteristics (determine visually) best represent characteristics of the entire community. Mark on the base map the approximate location of the observation point. PROCEED TO STEP 7.

- *STEP 7 - Characterize each plant community type.* Visually determine the dominant plant species in each vegetation layer of each community type and record them on DATA FORM 1 (use a separate DATA FORM 1 for each community type). Dominant species are those having the greatest relative basal area (woody overstory),[1] greatest height (woody understory), greatest percentage of areal cover (herbaceous understory), and/or greatest number of stems (woody vines). PROCEED TO STEP 8.

- *STEP 8 - Record indicator status of dominant species.* Record on DATA FORM 1 the indicator status ~~(Appendix C, Section 1 or 2)~~ of each dominant species in each community type. PROCEED TO STEP 9.

- *STEP 9 - Determine whether hydrophytic vegetation is present.* Examine each DATA FORM 1. When more than 50 percent of the dominant species in a community type have an indicator status (STEP 8) of OBL, FACW, and/or FAC,[2] hydrophytic vegetation is present. Complete the vegetation section of each DATA FORM 1. Portions of the area failing this test are not wetlands. PROCEED TO STEP 10.

- *STEP 10 - Apply wetland hydrologic indicators.* Examine the portion of the area occupied by each plant community type for positive indicators

---

[1] This term is used because species having the largest individuals may not be dominant when only a few are present. To determine relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.

[2] For the FAC-neutral option, see paragraph 35*a*.

of wetland hydrology (Part III, paragraph 49). Record findings on the appropriate DATA FORM 1. PROCEED TO STEP 11.

- *STEP 11 - Determine whether wetland hydrology is present.* Examine the hydrologic information on DATA FORM 1 for each plant community type. Any portion of the area having a positive wetland hydrology indicator has wetland hydrology. If positive wetland hydrology indicators are present in all community types, the entire area has wetland hydrology. If no plant community type has a wetland hydrology indicator, none of the area has wetland hydrology. Complete the hydrology portion of each DATA FORM 1. PROCEED TO STEP 12.

- *STEP 12 - Determine whether soils must be characterized.* Examine the vegetation section of each DATA FORM 1. Hydric soils are assumed to be present in any plant community type in which:

  a. All dominant species have an indicator status of OBL.

  b. All dominant species have an indicator status of OBL or FACW, and the wetland boundary (when present) is abrupt.[1]

  When either *a* or *b* occurs and wetland hydrology is present, check the hydric soils blank as positive on DATA FORM 1 and PROCEED TO STEP 16. If neither *a* nor *b* applies, PROCEED TO STEP 13.

- *STEP 13 - Dig a soil pit.* Using a soil auger or spade, dig a soil pit at the representative location in each community type. The procedure for digging a soil pit is described in Appendix D, Section 1. When completed, approximately 16 inches of the soil profile will be available for examination. PROCEED TO STEP 14.

- *STEP 14 - Apply hydric soil indicators.* Examine the soil at each location and compare its characteristics immediately below the A-horizon or 10 inches (whichever is shallower) with the hydric soil indicators described in Part III, paragraph 44 and/or 45. Record findings on the appropriate DATA FORM 1's. PROCEED TO STEP 15.

- *STEP 15 - Determine whether hydric soils are present.* Examine each DATA FORM 1 and determine whether a positive hydric soil indicator was found. If so, the area at that location has hydric soil. If soils at all sampling locations have positive hydric soil indicators, the entire area has hydric soils. If soils at all sampling locations lack positive hydric soil indicators, none of the area is a wetland. Complete the soil section of each DATA FORM 1. PROCEED TO STEP 16.

---

[1] The soils parameter must be considered in any plant community in which: (a) the community is dominated by one or more FAC species; (b) no community type dominated by OBL species is present; (c) the boundary between wetlands and nonwetlands is gradual or nondistinct; (d) the area is known to or is suspected of having significantly altered hydrology.

- *STEP 16 - Make wetland determination.* Examine DATA FORM 1. If the entire area presently or normally has wetland indicators of all three parameters (STEPS 9, 11, and 15), the entire area is a wetland. If the entire area presently or normally lacks wetland indicators of one or more parameters, the entire area is a nonwetland. If only a portion of the area presently or normally has wetland indicators for all three parameters, PROCEED TO STEP 17.

- *STEP 17 - Determine wetland-nonwetland boundary.* Mark each plant community type on the base map with a W if wetland or an N if non-wetland. Combine all wetland plant communities into one mapping unit and all nonwetland plant communities into another mapping unit. The wetland-nonwetland boundary will be represented by the interface of these two mapping units.

Areas Greater Than 5 Acres in Size

- *STEP 18 - Establish a baseline.* Select one project boundary as a baseline. The baseline should parallel the major watercourse through the area or should be perpendicular to the hydrologic gradient (Figure 15). Determine the approximate baseline length. PROCEED TO STEP 19.

- *STEP 19 - Determine the required number and position of transects.* Use the following to determine the required number and position of transects (specific site conditions may necessitate changes in intervals):

Baseline Length, Miles	**Number of Required Transects**
≤0.25	3
>0.25 - 0.50	3
>0.50 - 0.75	3
>0.75 - 1.00	3
>1.00 - 2.00	3-5
>2.00 - 4.00	5-8
>4.00	8 or more[1]

[1] Transect intervals should not exceed 0.5 mile.

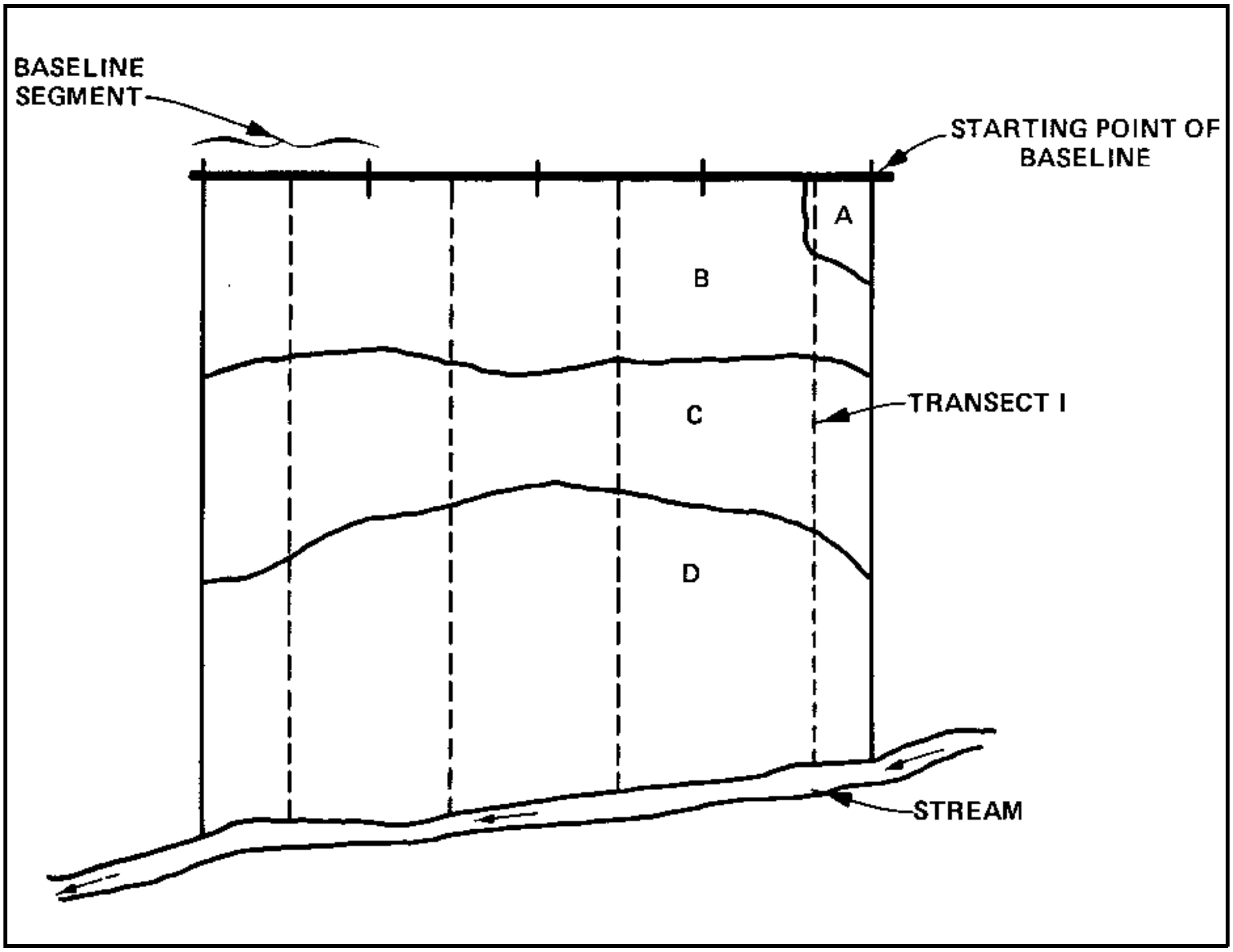


Figure 15. General orientation of baseline and transects (dotted lines) in a hypothetical project area. Alpha characters represent different plant communities. All transects start at the midpoint of a baseline segment except the first, which was repositioned to include community type A

Divide the baseline length by the number of required transects. Establish one transect in each resulting baseline increment. Use the midpoint of each baseline increment as a transect starting point. For example, if the baseline is 1,200 ft in length, three transects would be established—one at 200 ft, one at 600 ft, and one at 1,000 ft from the baseline starting point. *CAUTION: All plant community types must be included. This may necessitate relocation of one or more transect lines. PROCEED TO STEP 20.*

- *STEP 20 - Sample observation points along the first transect.* Beginning at the starting point of the first transect, extend the transect at a 90-deg angle to the baseline. Use the following procedure as appropriate to simultaneously characterize the parameters at each observation point. Combine field-collected data with information already available and make a wetland determination at each observation point. A DATA FORM 1 must be completed for each observation point.

a. *Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present by considering the following:

(1) Is the area presently lacking hydrophytic vegetation and/or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 20*b*.

b. *Establish an observation point in the first plant community type encountered.* Select a representative location along the transect in the first plant community type encountered. When the first plant community type is large and covers a significant distance along the transect, select an area that is no closer than 300 ft to a perceptible change in plant community type. PROCEED TO STEP 20*c*.

c. *Characterize parameters.* Characterize the parameters at the observation point by completing (1), (2), and (3) below:

(1) *Vegetation.* Record on DATA FORM 1 the dominant plant species in each vegetation layer occurring in the immediate vicinity of the observation point. Use a 5-ft radius for herbs and saplings/shrubs, and a 30-ft radius for trees and woody vines (when present). Subjectively determine the dominant species by estimating those having the largest relative basal area[1] (woody overstory), greatest height (woody understory), greatest percentage of areal cover (herbaceous understory), and/or greatest number of stems (woody vines). *NOTE: Plot size may be estimated, and plot size may also be varied when site conditions warrant.* Record on DATA FORM 1 any dominant species observed to have morphological adaptations (Appendix C, Section 3) for occurrence in wetlands, and determine and record dominant species that have known physiological adaptations for occurrence in wetlands (Appendix C, Section 3). Record on DATA FORM 1 the indicator status ~~(Appendix C, Section 1 or 2)~~ of each dominant species. Hydrophytic

---

[1] This term is used because species having the largest individuals may not be dominant when only a few are present. To use relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.

vegetation is present at the observation point when more than 50 percent of the dominant species have an indicator status of OBL, FACW, and/or FAC;[1] when two or more dominant species have observed morphological or known physiological adaptations for occurrence in wetlands; or when other indicators of hydrophytic vegetation (Part III, paragraph 35) are present. Complete the vegetation section of DATA FORM 1. PROCEED TO (2).

(2) *Soils.* In some cases, it is not necessary to characterize the soils. Examine the vegetation of DATA FORM 1. Hydric soils can be assumed to be present when:

(a) All dominant plant species have an indicator status of OBL.

(b) All dominant plant species have an indicator status of OBL and/or FACW (at least one dominant species must be OBL).[2]

When either (a) or (b) applies, check the hydric soils blank as positive and PROCEED TO (3). If neither (a) nor (b) applies but the vegetation qualifies as hydrophytic, dig a soil pit at the observation point using the procedure described in Appendix D, Section 1. Examine the soil immediately below the A-horizon or 10-inches (whichever is shallower) and compare its characteristics (Appendix D, Section 1) with the hydric soil indicators described in Part III, paragraph 44 and/or 45. Record findings on DATA FORM 1. If a positive hydric soil indicator is present, the soil at the observation point is a hydric soil. If no positive hydric soil indicator is found, the area at the observation point does not have hydric soils and the area at the observation point is not a wetland. Complete the soils section of DATA FORM 1 for the observation point. PROCEED TO (3) if hydrophytic vegetation (1) and hydric soils (2) are present. Otherwise, PROCEED TO STEP 20*d*.

(3) *Hydrology*. Examine the observation point for indicators of wetland hydrology (Part III, paragraph 49) and record observations on DATA FORM 1. Consider the indicators in the same sequence as presented in Part III, paragraph 49. If a positive wetland hydrology indicator

---

[1] For the FAC-neutral option, see paragraph 35*a*.
[2] Soils must be characterized when any dominant species has an indicator status of FAC.

is present, the area at the observation point has wetland hydrology. If no positive wetland hydrologic indicator is present, the area at the observation point is not a wetland. Complete the hydrology section of DATA FORM 1 for the observation point. PROCEED TO STEP 20*d*.

d. *Wetland determination.* Examine DATA FORM 1 for the observation point. Determine whether wetland indicators of all three parameters are or would normally be present during a significant portion of the growing season. If so, the area at the observation point is a wetland. If no evidence can be found that the area at the observation point normally has wetland indicators for all three parameters, the area is a nonwetland. PROCEED TO STEP 20*e*.

e. *Sample other observation points along the first transect.* Continue along the first transect until a different community type is encountered. Establish a representative observation point within this community type and repeat STEP 20*c* and 20*d*. If the areas at both observation points are either wetlands or nonwetlands, continue along the transect and repeat STEP 20*c* and 20*d* for the next community type encountered. Repeat for all other community types along the first transect. If the area at one observation point is wetlands and the next observation point is nonwetlands (or vice versa), PROCEED TO STEP 20*f*.

f. *Determine wetland-nonwetland boundary.* Proceed along the transect from the wetland observation point toward the nonwetland observation point. Look for subtle changes in the plant community (e.g., the first appearance of upland species, disappearance of apparent hydrology indicators, or slight changes in topography). When such features are noted, establish an observation point and repeat the procedures described in STEP 20*c* through 20*d*. *NOTE: A new DATA FORM 1 must be completed for this observation point, and all three parameters must be characterized by field observation.* If the area at this observation point is a wetland, proceed along the transect toward the nonwetland observation point until upland indicators are more apparent. Repeat the procedures described in STEP 20*c* through 20*d*. If the area at this observation point is a nonwetland, move halfway back along the transect toward the last documented wetland observation point and repeat the procedure described in STEP 20*c* through 20*d*. Continue this procedure until the wetland-nonwetland boundary is found. It is not necessary to complete a DATA FORM 1 for all intermediate points, but a DATA FORM 1 should be completed for the wetland-nonwetland boundary. Mark the position of the wetland boundary on the base map, and continue along the first transect until all community types have been sampled and all wetland boundaries located. *CAUTION: In areas where wetlands are interspersed among nonwetlands (or vice versa), several boundary determinations will be required.* When all necessary wetland determinations have been completed for the first transect, PROCEED TO STEP 21.

- *STEP 21 - Sample other transects.* Repeat procedures described in STEP 21 for all other transects. When completed, a wetland determination will have been made for one observation point in each community type along each transect, and all wetland-nonwetland boundaries along each transect will have been determined. PROCEED TO STEP 22.

- *STEP 22 - Synthesize data.* Examine all completed copies of DATA FORM 1, and mark each plant community type on the base map. Identify each plant community type as either a wetland (W) or nonwetland (N). If all plant community types are identified as wetlands, the entire area is wetlands. If all plant community types are identified as nonwetlands, the entire area is nonwetlands. If both wetlands and nonwetlands are present, identify observation points that represent wetland boundaries on the base map. Connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Walk the contour line between transects to confirm the wetland boundary. Should anomalies be encountered, it will be necessary to establish short transects in these areas, apply the procedures described in STEP 20*f*, and make any necessary adjustments on the base map.

Subsection 3 - Combination of Levels I and 2

66. In some cases, especially for large projects, adequate information may already be available (Section B) to enable a wetland determination for a portion of the project area, while an onsite visit will be required for the remainder of the area. Since procedures for each situation have already been described in Subsections 1 and 2, they will not be repeated. Apply the following steps:

- *STEP 1 - Make wetland determination for portions of the project area that are already adequately characterized.* Apply procedures described in Subsection 1. When completed, a DATA FORM 1 will have been completed for each community type, and a map will have been prepared identifying each community type as wetland or nonwetland and showing any wetland boundary occurring in this portion of the project area. PROCEED TO STEP 2.

- *STEP 2 - Make wetland determination for portions of the project area that require an onsite visit.* Apply procedures described in Subsection 2. When completed, a DATA FORM 1 will have been completed for each plant community type or for a number of observation points (including wetland boundary determinations). A map of the wetland (if present) will also be available. PROCEED TO STEP 3.

- *STEP 3 - Synthesize data.* Using the maps resulting from STEPS 1 and 2, prepare a summary map that shows the wetlands of the entire project area. *CAUTION: Wetland boundaries for the two maps will not always match exactly. When this occurs, an additional site visit will be required to refine the wetland boundaries. Since the degree of resolution of wetland boundaries will be greater when determined onsite, it may be necessary to employ procedures described in Subsection 2 in the vicinity of the boundaries determined from Subsection 1 to refine these boundaries.*

Section E. Comprehensive Determinations

67. This section describes procedures for making comprehensive wetland determinations. Unlike procedures for making routine determinations (Section D), application of procedures described in this section will result in maximum information for use in making determinations, and the information usually will be quantitatively expressed. Comprehensive determinations should only be used when the project area is very complex and/or when the determination requires rigorous documentation. This type of determination may be required in areas of any size, but will be especially useful in large areas. There may be instances in which only one parameter (vegetation, soil, or hydrology) is disputed. In such cases, only procedures described in this section that pertain to the disputed parameter need be completed. It is assumed that the user has already completed all applicable steps in Section B. *NOTE: Depending on site characteristics, it may be necessary to alter the sampling design and/or data collection procedures.*

68. This section is divided into five basic types of activities. The first consists of preliminary field activities that must be completed prior to making a determination (STEPS 1 through 5). The second outlines procedures for determining the number and locations of required determinations (STEPS 6 through 8). The third describes the basic procedure for making a comprehensive wetland determination at any given point (STEPS 9 through 17). The fourth describes a procedure for determining wetland boundaries (STEP 18). The fifth describes a procedure for synthesizing the collected data to determine the extent of wetlands in the area (STEPS 20 and 21). A flowchart showing the relationship of various steps required for making a comprehensive determination is presented in Figure 16.

Equipment and materials

69. Equipment and materials needed for making a comprehensive determination include:

a. Base map (Section B, STEP 2).

b. Copies of DATA FORMS 1 and 2.

c. Appendices C and D.

d. Compass.

e. Tape (300 ft).

f. Soil auger or spade.

g. Munsell Color Charts (Munsell Color 1975).

h. Quadrat (3.28 ft by 3.28 ft).

i. Diameter or basal area tape (for woody overstory).

Field procedures

70. Complete the following steps:

- *STEP 1 - Identify the project area.* Using information from the USGS quadrangle or other appropriate map (Section B), locate and measure the spatial boundaries of the project area. Determine the compass heading of each boundary and record on the base map (Section B, STEP 2). The applicant's survey plan may be helpful in locating the project boundaries. PROCEED TO STEP 2.

- *STEP 2 - Determine whether an atypical situation exists.* Examine the area and determine whether there is sufficient natural or human-induced alteration to significantly change the area vegetation, soils, and/or hydrology. If not, PROCEED TO STEP 3. If one or more parameters have been recently altered significantly, PROCEED TO Section F and determine whether there is sufficient evidence that hydrophytic vegetation, hydric soils, and/or wetland hydrology were present on the area prior to alteration. Then return to this section and characterize parameters not significantly influenced by human activities. PROCEED TO STEP 3.

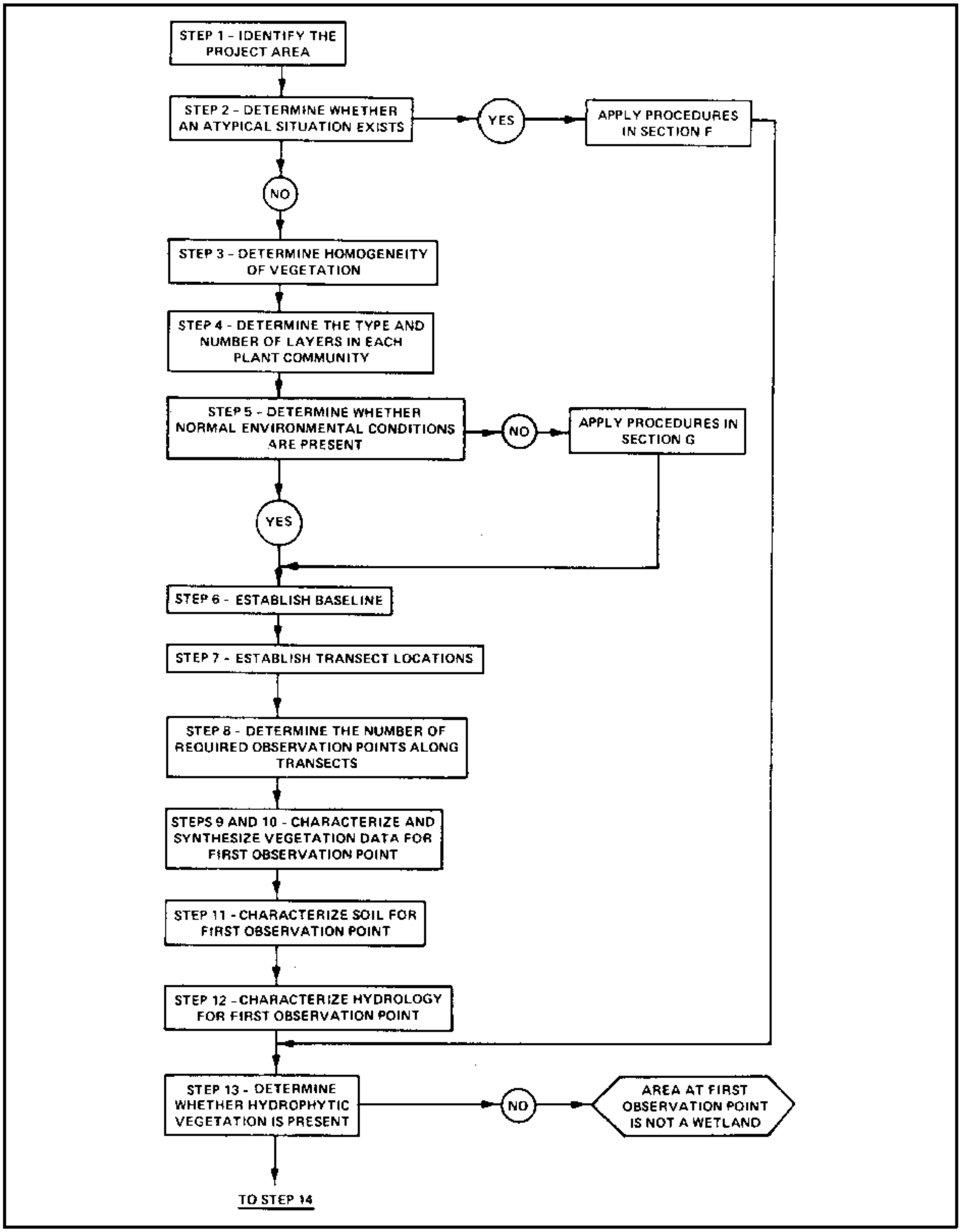


Figure 16. Flowchart of steps involved in making a comprehensive wetland determination (Section E) (Continued)

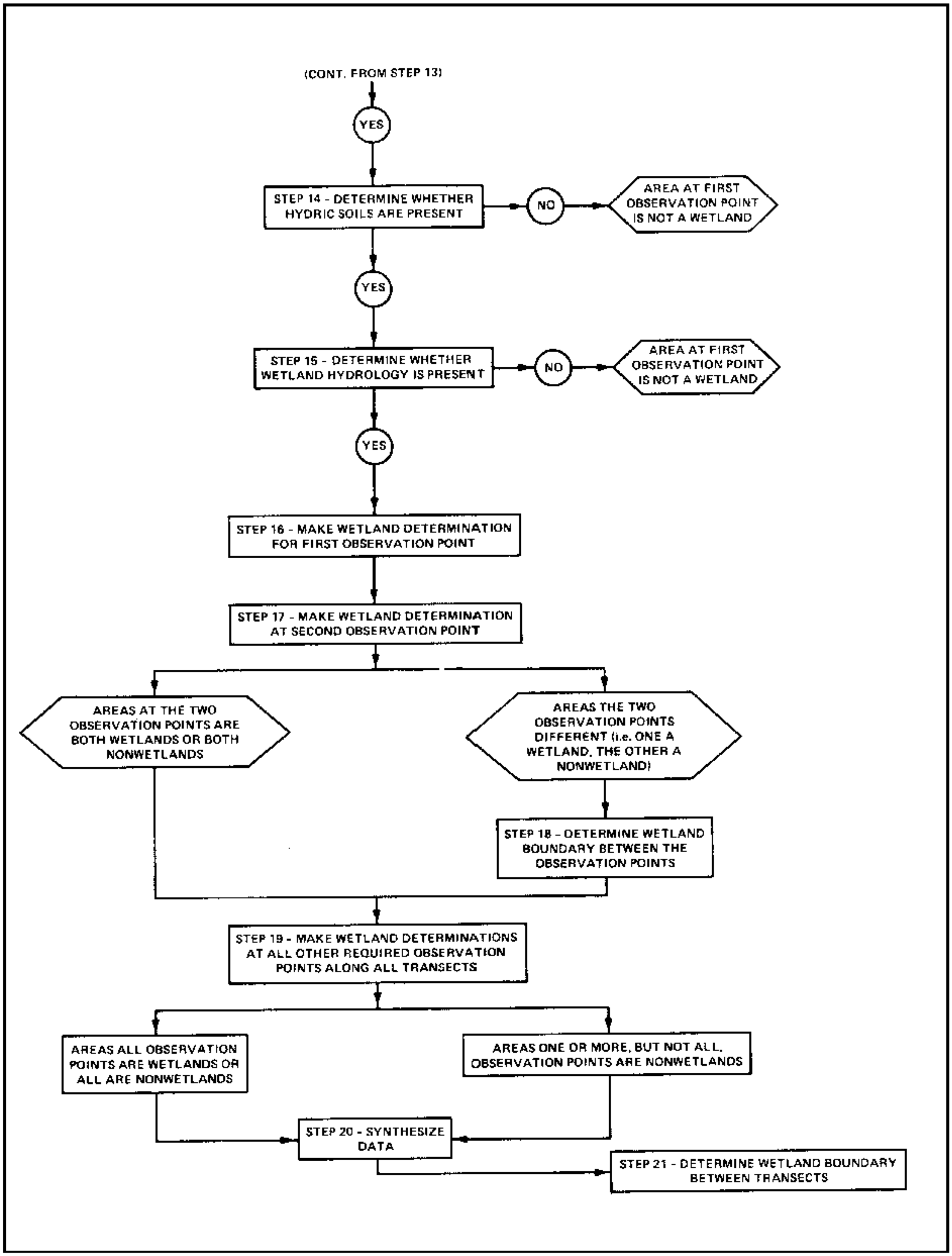


Figure 16. (Concluded)

- *STEP 3 - Determine homogeneity of vegetation.* While completing STEP 2, determine the number of plant community types present. Mark the approximate location of each community type on the base map. The number and locations of required wetland determinations will be strongly influenced by both the size of the area and the number and distribution of plant community types; the larger the area and greater the number of plant community types, the greater the number of required wetland determinations. It is imperative that all plant community types occurring in all portions of the area be included in the investigation. PROCEED TO STEP 4.

- *STEP 4 - Determine the type and number of layers in each plant community.* Examine each identified plant community type and determine the type(s) and number of layers in each community. Potential layers include trees (woody overstory), saplings/shrubs (woody understory), herbs (herbaceous understory), and/or woody vines. PROCEED TO STEP 5.

- *STEP 5 - Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present at the observation point by considering the following:

    a. Is the area at the observation point presently lacking hydrophytic vegetation and/or hydrologic indicators due to annual or seasonal fluctuations in precipitation or groundwater levels?

    b. Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

  If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 6.

- *STEP 6 - Establish a baseline.* Select one project boundary area as a baseline. The baseline should extend parallel to any major watercourse and/or perpendicular to a topographic gradient (see Figure 17). Determine the baseline length and record on the base map both the baseline length and its compass heading. PROCEED TO STEP 7.

- *STEP 7 - Establish transect locations.* Divide the baseline into a number of equal segments (Figure 17). Use the following as a guide to determine the appropriate number of baseline segments:

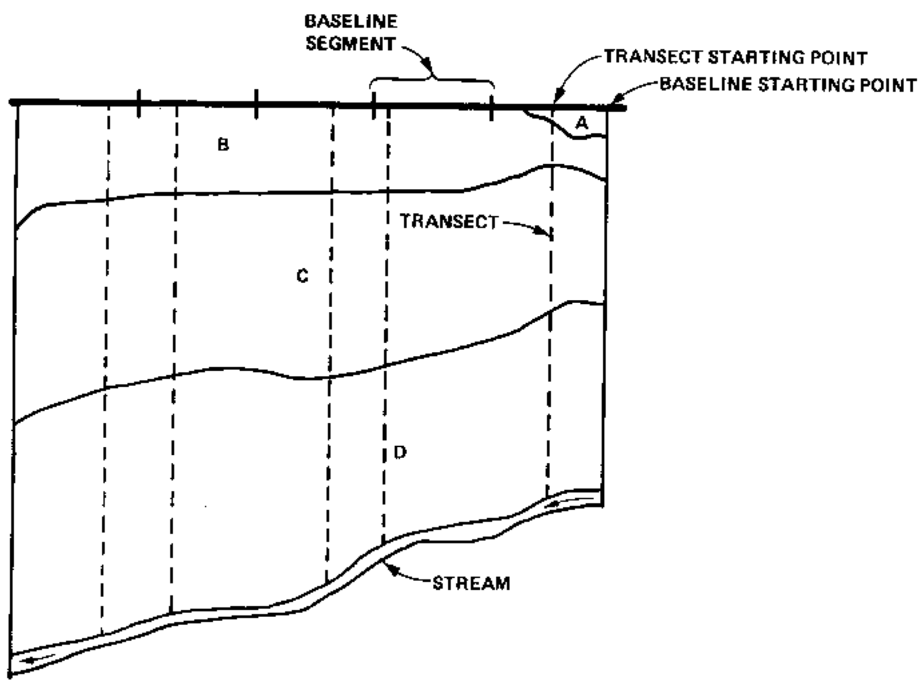


Figure 17. General orientation of baseline and transects in a hypothetical project area. Alpha characters represent different plant communities. Transect positions were determined using a random numbers table

Baseline Length, ft	Number of Segments	Length of Baseline Segment, ft
>50 - 500	3	18 - 167
>500 - 1,000	3	167 - 333
>1,000 - 5,000	5	200 - 1,000
>5,000 - 10,000	7	700 - 1,400
>10,000[1]	Variable	2,000

[1] If the baseline exceeds 5 miles, baseline segments should be 0.5 mile in length.

Use a random numbers table or a calculator with a random numbers generation feature to determine the position of a transect starting point within each baseline segment. For example, when the baseline is 4,000 ft, the number of baseline segments will be five, and the baseline segment length will be 4,000/5 = 800 ft. Locate the first transect within the first 800 ft of the baseline. If the random numbers table yields 264 as the distance from the baseline starting point, measure 264 ft from the baseline starting point and establish the starting point of the first transect. If the second random number selected is 530, the starting point of the second transect will be located at a distance of 1,330 ft (800 + 530 ft) from the baseline starting point. *CAUTION: Make sure that each plant community type is included in at least one transect. If not, modify the sampling design accordingly.* When the starting point locations for all required transects have been determined, PROCEED TO STEP 8.

- *STEP 8 - Determine the number of required observation points along transects.* The number of required observation points along each transect will be largely dependent on transect length. Establish observation points along each transect using the following as a guide:

Transect Length, ft	Number of Observation Points	Interval Between Observation Points, ft
<1,000	2-10	100
1,000 - <5,000	10	100 - 500
5,000 - <10,000	10	500 - 1,000
10,000	>10	1,000

Establish the first observation point at a distance of 50 ft from the baseline (Figure 17). When obvious nonwetlands occupy a long portion of the transect from the baseline starting point, establish the first observation point in the obvious nonwetland at a distance of approximately 300 ft from the point that the obvious nonwetland begins to intergrade into a potential wetland community type. Additional observation points must also be established to determine the wetland boundary between successive regular observation points when one of the points is a wetland and the other is a nonwetland. *CAUTION: In large areas having a mosaic of plant community types, several wetland boundaries may occur along the same transect.* PROCEED TO STEP 9 and apply the comprehensive wetland determination procedure at each required observation point. Use the described procedure to simultaneously characterize the vegetation, soil, and hydrology at each required observation point along each transect, and use the resulting characterization to make a wetland determination at each point. *NOTE: ALL required wetland boundary determinations should be made while proceeding along a transect.*

- *STEP 9 - Characterize the vegetation at the first observation point along the first transect.*[1] Record on DATA FORM 2 the vegetation occurring

---

1 There is no single best procedure for characterizing vegetation. Methods described in STEP 9 afford standardization of the procedure. However, plot size and descriptors for determining dominance may vary.

at the first observation point along the first transect by completing the following (as appropriate):

a. *Trees.* Identify each tree occurring within a 30-ft radius[1] of the observation point, measure its basal area (square inches) or diameter at breast height (DBH) using a basal area tape or diameter tape, respectively, and record. *NOTE: If DBH is measured, convert values to basal area by applying the formula* $A = \pi r^2$. *This must be done on an individual basis.* A tree is any nonclimbing, woody plant that has a DBH of ≥ 3.0 in., regardless of height.

b. *Saplings/shrubs.* Identify each sapling/shrub occurring within a 10-ft radius of the observation point, estimate its height, and record the midpoint of its class range using the following height classes (height is used as an indication of dominance; taller individuals exert a greater influence on the plant community):

Height Class	Height Class Range, ft	Midpoint of Range, ft
1	1-3	2
2	3-5	4
3	5-7	6
4	7-9	8
5	9-11	10
6	>11	12

A sapling/shrub is any woody plant having a height >3.2 ft but a stem diameter of <3.0 in., exclusive of woody vines.

c. *Herbs.* Place a 3.28- by 3.28-ft quadrat with one corner touching the observation point and one edge adjacent to the transect line. As an alternative, a 1.64-ft-radius plot with the center of the plot representing the observation point position may be used. Identify each plant species with foliage extending into the quadrat and estimate its percent cover by applying the following cover classes:

[1] A larger sampling plot may be necessary when trees are large and widely spaced.

Cover Class	Class Range, Percent	Midpoint of Class Range, Percent
1	0-5	2.5
2	>5-25	15.0
3	>25-50	37.5
4	>50-75	62.5
5	>75-95	85.0
6	>95-100	97.5

Include all nonwoody plants and woody plants <3.2 ft in height. *NOTE: Total percent cover for all species will often exceed 100 percent.*

d. *Woody vines (lianas).* Identify species of woody vines climbing each tree and sapling/shrub sampled in STEPS 9*a* and 9*b* above, and record the number of stems of each. Since many woody vines branch profusely, count or estimate the number of stems at the ground surface. Include only individuals rooted in the 10-ft radius plot. Do not include individuals <3.2 ft in height. PROCEED TO STEP 10.

- *STEP 10 - Analyze field vegetation data.* Examine the vegetation data (STEP 9) and determine the dominant species in each vegetation layer[1] by completing the following:

a. *Trees.* Obtain the total basal area (square inches) for each tree species identified in STEP 9*a* by summing the basal area of all individuals of a species found in the sample plot. Rank the species in descending order of dominance based on total basal area. Complete DATA FORM 2 for the tree layer.

b. *Saplings/shrubs.* Obtain the total height for each sapling/shrub species identified in STEP 9*b*. Total height, which is an estimate of dominance, is obtained by summing the midpoints of height classes for all individuals of a species found in the sample plot. Rank the species in descending order of dominance based on sums of midpoints of height class ranges. Complete DATA FORM 2 for the sapling/shrub layer.

c. *Herbs.* Obtain the total cover for each herbaceous and woody seedling species identified in STEP 9*c*. Total cover is obtained by using the midpoints of the cover class range as-

[1] The same species may occur as a dominant in more than one vegetation layer.

signed to each species (only one estimate of cover is made for a species in a given plot). Rank herbs and woody seedlings in descending order of dominance based on percent cover. Complete DATA FORM 2 for the herbaceous layer.

d. *Woody vines (lianas).* Obtain the total number of individuals of each species of woody vine identified in STEP 9*d*. Rank the species in descending order of dominance based on number of stems. Complete DATA FORM 2 for the woody vine layer. PROCEED TO STEP 11.

- *STEP 11 - Characterize soil.* If a soil survey is available (Section B), the soil type may already be known. Have a soil scientist confirm that the soil type is correct, and determine whether the soil series is a hydric soil ~~(Appendix D, Section 2)~~. *CAUTION: Mapping units on soil surveys sometimes have inclusions of soil series or phases not shown on the soil survey map.* If a hydric soil type is confirmed, record on DATA FORM 1 and PROCEED TO STEP 12. If not, dig a soil pit using a soil auger or spade (See Appendix D, Section 1) and look for indicators of hydric soils immediately below the A-horizon or 10 inches (whichever is shallower) (Part III, paragraphs 44 and/or 45). Record findings on DATA FORM 1. PROCEED TO STEP 12.

- *STEP 12 - Characterize hydrology.* Examine the observation point for indicators of wetland hydrology (Part III, paragraph 49) and record observations on DATA FORM 1. Consider indicators in the same sequence as listed in paragraph 49. PROCEED TO STEP 13.

- *STEP 13 - Determine whether hydrophytic vegetation is present.* Record the three dominant species from each vegetation layer (five species if only one or two layers are present) on DATA FORM 1.[1] Determine whether these species occur in wetlands by considering the following:

  a. *More than 50 percent of the dominant plant species are OBL, FACW, and/or FAC*[2] *on lists of plant species that occur in wetlands.* Record the indicator status of all dominant species ~~(Appendix C, Section 1 or 2)~~ on DATA FORM 1. Hydrophytic vegetation is present when the majority of the dominant species have an indicator status of OBL, FACW, or FAC. *CAUTION: Not necessarily all plant communities composed of only FAC species are hydrophytic communities. They are hydrophytic communities only when positive indicators of hydric soils and wetland hydrology are also found.* If this indicator is satisfied, complete the vegetation portion of

---

[1] Record all dominant species when less than three are present in a vegetation layer.
[2] For the FAC-neutral option, see paragraph 35*a*.

DATA FORM 1 and PROCEED TO STEP 14. If not, consider other indicators of hydrophytic vegetation.

b. *Presence of adaptations for occurrence in wetlands.* Do any of the species listed on DATA FORM 1 have observed morphological or known physiological adaptations (Appendix C, Section 3) for occurrence in wetlands? If so, record species having such adaptations on DATA FORM 1. When two or more dominant species have observed morphological adaptations or known physiological adaptations for occurrence in wetlands, hydrophytic vegetation is present. If so, complete the vegetation portion of DATA FORM 1 and PROCEED TO STEP 14. If not, consider other indicators of hydrophytic vegetation.

c. *Other indicators of hydrophytic vegetation.* Consider other indicators (see Part III, paragraph 35) that the species listed on DATA FORM 1 are commonly found in wetlands. If so, complete the vegetation portion of DATA FORM 1 by recording sources of supporting information, and PROCEED TO STEP 14. If no indicator of hydrophytic vegetation is present, the area at the observation point is not a wetland. In such cases, it is unnecessary to consider soil and hydrology at that observation point. PROCEED TO STEP 17.

- *STEP 14 - Determine whether hydric soils are present.* Examine DATA FORM 1 and determine whether any indicator of hydric soils is present. If so, complete the soils portion of DATA FORM 1 and PROCEED TO STEP 15. If not, the area at the observation point is not a wetland. PROCEED TO STEP 17.

- *STEP 15 - Determine whether wetland hydrology is present.* Examine DATA FORM 1 and determine whether any indicator of wetland hydrology is present. Complete the hydrology portion of DATA FORM 1 and PROCEED TO STEP 16.

- *STEP 16 - Make wetland determination.* When the area at the observation point presently or normally has wetland indicators of all three parameters, it is a wetland. When the area at the observation point presently or normally lacks wetland indicators of one or more parameters, it is a nonwetland. PROCEED TO STEP 17.

- *STEP 17 - Make wetland determination at second observation point.* Locate the second observation point along the first transect and make a wetland determination by repeating procedures described in STEPS 9 through 16. When the area at the second observation point is the same as the area at the first observation point (i.e., both wetlands or both nonwetlands), PROCEED TO STEP 19. When the areas at the two observation points are different (i.e., one wetlands, the other nonwetlands), PROCEED TO STEP 18.

- *STEP 18 - Determine the wetland boundary between observation points.* Determine the position of the wetland boundary by applying the following procedure:

  a. Look for a change in vegetation or topography. *NOTE: The changes may sometimes be very subtle.* If a change is noted, establish an observation point and repeat STEPS 9 through 16. Complete a DATA FORM 1. If the area at this point is a wetland, proceed toward the nonwetland observation point until a more obvious change in vegetation or topography is noted and repeat the procedure. If there is no obvious change, establish the next observation point approximately halfway between the last observation point and the nonwetland observation point and repeat STEPS 9 through 16.

  b. Make as many additional wetland determinations as necessary to find the wetland boundary. *NOTE: The completed DATA FORM 1's for the original two observation points often will provide a clue as to the parameters that change between the two points.*

  c. When the wetland boundary is found, mark the boundary location on the base map and indicate on the DATA FORM 1 that this represents a wetland boundary. Record the distance of the boundary from one of the two regular observation points. Since the regular observation points represent known distances from the baseline, it will be possible to accurately pinpoint the boundary location on the base map. PROCEED TO STEP 19.

- *STEP 19 - Make wetland determinations at all other required observation points along all transects.* Continue to locate and sample all required observation points along all transects. *NOTE: The procedure described in STEP 18 must be applied at every position where a wetland boundary occurs between successive observation points.* Complete a DATA FORM 1 for each observation point and PROCEED TO STEP 20.

- *STEP 20 - Synthesize data to determine the portion of the area containing wetlands.* Examine all completed copies of DATA FORM 1 (STEP 19), and mark on a copy of the base map the locations of all observation points that are wetlands with a W and all observation points that are nonwetlands with an N. Also, mark all wetland boundaries occurring along transects with an X. If all the observation points are wetlands, the entire area is wetlands. If all observation points are nonwetlands, none of the area is wetlands. If some wetlands and some nonwetlands are present, connect the wetland boundaries (X) by following contour lines between transects. *CAUTION: If the determination is considered to be* *highly controversial, it may be necessary to be more precise in determining the wetland boundary between transects. This is also true for very large areas where the distance between transects is greater. If this is necessary, PROCEED TO STEP 21.*

- *STEP 21 - Determine wetland boundary between transects.* Two procedures may be used to determine the wetland boundary between transects, both of which involve surveying:

  a. *Survey contour from wetland boundary along transects.* The first method involves surveying the elevation of the wetland boundaries along transects and then extending the survey to determine the same contour between transects. This procedure will be adequate in areas where there is no significant elevational change between transects. However, if a significant elevational change occurs between transects, either the surveyor must adjust elevational readings to accommodate such changes or the second method must be used. *NOTE: The surveyed wetland boundary must be examined to ensure that no anomalies exist. If these occur, additional wetland determinations will be required in the portion of the area where the anomalies occur, and the wetland boundary must be adjusted accordingly.*

  b. *Additional wetland determinations between transects.* This procedure consists of traversing the area between transects and making additional wetland determinations to locate the wetland boundary at sufficiently close intervals (not necessarily standard intervals) so that the area can be surveyed. Place surveyor flags at each wetland boundary location. Enlist a surveyor to survey the points between transects. From the resulting survey data, produce a map that separates wetlands from nonwetlands.

Section F. Atypical Situations

71. Methods described in this section should be used only when a determination has already been made in Section D or E that positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology could not be found due to effects of recent human activities or natural events. This section is applicable to delineations made in the following types of situations:

a. *Unauthorized activities.* Unauthorized discharges requiring enforcement actions may result in removal or covering of indicators of one or more wetland parameters. Examples include, but are not limited to: (1) alteration or removal of vegetation; (2) placement of dredged or fill material over hydric soils; and/or (3) construction of levees, drainage systems, or dams that significantly alter the area hydrology. NOTE: This section should not be used for activities that have been previously authorized or those that are exempted from CE regulation. For example, this section is not applicable to areas that have been drained under CE authorization or that did not require CE authorization. Some of these areas may still be wetlands, but procedures described in Section D or E must be used in these cases.

b. *Natural events.* Naturally occurring events may result in either creation or alteration of wetlands. For example, recent beaver dams may impound water, thereby resulting in a shift of hydrology and vegetation to wetlands. However, hydric soil indicators may not have developed due to insufficient time having passed to allow their development. Fire, avalanches, volcanic activity, and changing river courses are other examples. *NOTE: It is necessary to determine whether alterations to an area have resulted in changes that are now the "normal circumstances."* The relative permanence of the change and whether the area is now functioning as a wetland must be considered.

c. *Man-induced wetlands.* Procedures described in Subsection 4 are for use in delineating wetlands that have been purposely or incidentally created by human activities, but in which wetland indicators of one or more parameters are absent. For example, road construction may have resulted in impoundment of water in an area that previously was nonwetland, thereby effecting hydrophytic vegetation and wetland hydrology in the area. However, the area may lack hydric soil indicators. *NOTE: Subsection D is not intended to bring into CE jurisdiction those manmade wetlands that are exempted under CE regulations or policy.* It is also important to consider whether the man-induced changes are now the "normal circumstances" for the area. Both the relative permanence of the change and the functioning of the area as a wetland are implied.

72. When any of the three types of situations described in paragraph 71 occurs, application of methods described in Sections D and/or E will lead to the conclusion that the area is not a wetland because positive wetland indicators for at least one of the three parameters will be absent. Therefore, apply procedures described in one of the following subsections (as appropriate) to determine whether positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology existed prior to alteration of the area. Once these procedures have been employed, RETURN TO Section D or E to make a wetland determination. PROCEED TO the appropriate subsection.

Subsection 1 - Vegetation

73. Employ the following steps to determine whether hydrophytic vegetation previously occurred:

- *STEP 1 - Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of selective harvesting, clear cutting, bulldozing, recent conversion to agriculture, or other activities (e.g., burning, discing, or presence of buildings, dams, levees, roads, parking lots, etc.). Determine the approximate date[1] when the alteration occurred. Record observations on DATA FORM 3, and PROCEED TO STEP 2.

- *STEP 2 - Describe effects on vegetation.* Record on DATA FORM 3 a general description of how the activities (STEP 1) have affected the plant communities. Consider the following:

  a. Has all or a portion of the area been cleared of vegetation?

  b. Has only one layer of the plant community (e.g., trees) been removed?

  c. Has selective harvesting resulted in removal of some species?

  d. Has all vegetation been covered by fill, dredged material, or structures?

  e. Have increased water levels resulted in the death of some individuals?

  PROCEED TO STEP 3.

- *STEP 3 - Determine the type of vegetation that previously occurred.* Obtain all possible evidence of the type of plant communities that occurred in the area prior to alteration. Potential sources of such evidence include:

  a. *Aerial photography*. Recent (within 5 years) aerial photography can often be used to document the type of previous vegetation. The general type of plant communities formerly present can usually be determined, and species identification is sometimes possible.

  b. *Onsite inspection.* Many types of activities result in only partial removal of the previous plant communities, and remaining species may be indicative of hydrophytic vegetation. In other cases, plant fragments (e.g., stumps, roots) may be used to reconstruct the plant community types that occurred prior to site alteration. Sometimes, this can be determined by examining piles of debris resulting from land-clearing opera-

[1] It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

tions or excavation to uncover identifiable remains of the previous plant community.

c. *Previous site inspections.* Documented evidence from previous inspections of the area may describe the previous plant communities, particularly in cases where the area was altered after a permit application was denied.

d. *Adjacent vegetation.* Circumstantial evidence of the type of plant communities that previously occurred may sometimes be obtained by examining the vegetation in adjacent areas. If adjacent areas have the same topographic position, soils, and hydrology as the altered area, the plant community types on the altered area were probably similar to those of the adjacent areas.

e. *SCS records.* Most SCS soil surveys include a description of the plant community types associated with each soil type. If the soil type on the altered area can be determined, it may be possible to generally determine the type of plant communities that previously occurred.

f. *Permit applicant.* In some cases, the permit applicant may provide important information about the type of plant communities that occurred prior to alteration.

g. *Public.* Individuals familiar with the area may provide a good general description of the previously occurring plant communities.

h. *NWI wetland maps.* The NWI has developed wetland type maps for many areas. These may be useful in determining the type of plant communities that occurred prior to alteration.

To develop the strongest possible record, all of the above sources should be considered. If the plant community types that occurred prior to alteration can be determined, record them on DATA FORM 3 and also record the basis used for the determination. PROCEED TO STEP 4. If it is impossible to determine the plant community types that occurred on the area prior to alteration, a determination cannot be made using all three parameters. In such cases, the determination must be based on the other two parameters. PROCEED TO Subsection 2 or 3 if one of the other parameters has been altered, or return to the appropriate Subsection of Section D or to Section E, as appropriate.

- *STEP 4 - Determine whether plant community types constitute hydrophytic vegetation.* Develop a list of species that previously occurred on the site (DATA FORM 3). Subject the species list to applicable indicators of hydrophytic vegetation (Part III, paragraph 35). If none of the indicators are met, the plant communities that previously occurred did not constitute hydrophytic vegetation. If hydrophytic vegetation was present and no other parameter was in question, record appropriate data on the vegetation portion of DATA FORM 3, and return to either the appropriate subsection of Section D or to Section E. If either of the other parameters was also in question, PROCEED TO Subsection 2 or 3.

Subsection 2 - Soils

74. Employ the following steps to determine whether hydric soils previously occurred:

- *STEP 1 - Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of:

    a. *Deposition of dredged or fill material or natural sedimentation.* In many cases the presence of fill material will be obvious. If so, it will be necessary to dig a hole to reach the original soil (sometimes several feet deep). Fill material will usually be a different color or texture than the original soil (except when fill material has been obtained from like areas onsite). Look for decomposing vegetation between soil layers and the presence of buried organic or hydric soil layers. In accreting or recently formed sandbars in riverine situations, the soils may support hydrophytic vegetation but lack hydric soil characteristics.

    b. *Presence of nonwoody debris at the surface.* This can only be applied in areas where the original soils do not contain rocks. Nonwoody debris includes items such as rocks, bricks, and concrete fragments.

    c. *Subsurface plowing.* Has the area recently been plowed below the A-horizon or to depths of greater than 10 in.?

    d. *Removal of surface layers.* Has the surface soil layer been removed by scraping or natural landslides? Look for bare soil surfaces with exposed plant roots or scrape scars on the surface.

    e. *Presence of man-made structures.* Are buildings, dams, levees, roads, or parking lots present?

Determine the approximate date[1] when the alteration occurred. This may require checking aerial photography, examining building permits, etc. Record on DATA FORM 3, and PROCEED TO STEP 2.

- *STEP 2 - Describe effects on soils.* Record on DATA FORM 3 a general description of how identified activities in STEP 1 have affected the soils. Consider the following:

  a. Has the soil been buried? If so, record the depth of fill and determine whether the original soil is intact.

  b. Has the soil been mixed at a depth below the A-horizon or 10 inches? If so, it will be necessary to examine soil at a depth immediately below the plowed zone. Record supporting evidence.

  c. Has the soil been sufficiently altered to change the soil phase? Describe these changes.

  PROCEED TO STEP 3.

- *STEP 3 - Characterize soils that previously occurred.* Obtain all possible evidence that may be used to characterize soils that previously occurred on the area. Consider the following potential sources of information:

  a. *Soil surveys.* In many cases, recent soil surveys will be available. If so, determine the soil series that were mapped for the area, and compare these soil series with the list of hydric soils ~~(Appendix D, Section 2)~~. If all soil series are listed as hydric soils, the entire area had hydric soils prior to alteration.

  b. *Characterization of buried soils.* When fill material has been placed over the original soil without physically disturbing the soil, examine and characterize the buried soils. To accomplish this, dig a hole through the fill material until the original soil is encountered. Determine the point at which the original soil material begins. Remove 12 inches of the original soil from the hole and look for indicators of hydric soils (Part III, paragraphs 44 and/or 45) immediately below the A-horizon or 10 inches (whichever is shallower). Record on DATA FORM 3 the color of the soil matrix, presence of an organic layer, presence of mottles or gleying, and/or presence of iron and manganese concretions. If the original soil is mottled and the

[1] It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

chroma of the soil matrix is 2 or less,[1] a hydric soil was formerly present on the site. If any of these indicators are found, the original soil was a hydric soil. *(NOTE: When the fill material is a thick layer, it might be necessary to use a backhoe or posthole digger to excavate the soil pit.)* If USGS quadrangle maps indicate distinct variation in area topography, this procedure must be applied in each portion of the area that originally had a different surface elevation. Record findings on DATA FORM 3.

c. *Characterization of plowed soils.* Determine the depth to which the soil has been disturbed by plowing. Look for hydric soil characteristics (Part III, paragraphs 44 and/or 45) immediately below this depth. Record findings on DATA FORM 3.

d. *Removal of surface layers.* Dig a hole (Appendix D, Section 1) and determine whether the entire surface layer (A-horizon) has been removed. If so, examine the soil immediately below the top of the subsurface layer (B-horizon) for hydric soil characteristics. As an alternative, examine an undisturbed soil of the same soil series occurring in the same topographic position in an immediately adjacent area that has not been altered. Look for hydric soil indicators immediately below the A-horizon or 10 inches (whichever is shallower), and record findings on DATA FORM 3.

If sufficient data on soils that existed prior to alteration can be obtained to determine whether a hydric soil was present, PROCEED TO STEP 4. If not, a determination cannot be made using soils. Use the other parameters (Subsections 1 and 3) for the determination.

- *STEP 4 - Determine whether hydric soils were formerly present.* Examine the available data and determine whether indicators of hydric soils (Part III, paragraphs 44 and/or 45) were formerly present. If no indicators of hydric soils were found, the original soils were not hydric soils. If indicators of hydric soils were found, record the appropriate indicators on DATA FORM 3 and PROCEED TO Subsection 3 if the hydrology of the area has been significantly altered or return either to the appropriate subsection of Section D or to Section E and characterize the area hydrology.

[1] The matrix chroma must be 1 or less if no mottles are present. The soil must be moist when colors are determined.

Subsection 3 - Hydrology

75. Apply the following steps to determine whether wetland hydrology previously occurred:

- *STEP 1 - Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of:

  a. *Dams.* Has recent construction of a dam or some natural event (e.g., beaver activity or landslide) caused the area to become increasingly wetter or drier? *NOTE: This activity could have occurred a considerable distance away from the site in question.*

  b. *Levees, dikes, and similar structures.* Have levees or dikes recently been constructed that prevent the area from becoming periodically inundated by overbank flooding?

  c. *Ditching.* Have ditches been constructed recently that cause the area to drain more rapidly following inundation?

  d. *Filling of channels or depressions (land-leveling).* Have natural channels or depressions been recently filled?

  e. *Diversion of water.* Has an upstream drainage pattern been altered that results in water being diverted from the area?

  f. *Ground-water extraction.* Has prolonged and intensive pumping of ground water for irrigation or other purposes significantly lowered the water table and/or altered drainage patterns?

  g. *Channelization.* Have feeder streams recently been channelized sufficiently to alter the frequency and/or duration of inundation?

  Determine the approximate date[1] when the alteration occurred. Record observations on DATA FORM 3 and PROCEED TO STEP 2.

- *STEP 2 - Describe effects of alteration on area hydrology.* Record on DATA FORM 3 a general description of how the observed alteration (STEP 1) has affected the area. Consider the following:

  a. Is the area more frequently or less frequently inundated than prior to alteration? To what degree and why?

---

[1] It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

b. Is the duration of inundation and soil saturation different than prior to alteration? How much different and why?

PROCEED TO STEP 3.

- *STEP 3 - Characterize the hydrology that previously existed in the area.* Obtain all possible evidence that may be used to characterize the hydrology that previously occurred. Potential sources of information include:

  a. *Stream or tidal gage data.* If a stream or tidal gaging station is located near the area, it may be possible to calculate elevations representing the upper limit of wetlands hydrology based on duration of inundation. Consult hydrologists from the local CE District Office for assistance. The resulting mean sea level elevation will represent the upper limit of inundation for the area in the absence of any alteration. If fill material has not been placed on the area, survey this elevation from the nearest USGS benchmark. Record elevations representing zone boundaries on DATA FORM 3. If fill material has been placed on the area, compare the calculated elevation with elevations shown on a USGS quadrangle or any other survey map that predated site alteration.

  b. *Field hydrologic indicators.* Certain field indicators of wetland hydrology (Part III, paragraph 49) may still be present. Look for watermarks on trees or other structures, drift lines, and debris deposits. Record these on DATA FORM 3. If adjacent undisturbed areas are in the same topographic position and are similarly influenced by the same sources of inundation, look for wetland indicators in these areas.

  c. *Aerial photography.* Examine any available aerial photography and determine whether the area was inundated at the time of the photographic mission. Consider the time of the year that the aerial photography was taken and use only photography taken during the growing season and prior to site alteration.

  d. *Historical records.* Examine any available historical records for evidence that the area has been periodically inundated. Obtain copies of any such information and record findings on DATA FORM 3.

  e. *Floodplain management maps.* Determine the previous frequency of inundation of the area from Floodplain Management Maps (if available). Record flood frequency on DATA FORM 3.

f. *Public or local government officials.* Contact individuals who might have knowledge that the area was periodically inundated.

If sufficient data on hydrology that existed prior to site alteration can be obtained to determine whether wetland hydrology was previously present, PROCEED TO STEP 4. If not, a determination involving hydrology cannot be made. Use other parameters (Subsections 1 and 2) for the wetland determination. Return to either the appropriate subsection of Section D or to Section E and complete the necessary data forms. PROCEED TO STEP 4 if the previous hydrology can be characterized.

- *STEP 4 - Determine whether wetland hydrology previously occurred.* Examine the available data and determine whether indicators of wetland hydrology (Part III, paragraph 49) were present prior to site alteration. If no indicators of wetland hydrology were found, the original hydrology of the area was not wetland hydrology. If indicators of wetland hydrology were found, record the appropriate indicators on DATA FORM 3 and return either to the appropriate subsection of Section D or to Section E and complete the wetland determination.

Subsection 4 - Man-Induced Wetlands

76. A man-induced wetland is an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities. Examples of man-induced wetlands include irrigated wetlands, wetlands resulting from impoundment (e.g., reservoir shorelines), wetlands resulting from filling of formerly deepwater habitats, dredged material disposal areas, and wetlands resulting from stream channel realignment. Some man-induced wetlands may be subject to Section 404. In virtually all cases, man-induced wetlands involve a significant change in the hydrologic regime, which may either increase or decrease the wetness of the area. Although wetland indicators of all three parameters (i.e., vegetation, soils, and hydrology) may be found in some man-induced wetlands, indicators of hydric soils are usually absent. Hydric soils require long periods (hundreds of years) for development of wetness characteristics, and most man-induced wetlands have not been in existence for a sufficient period to allow development of hydric soil characteristics. Therefore, application of the multiparameter approach in making wetland determinations in man-induced wetlands must be based on the presence of hydrophytic vegetation and wetland hydrology.[1] There must also be documented evidence that the wetland resulted from human activities. Employ the following steps to determine whether an area consists of wetlands resulting from human activities:

---

[1] Uplands that support hydrophytic vegetation due to agricultural irrigation and that have an obvious hydrologic connection to other "waters of the United States" should not be delineated as wetlands under this subsection.

- *STEP 1 - Determine whether the area represents a potential man-induced wetland.* Consider the following questions:

  a. Has a recent man-induced change in hydrology occurred that caused the area to become significantly wetter?

  b. Has a major man-induced change in hydrology that occurred in the past caused a former deepwater aquatic habitat to become significantly drier?

  c. Has man-induced stream channel realignment significantly altered the area hydrology?

  d. Has the area been subjected to long-term irrigation practices?

  If the answer to any of the above questions is YES, document the approximate time during which the change in hydrology occurred, and PROCEED TO STEP 2. If the answer to all of the questions is NO, procedures described in Section D or E must be used.

- *STEP 2 - Determine whether a permit will be needed if the area is found to be a wetland.* Consider the current CE regulations and policy regarding man-induced wetlands. If the type of activity resulting in the area being a potential man-induced wetland is exempted by regulation or policy, no further action is needed. If not exempt, PROCEED TO STEP 3.

- *STEP 3 - Characterize the area vegetation, soils, and hydrology.* Apply procedures described in Section D (routine determinations) or Section E (comprehensive determinations) to the area. Complete the appropriate data forms and PROCEED TO STEP 4.

- *STEP 4 - Wetland determination.* Based on information resulting from STEP 3, determine whether the area is a wetland. When wetland indicators of all three parameters are found, the area is a wetland. When indicators of hydrophytic vegetation and wetland hydrology are found *and* there is documented evidence that the change in hydrology occurred so recently that soils could not have developed hydric characteristics, the area is a wetland. In such cases, it is assumed that the soils are functioning as hydric soils. *CAUTION: If hydrophytic vegetation is being maintained only because of man-induced wetland hydrology that would no longer exist if the activity (e.g., irrigation) were to be terminated, the area should not be considered a wetland.*

Section G - Problem Areas

77. There are certain wetland types and/or conditions that may make application of indicators of one or more parameters difficult, at least at certain times of the year. These are not considered to be atypical situations. Instead, they are wetland types in which wetland indicators of one or more parameters may be periodically lacking due to *normal* seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events.

Types of problem areas

78. Representative examples of potential problem areas, types of variations that occur, and their effects on wetland indicators are presented in the following subparagraphs. Similar situations may sometimes occur in other wetland types. *NOTE: This section is not intended to bring nonwetland areas having wetland indicators of two, but not all three, parameters into Section 404 jurisdiction.*

a. *Wetlands on drumlins.* Slope wetlands occur in glaciated areas in which thin soils cover relatively impermeable glacial till or in which layers of glacial till have different hydraulic conditions that produce a broad zone of ground-water seepage. Such areas are seldom, if ever, flooded, but downslope groundwater movement keeps the soils saturated for a sufficient portion of the growing season to produce anaerobic and reducing soil conditions. This fosters development of hydric soil characteristics and selects for hydrophytic vegetation. Indicators of wetland hydrology may be lacking during the drier portion of the growing season.

b. *Seasonal wetlands.* In many regions (especially in western states), depressional areas occur that have wetland indicators of all three parameters during the wetter portion of the growing season, but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetland plant species ~~(Appendix C, Section 1 or 2)~~ normally are dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. These areas may be inundated during the wetter portion of the growing season, but wetland hydrology indicators may be totally lacking during the drier portion of the growing season. It is important to establish that an area truly is a water body. Water in a depression normally must be sufficiently persistent to exhibit an ordinary high-water mark or the presence of wetland characteristics before it can be considered as a water body potentially subject to Clean Water Act jurisdiction. The determination that an area exhibits wetland characteristics for a sufficient portion of the growing season to qualify as a wetland under the Clean Water Act must be made on a case-by-case basis. Such determinations should consider the respective length of time that the area exhibits upland and wetland characteristics, and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soil, drainage characteristics, uses to which it has been subjected, and weather or hydrologic records.

c. *Prairie potholes.* Prairie potholes normally occur as shallow depressions in glaciated portions of the north-central United States. Many are landlocked, while others have a drainage outlet to streams or other potholes. Most have standing water for much of the growing season in years of normal or above normal precipitation, but are neither inundated nor have saturated soils during most of the growing season in years of below normal precipitation. During dry years, potholes often become incorporated into farming plans, and are either planted to row crops (e.g., soybeans) or are mowed as part of a haying operation. When this occurs, wetland indicators of one or more parameters may be lacking. For example, tillage would eliminate any onsite hydrologic indicator, and would make detection of soil and vegetation indicators much more difficult.

d. *Vegetated flats.* In both coastal and interior areas throughout the Nation, vegetated flats are often dominated by annual species that are categorized as OBL. Application of procedures described in Sections D and E during the growing season will clearly result in a positive wetland determination. However, these areas will appear to be unvegetated mudflats when examined during the nongrowing season, and the area would not qualify at that time as a wetland due to an apparent lack of vegetation.

Wetland determinations in problem areas

79. Procedures for making wetland determinations in problem areas are presented below. Application of these procedures is appropriate only when a decision has been made in Section D or E that wetland indicators of one or more parameters were lacking, probably due to normal seasonal or annual variations in environmental conditions. Specific procedures to be used will vary according to the nature of the area, site conditions, and parameter(s) affected by the variations in environmental conditions. A determination must be based on the best evidence available to the field inspector, including:

a. Available information (Section B).

b. Field data resulting from an onsite inspection.

c. Basic knowledge of the ecology of the particular community type(s) and environmental conditions associated with the community type.

NOTE: The procedures described below should only be applied to parameters not adequately characterized in Section D or E. Complete the following steps:

- *STEP 1 - Identify the parameter(s) to be considered.* Examine the DATA FORM 1 (Section D or E) and identify the parameter(s) that must be given additional consideration. PROCEED TO STEP 2.

- *STEP 2 - Determine the reason for further consideration.* Determine the reason why the parameter(s) identified in STEP 1 should be given further consideration. This will require a consideration and documentation of:

  a. Environmental condition(s) that have impacted the parameter(s).

  b. Impacts of the identified environmental condition(s) on the parameter(s) in question.

  Record findings in the comments section of DATA FORM 1. PROCEED TO STEP 3.

- *STEP 3 - Document available information for parameter(s) in question.* Examine the available information and consider personal ecological knowledge of the range of normal environmental conditions of the area. Local experts (e.g., university personnel) may provide additional information. Record information on DATA FORM 1. PROCEED TO STEP 4.

- *STEP 4 - Determine whether wetland indicators are normally present during a portion of the growing season.* Examine the information resulting from STEP 3 and determine whether wetland indicators are *normally* present during part of the growing season. If so, record on DATA FORM 1 the indicators normally present and return to Section D or Section E and make a wetland determination. If no information can be found that wetland indicators of all three parameters are normally present during part of the growing season, the determination must be made using procedures described in Section D or Section E.

References

Clark, J. R., and Benforado, J., eds. (1981). *Wetlands of Bottomland Hardwood Forests, Proceedings of a Workshop on Bottomland Hardwood Forest Wetlands of the Southeastern United States*, Elsevier Scientific Publishing Company, New York.

Correll, D. S., and Correll, H. B. (1972). *Aquatic and Wetland Plants of the Southwestern United States*, Publ. No. 16030 DNL 01/72, Environmental Protection Agency, Washington, DC.

Cowardin, L. M., Carter, V., Golet, F. C., and LaRoe, E. T. (1979). "Classification of Wetlands and Deepwater Habitats of the United States," FWS/OBS-79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, DC.

Cronquist, A., Holmgren, A. H., Holmgren, N. H., and Reveal, J. L. (1972). *Intermountain Flora - Vascular Plants of the Intermountain West, USA*, Vol. I and II, Hefner Publishing Company, New York.

Davis, R. J. (1952). *Flora of Idaho*, William C. Brown Company, Dubuque, IA.

Federal Register. (1980). "40 CFR Part 230: Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material," U.S. Government Printing Office, Washington, DC, 45(249), 85,352-85,353.

__________. (1982). "Title 33: Navigation and Navigable Waters; Chapter 2. Regulatory Programs of the Corps of Engineers," U.S. Government Printing Office, Washington, DC, 47(138), 31,810.

Fernald, M. L. (1950). *Gray's Manual of Botany*, 8th ed., American Book Company, New York.

Gleason, H. A., and Cronquist, A. (1963). *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, Van Nostrand, Princeton, NJ.

Godfrey, R. K., and Wooten, J. W. (1979). *Aquatic and Wetland Plants of the Southeastern United States*, Vol. I and II, University of Georgia Press, Athens, GA.

Harrington, H. D. (1979). *Manual of the Plants of Colorado*, 2nd ed., Sage Books, Denver, CO.

Hitchcock, A. S. (1950). *Manual of Grasses of the United States*, U.S. Department of Agriculture Miscellaneous Publication No. 200, U.S. Government Printing Office, Washington, DC.

Hitchcock, C. L., and Cronquist, A. (1973). *Flora of the Pacific Northwest*, University of Washington Press, Seattle, WA.

Kearney, T. H., and Peebles, R. H. (1960). *Arizona Flora*, 2nd ed., University of California Press, Berkeley, CA.

Long, R. W., and Lakela, O. (1976). *A Flora of Tropical Florida*, Banyan Books, Miami, FL.

Munsell Color. (1975). *Munsell Soil Color Charts*, Kollmorgen Corporation, Baltimore, MD.

Munz, P. A., and Keck, D. D. (1959). *A California Flora*, University of California Press, Berkeley, CA.

Radford, A. E., Ahles, H. E., and Bell, C. R. (1968). *Manual of the Vascular Flora of the Carolinas*, The University of North Carolina Press, Chapel Hill, NC.

Small, J. K. (1933). *Manual of the Southeastern Flora*, The University of North Carolina Press, Chapel Hill, NC.

Steyermark, J. A. (1963). *Flora of Missouri*, The Iowa State University Press, Ames, IA.

Theriot, R. F. (In Review). "Flood Tolerance Indices of Plant Species of Southeastern Bottomland Forests," Technical Report, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Department of Agriculture - Soil Conservation Service. (1975). *Soil Taxonomy*, Agriculture Handbook No. 436, U.S. Government Printing Office, Washington, DC.

__________. (1983). "List of Soils with Actual or High Potential for Hydric Conditions," USDA-SCS National Bulletin No. 430-3-10, Washington, DC.

U.S. Department of Agriculture - Soil Conservation Service. (1985). "Hydric Soils of the United States," USDA-SCS National Bulletin No. 430-5-9, Washington, DC.

U.S. Department of the Interior. (1970). *National Atlas of the United States*, U.S. Geological Survey, US Government Printing Office, Washington, DC, 110-111.

Bibliography

Copeland, B. J., Hodson, R. G., and Riggs, S. R. (1984). "The Ecology of the Pamlico River, North Carolina: An Estuarine Profile," FWS/OBS-82/06, U.S. Fish and Wildlife Service, Washington, DC.

Foster, M. S., and Schiel, D. R. (1985). "The Ecology of Giant Kelp Forests in California: A Community Profile," FWS/OBS-85(7.2), U.S. Fish and Wildlife Service, Washington, DC.

Gosselink, J. G. (1984). "The Ecology of Delta Marshes of Coastal Louisiana: A Community Profile," FWS/OBS-84/09, U.S. Fish and Wildlife Service, Washington, DC.

Hobbie, J. E. (1984). "The Ecology of Tundra Ponds of the Arctic Coastal Plain: A Community Profile," FWS/OBS-83/25, U.S. Fish and Wildlife Service, Washington, DC.

Huffman, R. T., and Tucker, G. E. (1984). "Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of Alaska," Technical Report Y-78-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Huffman, R. T., Tucker, G. E, Wooten, J. W., Limas, C. V., Feel, M. W., Forsythe, S. W., and Wilson, J. S. (1982). "Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the South Atlantic United States," Technical Report Y-78-7, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

__________. (1982). "Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the North Atlantic United States," Technical Report Y-78-8, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Japp, W. C. (1984). "The Ecology of the South Florida Coral Reefs: A Community Profile," FWS/OBS-82/08, U.S. Fish and Wildlife Service, Washington, DC.

Gasolene, M. (1983). "The Ecology of San Francisco Bay Tidal Marshes: A Community Profile," FWS/OBS-83/23, U.S. Fish and Wildlife Service, Washington, DC.

Livingston, R. J. (1984). "The Ecology of the Apalachicola Bay System: An Estuarine Profile," FWS/OBS-82/05, U.S. Fish and Wildlife Service, Washington, DC.

Nixon, S. W. (1982). "The Ecology of New England High Salt Marshes: A Community Profile," FWS/OBS-81/55, U.S. Fish and Wildlife Service, Washington, DC.

Odum, W. E., McIvor, C. C., and Smith, T. J., III. (1982). "The Ecology of the Mangroves of South Florida: A Community Profile," FWS/OBS-81/24, U.S. Fish and Wildlife Service, Washington, DC.

Odum, W. E., Smith, T. J., III, Hoover, J. K., and McIvor, C. C. (1984). "The Ecology of Tidal Freshwater Marshes of the United States East Coast: A Community Profile," FWS/OBS-83/17, U.S. Fish and Wildlife Service, Washington, DC.

Peterson, C. H., and Peterson, N. M. (1979). "The Ecology of Intertidal Flats of North Carolina: A Community Profile," FWS/OBS-79/39, U.S. Fish and Wildlife Service, Washington, DC.

Phillips, R. C. (1984). "The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile," FWS/OBS-84/24, U.S. Fish and Wildlife Service, Washington, DC.

Seliskar, D. M., and Gallagher, J. L. (1983). "The Ecology of Tidal Marshes of the Pacific Northwest Coast: A Community Profile," FWS/OBS-82/32, U.S. Fish and Wildlife Service, Washington, DC.

Sharitz, R. R., and Gibbons, J. W. (1982). "The Ecology of Southeastern Shrub Bogs (Pocosins) and Carolina Bays: A Community Profile," FWS/OBS-82/04, U.S. Fish and Wildlife Service, Washington, DC.

Thayer, G. W., Kenworthy, W. J., and Fonseca, M. S. (1984). "The Ecology of Eelgrass Meadows of the Atlantic Coast: A Community Profile," FWS/OBS-84/02, U.S. Fish and Wildlife Service, Washington, DC.

U.S. Army Corps of Engineers. (1978). "Preliminary Guide to Wetlands of Peninsular Florida," Technical Report Y-78-2, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

__________. (1978). "Preliminary Guide to Wetlands of Puerto Rico," Technical Report Y-78-3, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers. (1978). "Preliminary Guide to Wetlands of the West Coast States," Technical Report Y-78-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

__________. (1978). "Preliminary Guide to Wetlands of the Gulf Coastal Plain," Technical Report Y-78-5, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

__________. (1982). "Preliminary Guide to the Onsite Identification and Delineation of the Wetlands of the Interior United States," Technical Report Y-78-6, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Witlatch, R. B. (1982). "The Ecology of New England Tidal Flats: A Community Profile," FWS/OBS-81/01, U.S. Fish and Wildlife Service, Washington, DC.

Wharton, C. H., Kitchens, W. M., and Sipe, T. W. (1982). "The Ecology of Bottomland Hardwood Swamps of the Southeast: A Community Profile," FWS/OBS-81/37, U.S. Fish and Wildlife Service, Washington, DC.

Zedler, J. B. (1984). "The Ecology of Southern California Coastal Salt Marshes: A Community Profile," FWS/OBS-81/54, U.S. Fish and Wildlife Service, Washington, DC.

Zieman, J. C. (1982). "The Ecology of the Seagrasses of South Florida: A Community Profile," FWS/OBS-82/25, U.S. Fish and Wildlife Service, Washington, DC.

Appendix A
Glossary

Active water table. A condition in which the zone of soil saturation fluctuates, resulting in periodic anaerobic soil conditions. Soils with an active water table often contain bright mottles and matrix chromas of 2 or less.

Adaptation. A modification of a species that makes it more fit for existence under the conditions of its environment. These modifications are the result of genetic selection processes.

Adventitious roots. Roots found on plant stems in positions where they normally do not occur.

Aerenchymous tissue. A type of plant tissue in which cells are unusually large and arranged in a manner that results in air spaces in the plant organ. Such tissues are often referred to as spongy and usually provide increased buoyancy.

Aerobic. A situation in which molecular oxygen is a part of the environment.

Anaerobic. A situation in which molecular oxygen is absent (or effectively so) from the environment.

Aquatic roots. Roots that develop on stems above the normal position occupied by roots in response to prolonged inundation.

Aquic moisture regime. A mostly reducing soil moisture regime nearly free of dissolved oxygen due to saturation by ground water or its capillary fringe and occurring at periods when the soil temperature at 19.7 in. is greater than 5 °C.

Arched roots. Roots produced on plant stems in a position above the normal position of roots, which serve to brace the plant during and following periods of prolonged inundation.

Areal cover. A measure of dominance that defines the degree to which above-ground portions of plants (not limited to those rooted in a sample plot) cover the ground surface. It is possible for the total areal cover in a community to exceed 100 percent because (a) most plant communities consist of two or more vegetative strata; (b) areal cover is estimated by vegetative layer; and (c) foliage within a single layer may overlap.

Atypical situation. As used herein, this term refers to areas in which one or more parameters (vegetation, soil, and/or hydrology) have been sufficiently altered by recent human activities or natural events to preclude the presence of wetland indicators of the parameter.

Backwater flooding. Situations in which the source of inundation is overbank flooding from a nearby stream.

Basal area. The cross-sectional area of a tree trunk measured in square inches, square centimeters, etc. Basal area is normally measured at 4.5 ft above the ground level and is used as a measure of dominance. The most easily used tool for measuring basal area is a tape marked in square inches. When plotless methods are used, an angle gauge or prism will provide a means for rapidly determining basal area. This term is also applicable to the cross-sectional area of a clumped herbaceous plant, measured at 1.0 in. above the soil surface.

Bench mark. A fixed, more or less permanent reference point or object, the elevation of which is known. The U.S. Geological Survey (USGS) installs brass caps in bridge abutments or otherwise permanently sets bench marks at convenient locations nationwide. The elevations on these marks are referenced to the National Geodetic Vertical Datum (NGVD), also commonly known as mean sea level (MSL). Locations of these bench marks on USGS quadrangle maps are shown as small triangles. However, the marks are sometimes destroyed by construction or vandalism. The existence of any bench mark should be field verified before planning work that relies on a particular reference point. The USGS and/or local state surveyor's office can provide information on the existence, exact location, and exact elevation of bench marks.

Biennial. An event that occurs at 2-year intervals.

Buried soil. A once-exposed soil now covered by an alluvial, loessal, or other deposit (including man-made).

Canopy layer. The uppermost layer of vegetation in a plant community. In forested areas, mature trees comprise the canopy layer, while the tallest herbaceous species constitute the canopy layer in a marsh.

Capillary fringe. A zone immediately above the water table (zero gauge pressure) in which water is drawn upward from the water table by capillary action.

Chemical reduction. Any process by which one compound or ion acts as an electron donor. In such cases, the valence state of the electron donor is decreased.

Chroma. The relative purity or saturation of a color; intensity of distinctive hue as related to grayness; one of the three variables of color.

Comprehensive wetland determination. A type of wetland determination that is based on the strongest possible evidence, requiring the collection of quantitative data.

Concretion. A local concentration of chemical compounds (e.g., calcium carbonate, iron oxide) in the form of a grain or nodule of varying size, shape, hardness, and color. Concretions of significance in hydric soils are usually iron and/or manganese oxides occurring at or near the soil surface, which develop under conditions of prolonged soil saturation.

Contour. An imaginary line of constant elevation on the ground surface. The corresponding line on a map is called a "contour line."

Criteria. Standards, rules, or tests on which a judgment or decision may be based.

Deepwater aquatic habitat. Any open water area that has a mean annual water depth >6.6 ft, lacks soil, and/or is either unvegetated or supports only floating or submersed macrophytes.

Density. The number of individuals of a species per unit area.

Detritus. Minute fragments of plant parts found on the soil surface. When fused together by algae or soil particles, this is an indicator that surface water was recently present.

Diameter at breast height (DBH). The width of a plant stem as measured at 4.5 ft above the ground surface.

Dike. A bank (usually earthen) constructed to control or confine water.

Dominance. As used herein, a descriptor of vegetation that is related to the standing crop of a species in an area, usually measured by height, areal cover, or basal area (for trees).

Dominant species. As used herein, a plant species that exerts a controlling influence on or defines the character of a community.

Drained. A condition in which ground or surface water has been reduced or eliminated from an area by artificial means.

Drift line. An accumulation of debris along a contour (parallel to the water flow) that represents the height of an inundation event.

Duration (inundation/soil saturation). The length of time during which water stands at or above the soil surface (inundation), or during which the soil is saturated. As used herein, duration refers to a period during the growing season.

Ecological tolerance. The range of environmental conditions in which a plant species can grow.

Emergent plant. A rooted herbaceous plant species that has parts extending above a water surface.

Field capacity. The percentage of water remaining in a soil after it has been saturated and after free drainage is negligible.

Fill material. Any material placed in an area to increase surface elevation.

Flooded. A condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combination of sources.

Flora. A list of all plant species that occur in an area.

Frequency (inundation or soil saturation). The periodicity of coverage of an area by surface water or soil saturation. It is usually expressed as the number of years (e.g., 50 years) the soil is inundated or saturated at least once each year during part of the growing season per 100 years or as a l-, 2-, 5-year, etc., inundation frequency.

Frequency (vegetation). The distribution of individuals of a species in an area. It is quantitatively expressed as

$$\frac{\text{Number of samples containing species A}}{\text{Total number of samples}} \times 100$$

More than one species may have a frequency of 100 percent within the same area.

Frequently flooded. A flooding class in which flooding is likely to occur often under normal weather conditions (more than 50-percent chance of flooding in any year or more than 50 times in 100 years).

Gleyed. A soil condition resulting from prolonged soil saturation, which is manifested by the presence of bluish or greenish colors through the soil mass or in mottles (spots or streaks) among other colors. Gleying occurs under reducing soil conditions resulting from soil saturation, by which iron is reduced predominantly to the ferrous state.

Ground water. That portion of the water below the ground surface that is under greater pressure than atmospheric pressure.

Growing season. The portion of the year when soil temperatures at 19.7 in. below the soil surface are higher than biologic zero (5 °C) (U.S. Department of Agriculture—Soil Conservation Service 1985). For ease of determination this period can be approximated by the number of frost-free days (U.S Department of the Interior 1970).

Habitat. The environment occupied by individuals of a particular species, population, or community.

Headwater flooding. A situation in which an area becomes inundated directly by surface runoff from upland areas.

Herb. A nonwoody individual of a macrophytic species. In this manual, seedlings of woody plants (including vines) that are less than 3.2 ft in height are considered to be herbs.

Herbaceous layer. Any vegetative stratum of a plant community that is composed predominantly of herbs.

Histic epipedon. An 8- to 16-in. soil layer at or near the surface that is saturated for 30 consecutive days or more during the growing season in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent organic matter when 60 percent or greater clay is present.

Histosols. An order in soil taxonomy composed of organic soils that have organic soil materials in more than half of the upper 80 cm or that are of any thickness if directly overlying bedrock.

Homogeneous vegetation. A situation in which the same plant species association occurs throughout an area.

Hue. A characteristic of color that denotes a color in relation to red, yellow, blue, etc; one of the three variables of color. Each color chart in the Munsell Color Book (Munsell Color 1975) consists of a specific hue.

Hydric soil. A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (U.S. Department of Agriculture—Soil Conservation Service 1985). Hydric soils that occur in areas having positive indicators of hydrophytic vegetation and wetland hydrology are wetland soils.

Hydric soil condition. A situation in which characteristics exist that are associated with soil development under reducing conditions.

Hydrologic regime. The sum total of water that occurs in an area on average during a given period.

Hydrologic zone. An area that is inundated or has saturated soils within a specified range of frequency and duration of inundation and soil saturation.

Hydrology. The science dealing with the properties, distribution, and circulation of water.

Hydrophyte. Any macrophyte that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats.

Hydrophytic vegetation. The sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. When hydrophytic vegetation comprises a community where indicators of hydric soils and wetland hydrology also occur, the area has wetland vegetation.

Hypertrophied lenticels. An exaggerated (oversized) pore on the surface of stems of woody plants through which gases are exchanged between the plant and the atmosphere. The enlarged lenticels serve as a mechanism for increasing oxygen to plant roots during periods of inundation and/or saturated soils.

Importance value. A quantitative term describing the relative influence of a plant species in a plant community, obtained by summing any combination of relative frequency, relative density, and relative dominance.

Indicator. As used in this manual, an event, entity, or condition that typically characterizes a prescribed environment or situation; indicators determine or aid in determining whether or not certain stated circumstances exist.

Indicator status. One of the categories (e.g., OBL) that describes the estimated probability of a plant species occurring in wetlands.

Intercellular air space. A cavity between cells in plant tissues, resulting from variations in cell shape and configuration. Aerenchymous tissue (a morphological adaptation found in many hydrophytes) often has large intercellular air spaces.

Inundation. A condition in which water from any source temporarily or permanently covers a land surface.

Levee. A natural or man-made feature of the landscape that restricts movement of water into or through an area.

Liana. As used in this manual, a layer of vegetation in forested plant communities that consists of woody vines. The term may also be applied to a given species.

Limit of biological activity. With reference to soils, the zone below which conditions preclude normal growth of soil organisms. This term often is used to refer to the temperature (5 °C) in a soil below which metabolic processes of soil microorganisms, plant roots, and animals are negligible.

Long duration (flooding). A flooding class in which the period of inundation for a single event ranges from 7 days to 1 month.

Macrophyte. Any plant species that can be readily observed without the aid of optical magnification. This includes all vascular plant species and mosses (e.g., *Sphagnum* spp.), as well as large algae (e.g., *Cara* spp., kelp).

Macrophytic. A term referring to a plant species that is a macrophyte.

Major portion of the root zone. The portion of the soil profile in which more than 50 percent of plant roots occur. In wetlands, this usually constitutes the upper 12 in. of the profile.

Man-induced wetland. Any area that develops wetland characteristics due to some activity (e.g., irrigation) of man.

Mapping unit. As used in this manual, some common characteristic of soil, vegetation, and/or hydrology that can be shown at the scale of mapping for the defined purpose and objectives of a survey.

Mean sea level. A datum, or "plane of zero elevation," established by averaging all stages of oceanic tides over a 19-year tidal cycle or "epoch." This plane is corrected for curvature of the earth and is the standard reference for elevations on the earth's surface. The correct term for mean sea level is the National Geodetic Vertical Datum (NGVD).

Mesophytic. Any plant species growing where soil moisture and aeration conditions lie between extremes. These species are typically found in habitats with average moisture conditions, neither very dry nor very wet.

Metabolic processes. The complex of internal chemical reactions associated with life-sustaining functions of an organism.

Method. A particular procedure or set of procedures to be followed.

Mineral soil. A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter usually containing less than 20 percent organic matter.

Morphological adaptation. A feature of structure and form that aids in fitting a species to its particular environment (e.g., buttressed base, adventitious roots, aerenchymous tissue).

Mottles. Spots or blotches of different color or shades of color interspersed within the dominant color in a soil layer, usually resulting from the presence of periodic reducing soil conditions.

Muck. Highly decomposed organic material in which the original plant parts are not recognizable.

Multitrunk. A situation in which a single individual of a woody plant species has several stems.

Nonhydric soil. A soil that has developed under predominantly aerobic soil conditions. These soils normally support mesophytic or xerophytic species.

Nonwetland. Any area that has sufficiently dry conditions that indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking. As used in this manual, any area that is neither a wetland, a deepwater aquatic habitat, nor other special aquatic site.

Organic pan. A layer usually occurring at 12 to 30 in. below the soil surface in coarse-textured soils, in which organic matter and aluminum (with or without iron) accumulate at the point where the top of the water table most often occurs. Cementing of the organic matter slightly reduces permeability of this layer.

Organic soil. A soil is classified as an organic soil when it is: (1) saturated for prolonged periods (unless artificially drained) and has more than 30 percent organic matter if the mineral fraction is more than 50 percent clay, or more than 20 percent organic matter if the mineral fraction has no clay; or (2) never saturated with water for more than a few days and having more than 34 percent organic matter.

Overbank flooding. Any situation in which inundation occurs as a result of the water level of a stream rising above bank level.

Oxidation-reduction process. A complex of biochemical reactions in soil that influences the valence state of component elements and their ions. Prolonged soil saturation during the growing season elicits anaerobic conditions that shift the overall process to a reducing condition.

Oxygen pathway. The sequence of cells, intercellular spaces, tissues, and organs, through which molecular oxygen is transported in plants. Plant species having pathways for oxygen transport to the root system are often adapted for life in saturated soils.

Parameter. A characteristic component of a unit that can be defined. Vegetation, soil, and hydrology are three parameters that may be used to define wetlands.

Parent material. The unconsolidated and more or less weathered mineral or organic matter from which a soil profile develops.

Ped. A unit of soil structure (e.g., aggregate, crumb, prism, block, or granule) formed by natural processes.

Peraquic moisture regime. A soil condition in which a reducing environment always occurs due to the presence of ground water at or near the soil surface.

Periodically. Used herein to define detectable regular or irregular saturated soil conditions or inundation, resulting from ponding of ground water, precipitation, overland flow, stream flooding, or tidal influences that occur(s) with hours, days, weeks, months, or even years between events.

Permeability. A soil characteristic that enables water or air to move through the profile, measured as the number of inches per hour that water moves downward through the saturated soil. The rate at which water moves through the least permeable layer governs soil permeability.

Physiognomy. A term used to describe a plant community based on the growth habit (e.g., trees, herbs, lianas) of the dominant species.

Physiological adaptation. A feature of the basic physical and chemical activities that occurs in cells and tissues of a species, which results in it being better fitted to its environment (e.g., ability to absorb nutrients under low oxygen tensions).

Plant community. All of the plant populations occurring in a shared habitat or environment.

Plant cover. See areal cover.

Pneumatophore. Modified roots that may function as a respiratory organ in species subjected to frequent inundation or soil saturation (e.g., cypress knees).

Ponded. A condition in which water stands in a closed depression. Water may be removed only by percolation, evaporation, and/or transpiration.

Poorly drained. Soils that commonly are wet at or near the surface during a sufficient part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these conditions.

Population. A group of individuals of the same species that occurs in a given area.

Positive wetland indicator. Any evidence of the presence of hydrophytic vegetation, hydric soil, and/or wetland hydrology in an area.

Prevalent vegetation. The plant community or communities that occur in an area during a given period. The prevalent vegetation is characterized by the dominant macrophytic species that comprise the plant community.

Quantitative. A precise measurement or determination expressed numerically.

Range. As used herein, the geographical area in which a plant species is known to occur.

Redox potential. A measure of the tendency of a system to donate or accept electrons, which is governed by the nature and proportions of the oxidizing and reducing substances contained in the system.

Reducing environment. An environment conducive to the removal of oxygen and chemical reduction of ions in the soils.

Relative density. A quantitative descriptor, expressed as a percent, of the relative number of individuals of a species in an area; it is calculated by

$$\frac{\text{Number of individuals of species A}}{\text{Total number of individuals of all species}} \times 100$$

Relative dominance. A quantitative descriptor, expressed as a percent, of the relative size or cover of individuals of a species in an area; it is calculated by

$$\frac{\text{Amount}^{1}\text{ of species A}}{\text{Total amount of all species}} \times 100$$

Relative frequency. A quantitative descriptor, expressed as a percent, of the relative distribution of individuals of a species in an area; it is calculated by

$$\frac{\text{Frequency of species A}}{\text{Total frequency of all species}} \times 100$$

Relief. The change in elevation of a land surface between two points; collectively, the configuration of the earth's surface, including such features as hills and valleys.

---

[1] The "amount" of a species may be based on percent areal cover, basal area, or height.

Reproductive adaptation. A feature of the reproductive mechanism of a species that results in it being better fitted to its environment (e.g., ability for seed germination under water).

Respiration. The sum total of metabolic processes associated with conversion of stored (chemical) energy into kinetic (physical) energy for use by an organism.

Rhizosphere. The zone of soil in which interactions between living plant roots and microorganisms occur.

Root zone. The portion of a soil profile in which plant roots occur.

Routine wetland determination. A type of wetland determination in which office data and/or relatively simple, rapidly applied onsite methods are employed to determine whether or not an area is a wetland. Most wetland determinations are of this type, which usually does not require collection of quantitative data.

Sample plot. An area of land used for measuring or observing existing conditions.

Sapling/shrub. A layer of vegetation composed of woody plants <3.0 in. in diameter at breast height but greater than 3.2 ft in height, exclusive of woody vines.

Saturated soil conditions. A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric.

Soil. Unconsolidated mineral and organic material that supports, or is capable of supporting, plants, and which has recognizable properties due to the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over time.

Soil horizon. A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics (e.g., color, structure, texture, etc.).

Soil matrix. The portion of a given soil having the dominant color. In most cases, the matrix will be the portion of the soil having more than 50 percent of the same color.

Soil permeability. The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil.

Soil phase. A subdivision of a soil series having features (e.g., slope, surface texture, and stoniness) that affect the use and management of the soil, but which do not vary sufficiently to differentiate it as a separate series. These are usually the basic mapping units on detailed soil maps produced by the Soil Conservation Service.

Soil pore. An area within soil occupied by either air or water, resulting from the arrangement of individual soil particles or peds.

Soil profile. A vertical section of a soil through all its horizons and extending into the parent material.

Soil series. A group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface horizon.

Soil structure. The combination or arrangement of primary soil particles into secondary particles, units, or peds.

Soil surface. The upper limits of the soil profile. For mineral soils, this is the upper limit of the highest (Al) mineral horizon. For organic soils, it is the upper limit of undecomposed, dead organic matter.

Soil texture. The relative proportions of the various sizes of particles in a soil.

Somewhat poorly drained. Soils that are wet near enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, wet conditions high in the profile, additions of water through seepage, or a combination of these conditions.

Stilted roots. Aerial roots arising from stems (e.g., trunk and branches), presumably providing plant support (e.g., *Rhizophora mangle).*

Stooling. A form of asexual reproduction in which new shoots are produced at the base of senescing stems, often resulting in a multitrunk growth habit.

Stratigraphy. Features of geology dealing with the origin, composition, distribution, and succession of geologic strata (layers).

Substrate. The base or substance on which an attached species is growing.

Surface water. Water present above the substrate or soil surface.

Tidal. A situation in which the water level periodically fluctuates due to the action of lunar and solar forces upon the rotating earth.

Topography. The configuration of a surface, including its relief and the position of its natural and man-made features.

Transect. As used herein, a line on the ground along which observations are made at some interval.

Transition zone. The area in which a change from wetlands to nonwetlands occurs. The transition zone may be narrow or broad.

Transpiration. The process in plants by which water vapor is released into the gaseous environment, primarily through stomata.

Tree. A woody plant >3.0 in. in diameter at breast height, regardless of height (exclusive of woody vines).

Typical. That which normally, usually, or commonly occurs.

Typically adapted. A term that refers to a species being normally or commonly suited to a given set of environmental conditions, due to some feature of its morphology, physiology, or reproduction.

Unconsolidated parent material. Material from which a soil develops, usually formed by weathering of rock or placement in an area by natural forces (e.g., water, wind, or gravity).

Under normal circumstances. As used in the definition of wetlands, this term refers to situations in which the vegetation has not been substantially altered by man's activities.

Uniform vegetation. As used herein, a situation in which the same group of dominant species generally occurs throughout a given area.

Upland. As used herein, any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands. Such areas occurring within floodplains are more appropriately termed nonwetlands.

Value (soil color). The relative lightness or intensity of color, approximately a function of the square root of the total amount of light reflected from a surface; one of the three variables of color.

Vegetation. The sum total of macrophytes that occupy a given area.

Vegetation layer. A subunit of a plant community in which all component species exhibit the same growth form (e.g., trees, saplings/shrubs, herbs).

Very long duration (flooding). A duration class in which the length of a single inundation event is greater than 1 month.

Very poorly drained. Soils that are wet to the surface most of the time. These soils are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Watermark. A line on a tree or other upright structure that represents the maximum static water level reached during an inundation event.

Water table. The upper surface of ground water or that level below which the soil is saturated with water. It is at least 6 in. thick and persists in the soil for more than a few weeks.

Wetlands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetland boundary. The point on the ground at which a shift from wetlands to nonwetlands or aquatic habitats occurs. These boundaries usually follow contours.

Wetland determination. The process or procedure by which an area is adjudged a wetland or nonwetland.

Wetland hydrology. The sum total of wetness characteristics in areas that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation.

Wetland plant association. Any grouping of plant species that recurs wherever certain wetland conditions occur.

Wetland soil. A soil that has characteristics developed in a reducing atmosphere, which exists when periods of prolonged soil saturation result in anaerobic conditions. Hydric soils that are sufficiently wet to support hydrophytic vegetation are wetland soils.

Wetland vegetation. The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. As used herein, hydrophytic vegetation occurring in areas that also have hydric soils and wetland hydrology may be properly referred to as wetland vegetation.

Woody vine. See liana.

Xerophytic. A plant species that is typically adapted for life in conditions where a lack of water is a limiting factor for growth and/or reproduction. These species are capable of growth in extremely dry conditions as a result of morphological, physiological, and/or reproductive adaptations.

Appendix B
Blank and Example Data Forms

USER NOTES: The following field data form ("Data Form, Routine Wetland Determination, 1987 COE Wetlands Delineation Manual") dated 3/92 is the HQUSACE-approved replacement for Data Form 1 given in the 1987 Manual. (HQUSACE, 6 Mar 92)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ______________ Applicant/Owner: ______________ Investigator: ______________	Date: ________ County: ________ State: ________
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: ________ Transect ID: ________ Plot ID: ________

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1.			9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). ______________

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
  ___ Stream, Lake, or Tide Gauge
  ___ Aerial Photographs
  ___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: ________(in.)

Depth to Free Water in Pit: ________(in.)

Depth to Saturated Soil: ________(in.)

Wetland Hydrology Indicators:
Primary Indicators:
  ___ Inundated
  ___ Saturated in Upper 12 Inches
  ___ Water Marks
  ___ Drift Lines
  ___ Sediment Deposits
  ___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
  ___ Oxidized Root Channels in Upper 12 Inches
  ___ Water-Stained Leaves
  ___ Local Soil Survey Data
  ___ FAC-Neutral Test
  ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name
(Series and Phase): ______________________ Drainage Class: ______________
Field Observations
Taxonomy (Subgroup): ______________________ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)		(Circle)
Wetland Hydrology Present? Yes No		
Hydric Soils Present? Yes No	Is this Sampling Point Within a Wetland?	Yes No

Remarks:

Approved by HQUSACE 3/92

DATA FORM 1

WETLAND DETERMINATION

Applicant Name:__________ Application Number:__________ Project Name:__________

State:__________ County:__________ Legal Description: Township:_____ Range:_____

Date:__________ Plot No.:__________ Section:__________

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status
Trees		Herbs	
1.		7.	
2.		8.	
3.		9.	
Saplings/shrubs		Woody vines	
4.		10.	
5.		11.	
6.		12.	

% of species that are OBL, FACW, and/or FAC:____. Other indicators:__________.

Hydrophytic vegetation: Yes ____ No ____. Basis:__________.

Soil

Series and phase:__________ On hydric soils list? Yes_____; No_____.

Mottled: Yes_____; No_____. Mottle color:__________; Matrix color:__________.

Gleyed: Yes_____ No_____ Other indicators:__________.

Hydric soils: Yes_____ No_____; Basis:__________.

Hydrology

Inundated: Yes_____; No_____. Depth of standing water:__________.

Saturated soils: Yes_____; No_____. Depth to saturated soil:__________.

Other indicators:__________.

Wetland hydrology: Yes_____; No_____. Basis:__________.

Atypical situation: Yes_____; No_____.

Normal Circumstances? Yes_____ No_____.

Wetland Determination: Wetland__________; Nonwetland__________.

Comments:

Determined by:__________

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name:____________ Application No.:____________ Project Name:____________

Location:____________ Plot #:____________ Date:____________ Determined By:____________

VEGETATION LAYER

TREES	BASAL AREA	TOTAL BASAL AREA	RANK	HERBS	MIDPOINT OF % COVER CLASS	RANK
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		
9				9		
10				10		

SAPLINGS/SHRUBS	MIDPOINT OF HEIGHT CLASS	TOTAL HEIGHT CLASS	RANK	WOODY VINES	NUMBER OF STEMS	RANK
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		
9				9		
10				10		

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name:________________ Application Number:________________ Project Name:________________

Location:________________ Plot Number:________________ Date:________________

A. VEGETATION:

1. Type of Alteration:____

____

____.

2. Effect on Vegetation:____

____

____.

3. Previous Vegetation:____

(Attach documentation) ____

____.

4. Hydrophytic Vegetation? Yes________________ No________________.

B. SOILS:

1. Type of Alteration:____

____

____.

2. Effect on Soils:____

____

____.

3. Previous Soils:____

(Attach documentation) ____

____.

4. Hydric Soils? Yes________________ No________________.

C. HYDROLOGY:

1. Type of Alteration:____

____

____.

2. Effect on Hydrology:____

____

____.

3. Previous Hydrology:____

(Attach documentation) ____

____.

4. Wetland Hydrology? Yes________________ No________________.

Characterized By:________________

DATA FORM 1

WETLAND DETERMINATION

Applicant Name: John Doe Application Number: R-85-1421 Project Name: Zena Acricultural Land

State: LA County: Choctaw Legal Description: Township: 7N Range: 2E

Date: 10/08/85 Plot No.: 1-1 Section: 32

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status
Trees		Herbs	
1. *Quercus lyrata*	OBL	7. *Polygonum hydropiperoides*	OBL
2. *Carya aquatica*	OBL	8. *Boehmeria cylindrica*	FACW+
3. *Gleditsia aquatica*	OBL	9. *Brunnichia cirrhosa*	--
Saplings/shurbs		Woody vines	
4. *Forestiera acuminata*	OBL	10. *Toxicodendron radicans*	FAC
5. *Planera aquatica*	OBL	11. --	--
6. --	--	12. --	--

% of species that are OBL, FACW, and/or FAC: 100%. Other indicators: --.

Hydrophytic vegetation: Yes X No ___. Basis: 50% of dominants are OBL, FACW, and/or FAC on plant list.

Soil

Series and phase: Sharkey, frequently flooded On hydric soils list? Yes X; No ___.

Mottled: Yes X ; No ___. Mottle color: 5YR4/6 ; Matrix color: 10YR4/1 .

Gleyed: Yes ___ No X . Other indicators: ___.

Hydric soils: Yes X No ___; Basis: On hydric soil list and matrix color .

Hydrology

Inundated: Yes ___; No X . Depth of standing water: -- .

Saturated soils: Yes X ; No ___. Depth to saturated soil: 6" .

Other indicators: Drift lines and sediment deposits present on trees .

Wetland hydrology: Yes X ; No ___. Basis: Saturated soils .

Atypical situation: Yes ___; No X .

Normal Circumstances?: Yes X No ___.

Wetland Determination: Wetland X ; Nonwetland ___.

Comments: No rain reported from area in previous two weeks.

Determined by: Zelda Schmell (Signed)

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: John Doe Application No.: R-85-1421 Project Name: Zena Agricultural Land

Location: LA (Choctaw Parish) Plot #: 1-1 Date: 10/08/85 Determined By: Zelda Schmell

VEGETATION LAYER

TREES		BASAL AREA (in^2)	TOTAL BASAL AREA	RANK
1	*Quercus lyrata*	465	1,145	1
2	*Quercus lyrata*	680		
3	*Carya aquatica*	85	243	3
4	*Carya aquatica*	120		
5	*Carya aquatica*	38		
6	*Gleditsia aquatica*	235	253	2
7	*Gleditsia aquatica*	18		
8	*Diospyros virginiana*	46	46	
9				
10				

HERBS		MIDPOINT OF % COVER CLASS	RANK
1	*Boehmeria cylindrica*	37.5	2
2	*Polygonum hydropiperoides*	62.5	1
3	*Brunnichia ovata*	37.5	3
4	*Gleditsia aquatica* (seedling)	2.5	
5	*Eclipta alba*	2.5	
6			
7			
8			
9			
10			

SAPLINGS/SHRUBS		MIDPOINT OF HEIGHT CLASS	TOTAL HEIGHT CLASS	RANK
1	*Forestiera acuminata*	4.5	13.0	1
2	*Forestiera acuminata*	4.5		
3	*Forestiera acuminata*	1.5		
4	*Forestiera acuminata*	2.5		
5	*Planera aquatica*	4.5	8.0	2
6	*Planera aquatica*	3.5		
7	*Carya aquatica*	1.5	1.5	
8				
9				
10				

WOODY VINES		NUMBER OF STEMS	RANK
1	*Toxicodendron radicans*	35	1
2	(only woody vine present)		
3			
4			
5			
6			
7			
8			
9			
10			

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: Wetland Developers, Inc. Application Number: R-85-12 Project Name: Big Canal

Location: Joshua Co., MT Plot Number: 2 Date: 10/08/85

A. VEGETATION:

1. Type of Alteration: Vegetation totally removed or covered by placement of fill from canal (1984).

2. Effect on Vegetation: None remaining.

3. Previous Vegetation: *Carex nebrascensis* - *Juncus effusus* freshwater (Attach documentation) marsh (based on contiguous plant communities and aerial photography predating fill).

4. Hydrophytic Vegetation? Yes X No ____.

B. SOILS:

1. Type of Alteration: Original soil covered by 4 feet of fill material excavated from canal.

2. Effect on Soils: Original soil buried in 1984.

3. Previous Soils: Original soil examined at 10 inches below (Attach documentation) original soil surface. Soil gleyed (color notation 5Y2/0).

4. Hydric Soils? Yes X No ____.

C. HYDROLOGY:

1. Type of Alteration: 4 feet of fill material placed on original surface.

2. Effect on Hydrology: Area no longer is inundated.

3. Previous Hydrology: Examination of color IR photography taken on 6/5/84 (Attach documentation) showed the area to be inundated. Gaging station data from gage 2 miles upstream indicated the area has been inundated for as much as 3 months of the growing season during 8 of the past 12 years.

4. Wetland Hydrology? Yes X No ____.

Characterized By: Joe Zook

Appendix C
Vegetation

1. This appendix contains three sections. ~~Section 1 is a subset of the regional list of plants that occur in wetlands, but includes only those species having an indicator status of OBL, FACW, or FAC. Section 2 is a list of plants that commonly occur in wetlands of a given region. Since many geographic areas of Section 404 responsibility include portions of two or more plant list regions, users will often need more than one regional list; thus, Sections 1 and 2 will be published separately from the remainder of the manual. Users will be furnished all appropriate regional lists.~~

> USER NOTES: CE-supplied plant lists are obsolete and have been superseded by the May 1988 version of the "National List of Plant Species that Occur in Wetlands" published by the U.S. Fish and Wildlife Service and available on the World Wide Web. (HQUSACE, 27 Aug 91)

2. Section 3, which is presented herein, describes morphological, physiological, and reproductive adaptations that can be observed or are known to occur in plant species that are typically adapted for life in anaerobic soil conditions.

Section 3 - Morphological, Physiological, and Reproductive Adaptations of Plant Species for Occurrence in Areas Having Anaerobic Soil Conditions

Morphological adaptations

3. Many plant species have morphological adaptations for occurrence in wetlands. These structural modifications most often provide the plant with increased buoyancy or support. In some cases (e.g., adventitious roots), the adaptation may facilitate the uptake of nutrients and/or gases (particularly oxygen). However, not all species occurring in areas having anaerobic soil condi-

tions exhibit morphological adaptations for such conditions. The following is a list of morphological adaptations that a species occurring in areas having anaerobic soil conditions may possess (a partial list of species with such adaptations is presented in Table Cl):

Table C1
Partial List of Species with Known Morphological Adaptations for Occurrence in Wetlands[1]

Species	Common Name	Adaptation
Acer negundo	Box elder	Adventitious roots
Acer rubrum	Red maple	Hypertrophied lenticels
Acer saccharinum	Silver maple	Hypertrophied lenticels; adventitious roots (juvenile plants)
Alisma spp.	Water plantain	Polymorphic leaves
Alternanthera philoxeroides	Alligatorweed	Adventitious roots; inflated, floating stems
Avicennia nitida	Black mangrove	Pneumatophores; hypertrophied lenticels
Brasenia schreberi	Watershield	Inflated, floating leaves
Caladium mariscoides	Twig rush	Inflated stems
Cyperus spp. (most species)	Flat sedge	Inflated stems and leaves
Eleocharis spp. (most species)	Spikerush	Inflated stems and leaves
Forestiera accuminata	Swamp privet	Multi-trunk, stooling
Fraxinus pennsylvanica	Green ash	Buttressed trunks; adventitious roots
Gleditsia aquatica	Water locust	Hypertrophied lenticels
Juncus spp.	Rush	Inflated stems and leaves
Limnobium spongia	Frogbit	Inflated, floating leaves
Ludwigia spp.	Waterprimrose	Adventitious roots; inflated floating stems
Menyanthes trifoliata	Buckbean	Inflated stems (rhizome)
Myrica gale	Sweetgale	Hypertrophied lenticels
Nelumbo spp.	Lotus	Floating leaves
Nuphar spp.	Cowlily	Floating leaves
Nymphaea spp.	Waterlily	Floating leaves
Nyssa aquatica	Water tupelo	Buttressed trunks; pneumatophores; adventitious roots
Nyssa ogechee	Ogechee tupelo	Buttressed trunks; multi-trunk; stooling
Nyssa sylvatica var. *biflora*	Swamp blackgum	Buttressed trunks
Platanus occidentalis	Sycamore	Adventitious roots
Populus deltoides	Cottonwood	Adventitious roots
Quercus laurifolia	Laurel oak	Shallow root system
Quercus palustris	Pin oak	Adventitious roots
Rhizophora mangle	Red mangrove	Pneumatophores
Sagittaria spp.	Arrowhead	Polymorphic leaves
Salix spp.	Willow	Hypertrophied lenticels; adventitious roots; oxygen pathway to roots
Scirpus spp.	Bulrush	Inflated stems and leaves
Spartina alterniflora	Smooth cordgrass	Oxygen pathway to roots
Taxodium distichum	Bald cypress	Buttressed trunks; pneumatophores

[1] Many other species exhibit one or more morphological adaptations for occurrence in wetlands. However, not all individuals of a species will exhibit these adaptations under field conditions, and individuals occurring in uplands characteristically may not exhibit them.

a. *Buttressed tree trunks.* Tree species (e.g., *Taxodium distichum)* may develop enlarged trunks (Figure Cl) in response to frequent inundation. This adaptation is a strong indicator of hydrophytic vegetation in non-tropical forested areas.

b. *Pneumatophores.* These modified roots may serve as respiratory organs in species subjected to frequent inundation or soil saturation. Cypress knees (Figure C2) are a classic example, but other species (e.g., *Nyssa aquatica, Rhizophora mangle)* may also develop pneumatophores.

Figure C1. Buttressed tree truck (bald cypress)

Figure C2. Pneumatophores (bald cypress)

c. *Adventitious roots.* Sometimes referred to as "water roots," adventitious roots occur on plant stems in positions where roots normally are not found. Small fibrous roots protruding from the base of trees (e.g., *Salix nigra)* or roots on stems of herbaceous plants and tree seedlings in positions immediately above the soil surface (e.g., *Ludwigia* spp.) occur in response to inundation or soil saturation (Figure C3). These usually develop during periods of sufficiently prolonged soil saturation to destroy most of the root system. *CAUTION: Not all adventitious roots develop as a result of inundation or soil saturation. For example, aerial roots on woody vines are not normally produced as a response to inundation or soil saturation.*

Figure C3. Adventitious roots

d. *Shallow root systems.* When soils are inundated or saturated for long periods during the growing season, anaerobic conditions develop in the zone of root growth. Most species with deep root systems cannot survive in such conditions. Most species capable of growth during periods when soils are oxygenated only near the surface have shallow root systems. In forested wetlands, windthrown trees (Figure C4) are often indicative of shallow root systems.

Figure C4. Wind-thrown tree with shallow root system

e. *Inflated leaves, stems, or roots.* Many hydrophytic species, particularly herbs (e.g., *Limnobium spongia*, *Ludwigia* spp.) have or develop spongy (aerenchymous) tissues in leaves, stems, and/or roots that provide buoyancy or support and serve as a reservoir or passageway for oxygen needed for metabolic processes. An example of inflated leaves is shown in Figure C5.

f. *Polymorphic leaves.* Some herbaceous species produce different types of leaves, depending on the water level at the time of leaf formation. For example, *Alisma* spp. produce strap-shaped leaves when totally submerged, but produce broader, floating leaves when plants are emergent. *CAUTION: Many upland species also produce polymorphic leaves.*

Figure C5. Inflated leaves

g. *Floating leaves.* Some species (e.g., *Nymphaea* spp.) produce leaves that are uniquely adapted for floating on a water surface (Figure C6). These leaves have stomata primarily on the upper surface and a thick waxy cuticle that restricts water penetration. The presence of species with floating leaves is strongly indicative of hydrophytic vegetation.

Figure C6. Floating leaves

h. *Floating stems.* A number of species (e.g., *Alternanthera philoxeroides*) produce matted stems that have large internal air spaces when occurring in inundated areas. Such species root in shallow water and grow across the water surface into deeper areas. Species with floating stems often produce adventitious roots at leaf nodes.

i. *Hypertrophied lenticels.* Some plant species (e.g., *Gleditsia aquatica*) produce enlarged lenticels on the stem in response to prolonged inundation or soil saturation. These are thought to increase oxygen uptake through the stem during such periods.

Figure C7. Multitrunk plant

k. *Multitrunks or stooling.* Some woody hydrophytes characteristically produce several trunks of different ages (Figure C7) or produce new stems arising from the base of a senescing individual (e.g., *Forestiera acuminata, Nyssa ogechee)* in response to inundation.

l. *Oxygen pathway to roots.* Some species (e.g., *Spartina alterniflora*) have a specialized cellular arrangement that facilitates diffusion of gaseous oxygen from leaves and stems to the root system.

Physiological adaptations

4. Most, if not all, hydrophytic species are thought to possess physiological adaptations for occurrence in areas that have prolonged periods of anaerobic soil conditions. However, relatively few species have actually been proven to possess such adaptations, primarily due to the limited research that has been conducted. Nevertheless, several types of physiological adaptations known to occur in hydrophytic species are discussed below, and a list of species having one or more of these adaptations is presented in Table C2. *NOTE: Since it is impossible to detect these adaptations in the field, use of this indicator will be limited to observing the species in the field and checking the list in Table C2 to determine whether the species is known to have a physiological adaptation for occurrence in areas having anaerobic soil conditions.*

Table C2
Species Exhibiting Physiological Adaptations for Occurrence in Wetlands

Species	Physiological Adaptation
Alnus incana	Increased levels of nitrate reductase; malate accumulation
Alnus rubra	Increased levels of nitrate reductase
Baccharis viminea	Ability for root growth in low oxygen tensions
Betula pubescens	Oxidizes the rhizosphere; malate accumulation
Carex arenaria	Malate accumulation
Carex flacca	Absence of ADH activity
Carex lasiocarpa	Malate accumulation
Deschampsia cespitosa	Absence of ADH activity
Filipendula ulmaria	Absence of ADH activity
Fraxinus pennsylvanica	Oxidizes the rhizosphere
Glyceria maxima	Malate accumulation; absence of ADH activity
Juncus effusus	Ability for root growth in low oxygen tensions; absence of ADH activity
Larix laricina	Slight increases in metabolic rates; increased levels of nitrate reductase
Lobelia dortmanna	Oxidizes the rhizosphere
Lythrum salicaria	Absence of ADH activity
Molinia caerulea	Oxidizes the rhizosphere
Myrica gale	Oxidizes the rhizosphere
Nuphar lutea	Organic acid production
Nyssa aquatica	Oxidizes the rhizosphere
Nyssa sylvatica var. *biflora*	Oxidizes the rhizosphere; malate accumulation
Phalaris arundinacea	Absence of ADH activity; ability for root growth in low oxygen tensions
Phragmites australis	Malate accumulation
Pinus contorta	Slight increases in metabolic rates; increased levels of nitrate reductase
Polygonum amphibium	Absence of ADH activity
Potentilla anserina	Absence of ADH activity; ability for root growth in low oxygen tensions
Ranunculus flammula	Malate accumulation; absence of ADH activity
Salix cinerea	Malate accumulation
Salix fragilis	Oxidizes the rhizosphere
Salix lasiolepis	Ability for root growth in low oxygen tensions
Scirpus maritimus	Ability for root growth in low oxygen tensions
Senecio vulgaris	Slight increases in metabolic rates
Spartina alterniflora	Oxidizes the rhizosphere
Trifolia subterraneum	Low ADH activity
Typha angustifolia	Ability for root growth in low oxygen tensions

a. *Accumulation of malate.* Malate, a nontoxic metabolite, accumulates in roots of many hydrophytic species (e.g., *Glyceria maxima*, *Nyssa sylvatica* var. *biflora*). Nonwetland species concentrate ethanol, a toxic by-product of anaerobic respiration, when growing in anaerobic soil conditions. Under such conditions, many hydrophytic species produce high concentrations of malate and unchanged concentrations of ethanol, thereby avoiding accumulation of toxic materials. Thus, species having the ability to concentrate malate instead of ethanol in the root system under anaerobic soil conditions are adapted for life in such conditions, while species that concentrate ethanol are poorly adapted for life in anaerobic soil conditions.

b. *Increased levels of nitrate reductase.* Nitrate reductase is an enzyme involved in conversion of nitrate nitrogen to nitrite nitrogen, an intermediate step in ammonium production. Ammonium ions can accept electrons as a replacement for gaseous oxygen in some species, thereby allowing continued functioning of metabolic processes under low soil oxygen conditions. Species that produce high levels of nitrate reductase (e.g., *Larix laricina*) are adapted for life in anaerobic soil conditions.

c. *Slight increases in metabolic rates.* Anaerobic soil conditions effect short-term increases in metabolic rates in most species. However, the rate of metabolism often increases only slightly in wetland species, while metabolic rates increase significantly in nonwetland species. Species exhibiting only slight increases in metabolic rates (e.g., *Larix laricina, Senecio vulgaris)* are adapted for life in anaerobic soil conditions.

d. *Rhizosphere oxidation.* Some hydrophytic species (e.g., *Nyssa sylvatica*, *Myrica gale*) are capable of transferring gaseous oxygen from the root system into soil pores immediately surrounding the roots. This adaptation prevents root deterioration and maintains the rates of water and nutrient absorption under anaerobic soil conditions.

e. *Ability for root growth in low oxygen tensions.* Some species (e.g., *Typha angustifolia*, *Juncus effusus*) have the ability to maintain root growth under soil oxygen concentrations as low as 0.5 percent. Although prolonged (>l year) exposure to soil oxygen concentrations lower than 0.5 percent generally results in the death of most individuals, this adaptation enables some species to survive extended periods of anaerobic soil conditions.

f. *Absence of alcohol dehydrogenase (ADH) activity.* ADH is an enzyme associated with increased ethanol production. When the enzyme is not functioning, ethanol production does not increase significantly. Some hydrophytic species (e.g., *Potentilla anserina, Polygonum amphibium*) show only slight increases in ADH activity under anaerobic soil conditions. Therefore, ethanol production occurs at a slower rate in species that have low concentrations of ADH.

Reproductive adaptations

5. Some plant species have reproductive features that enable them to become established and grow in saturated soil conditions. The following have been identified in the technical literature as reproductive adaptations that occur in hydrophytic species:

a. *Prolonged seed viability.* Some plant species produce seeds that may remain viable for 20 years or more. Exposure of these seeds to atmospheric oxygen usually triggers germination. Thus, species (e.g., *Taxodium distichum)* that grow in very wet areas may produce seeds that germinate only during infrequent periods when the soil is dewatered. *NOTE: Many upland species also have prolonged seed viability, but the trigger mechanism for germination is not exposure to atmospheric oxygen.*

b. *Seed germination under low oxygen concentrations.* Seeds of some hydrophytic species germinate when submerged. This enables germination during periods of early-spring inundation, which may provide resulting seedlings a competitive advantage over species whose seeds germinate only when exposed to atmospheric oxygen.

c. *Flood-tolerant seedlings.* Seedlings of some hydrophytic species (e.g., *Fraxinus pennsylvanica)* can survive moderate periods of total or partial inundation. Seedlings of these species have a competitive advantage over seedlings of flood-intolerant species.

Appendix D
Hydric Soils

1. This appendix consists of two sections. Section 1 describes the basic procedure for digging a soil pit and examining for hydric soil indicators. ~~Section 2 is a list of hydric soils of the United States.~~

Section I - Procedures for Digging a Soil Pit and Examining for Hydric Soil Indicators

Digging a soil pit

2. Apply the following procedure: Circumscribe a 1-ft-diam area, preferably with a tile spade (sharpshooter). Extend the blade vertically downward, cut all roots to the depth of the blade, and lift the soil from the hole. This should provide approximately 16 inches of the soil profile for examination. *NOTE: Observations are usually made immediately below the A-horizon or 10 in. (whichever is shallower).* In many cases, a soil auger or probe can be used instead of a spade. If so, remove successive cores until 16 inches of the soil profile have been removed. Place successive cores in the same sequence as removed from the hole. *NOTE: An auger or probe cannot be effectively used when the soil profile is loose, rocky, or contains a large volume of water (e.g., peraquic moisture regime).*

Examining the soil

3. Examine the soil for hydric soils indicators (paragraphs 44 and/or 45 of main text (for sandy soils)). *NOTE: It may not be necessary to conduct a classical characterization (e.g., texture, structure, etc.) of the soil*. Consider the hydric soil indicators in the following sequence *(NOTE: The soil examination can be terminated when a positive hydric soil indicator is found):*

Nonsandy soils.

a. Determine whether an organic soil is present (see paragraph 44 of the main text). If so, the soil is hydric.

b. Determine whether the soil has a histic epipedon (see paragraph 44 of the main text). Record the thickness of the histic epipedon on Data Form 1.

c. Determine whether sulfidic materials are present by smelling the soil. The presence of a "rotten egg" odor is indicative of hydrogen sulfide, which forms only under extreme reducing conditions associated with prolonged inundation/soil saturation.

d. Determine whether the soil has an aquic or peraquic moisture regime (see paragraph 44 of the main text). If so, the soil is hydric.

e. Conduct a ferrous iron test. A colorimetric field test kit has been developed for this purpose. A reducing soil environment is present when the soil extract turns pink upon addition of α,α'-dipyridyl.

f. Determine the color(s) of the matrix and any mottles that may be present. Soil color is characterized by three features: hue, value, and chroma. Hue refers to the soil color in relation to red, yellow, blue, etc. Value refers to the lightness of the hue. Chroma refers to the strength of the color (or departure from a neutral of the same lightness). Soil colors are determined by use of a Munsell Color Book (Munsell Color 1975).[1] Each Munsell Color Book has color charts of different hues, ranging from 10R to 5Y. Each page of hue has color chips that show values and chromas. Values are shown in columns down the page from as low as 0 to as much as 8, and chromas are shown in rows across the page from as low as 0 to as much as 8. In writing Munsell color notations, the sequence is always hue, value, and chroma (e.g., 10YR 5/2). To determine soil color, place a small portion of soil[2] in the openings behind the color page and match the soil color to the appropriate color chip. *NOTE: Match the soil to the nearest color chip.* Record on DATA FORM 1 the hue, value, and chroma of the best matching color chip. *CAUTION: Never place soil on the face or front of the color page because this might smear the color chips.* Mineral hydric soils usually have one of the following color features immediately below the A-horizon or 10 inches (whichever is shallower):

(1) Gleyed soil.

---

[1] See references at the end of the main text.
[2] The soil must be moistened if dry at the time of examination.

Determine whether the soil is gleyed. If the matrix color best fits a color chip found on the gley page of the Munsell soil color charts, the soil is gleyed. This indicates prolonged soil saturation, and the soil is highly reduced.

(2) Nongleyed soil.

(a) Matrix chroma of 2 or less in mottled soils.[1]

(b) Matrix chroma of 1 or less in unmottled soils.[1]

(c) Gray mottles within 10 in. of the soil surface in dark (black) mineral soils (e.g., Mollisols) that do not have characteristics of (a) or (b) above.

Soils having the above color characteristics are normally saturated for significant duration during the growing season. However, hydric soils with significant coloration due to the nature of the parent material (e.g., red soils of the Red River Valley) may not exhibit chromas within the range indicated above. In such cases, this indicator cannot be used.

g. Determine whether the mapped soil series or phase is on the national list of hydric soils (Section 2). *CAUTION: It will often be necessary to compare the profile description of the soil with that of the soil series or phase indicated on the soil map to verify that the soil was correctly mapped. This is especially true when the soil survey indicates the presence of inclusions or when the soil is mapped as an association of two or more soil series.*

h. Look for iron and manganese concretions. Look for small (>0.08-in.) aggregates within 3 in. of the soil surface. These are usually black or dark brown and reflect prolonged saturation near the soil surface.

Sandy soils.

Look for one of the following indicators in sandy soils:

a. A layer of organic material above the mineral surface or high organic matter content in the surface horizon (see paragraph 45*a* of the main text). This is evidenced by a darker color of the surface layer due to organic matter interspersed among or adhering to the sand particles. This is not observed in upland soils due to associated aerobic conditions.

b. Streaking of subsurface horizons (see paragraph 45*b* of the main text). Look for dark vertical streaks in subsurface horizons. These streaks

[1] The soil must be moistened if dry at the time of examination.

represent organic matter being moved downward in the profile. When soil is rubbed between the fingers, the organic matter will leave a dark stain on the fingers.

c. Organic pans (see paragraph 45*c* of the main text). This is evidenced by a thin layer of hardened soil at a depth of 12 to 30 inches below the mineral surface.

Section 2 - Hydric Soils of the United States

4. The list of hydric soils of the United States ~~(Table D1)~~ was developed by the National Technical Committee for Hydric Soils (NTCHS), a panel consisting of representatives of the Soil Conservation Service (SCS), Fish and Wildlife Service, Environmental Protection Agency, Corps of Engineers, Auburn University, University of Maryland, and Louisiana State University. Keith Young of SCS was committee chairman.

5. The NTCHS developed the following definition of hydric soils:

~~A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (U.S. Department of Agriculture (USDA) Soil Conservation Service 1985, as amended by the NTCHS in December 1986).~~

> USER NOTES: The hydric soil definition, criteria, and hydric soil list (Table D1) published in the 1987 Corps Manual are obsolete. Current hydric soil definition, criteria, and lists are available over the World Wide Web from the U.S.D.A. Natural Resources Conservation Service (NRCS). (HQUSACE, 27 Aug 91, 6 Mar 92)

Criteria for hydric soils

6. Based on the above definition, the NTCHS developed the following criteria for hydric soils, and all soils appearing on the list will meet at least one criterion:

a. ~~All Histosols[1] except Folists;~~

b. ~~Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:~~

[1] Soil taxa conform to USDA-SCS (1975).

(1) ~~Somewhat poorly drained and have water table less than 0.5 ft from the surface for a significant period (usually a week or more) during the growing season, or~~

(2) ~~Poorly drained or very poorly drained and have either:~~

(a) ~~A water table at less than 1.0 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within 20 inches; or~~

(b) ~~A water table at less than 1.5 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 in/hr in any layer within 20 inches; or~~

c. ~~Soils that are ponded for long duration or very long duration during part of the growing season; or~~

d. ~~Soils that are frequently flooded for long duration or very long duration during the growing season.~~

7. ~~The hydric soils list was formulated by applying the above criteria to soil properties documented in USDA-SCS (1975) and the SCS Soil Interpretation Records (SOI-5).~~

Use of the list

8. ~~The list of hydric soils of the United States (Table D1) is arranged alphabetically by soil series. Unless otherwise specified, all phases of a listed soil series are hydric. In some cases, only those phases of a soil series that are ponded, frequently flooded, or otherwise designated as wet are hydric. Such phases are denoted in Table D1 by the following symbols in parentheses after the series name:~~

~~F - flooded~~

~~FF - frequently flooded~~

~~P - ponded~~

~~W - wet~~

~~D - depressional~~

9. ~~Drained phases of some soil series retain their hydric properties even after drainage. Such phases are identified in Table D1 by the symbol "DR" in parentheses following the soil series name. In such cases, both the drained and un-~~

~~drained phases of the soil series are hydric.~~ *CAUTION: Be sure that the profile description of the mapping unit conforms to that of the sampled soil. Also, designation of a soil series or phase as hydric does not necessarily mean that the area is a wetland. An area having a hydric soil is a wetland only if positive indicators of hydrophytic vegetation and wetland hydrology are also present.*

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY ***(Leave blank)***

2. REPORT DATE
January 1987

3. REPORT TYPE AND DATES COVERED
Final report

4. TITLE AND SUBTITLE
Corps of Engineers Wetlands Delineation Manual

5. FUNDING NUMBERS

6. AUTHOR(S)
Environmental Laboratory

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Engineer Waterways Experiment Station
3909 Halls Ferry Road, Vicksburg, MS 39180-6199

8. PERFORMING ORGANIZATION REPORT NUMBER
Technical Report Y-87-1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers
Washington, DC 20314-1000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 words)***

This document presents approaches and methods for identifying and delineating wetlands for purposes of Section 404 of the Clean Water Act. It is designed to assist users in making wetland determinations using a multiparameter approach. Except where noted in the manual, this approach requires positive evidence of hydrophytic vegetation, hydric soils, and wetland hydrology for a determination that an area is a wetland. The multiparameter approach provides a logical, easily defensible, and technical basis for wetland determinations. Technical guidelines are presented for wetlands, deepwater aquatic habitats, and nonwetlands (uplands).

Hydrophytic vegetation, hydric soils, and wetland hydrology are also characterized, and wetland indicators of each parameter are listed.

Methods for applying the multiparameter approach are described. Separate sections are devoted to preliminary data gathering and analysis, method selection, routine determinations, comprehensive determinations, atypical situations, and problem areas. Three levels of routine determinations are described, thereby affording significant flexibility in method selection.

(Continued)

14. SUBJECT TERMS

Delineation	Methods	Vegetation
Hydrology	Plant communities	Wetlands
Manual	Soil	

15. NUMBER OF PAGES
169

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED		

13. (Concluded).

Four appendices provide supporting information. Appendix A is a glossary of technical terms used in the manual. Appendix B contains data forms for use with the various methods. Appendix C, developed by a Federal interagency panel, contains a list of all plant species known to occur in wetlands of the region. Each species has been assigned an indicator status that describes its estimated probability of occurring in wetlands of the region. Morphological, physiological, and reproductive adaptations that enable a plant species to occur in wetlands are also described, along with a listing of some species having such adaptations. Appendix D describes the procedure for examining the soil for indicators of hydric soil conditions, and includes a national list of hydric soils developed by the National Technical Committee for Hydric Soils.

ERDC/EL TR-10-3

Environmental Laboratory

US Army Corps of Engineers®
Engineer Research and Development Center

Wetlands Regulatory Assistance Program

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)

U.S. Army Corps of Engineers

May 2010

Approved for public release; distribution is unlimited.

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)

U.S. Army Corps of Engineers

U.S. Army Engineer Research and Development Center
Environmental Laboratory
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Final report

Prepared for Headquarters, U.S. Army Corps of Engineers
Washington, DC 20314-1000

Abstract: This document is one of a series of Regional Supplements to the Corps of Engineers Wetland Delineation Manual, which provides technical guidance and procedures for identifying and delineating wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. The development of Regional Supplements is part of a nationwide effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures. This supplement is applicable to the Western Mountains, Valleys, and Coast Region, which consists of portions of 12 states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming.

Contents

Figures and Tables

Figures

Tables

Preface

This document is one of a series of Regional Supplements to the Corps of Engineers Wetland Delineation Manual. It was developed by the U.S. Army Engineer Research and Development Center (ERDC) at the request of Headquarters, U.S. Army Corps of Engineers (USACE), with funding provided through the Wetlands Regulatory Assistance Program (WRAP). This is Version 2.0 of the Western Mountains, Valleys, and Coast Regional Supplement; it replaces the "interim" version, which was published in April 2008.

This document was developed in cooperation with the Western Mountains, Valleys, and Coast Regional Working Group, whose members contributed their time and expertise to the project over a period of many months. Working Group meetings were held in Portland, OR, on 15-17 November 2005; and Denver, CO, on 22-23 March 2006. Members of the Regional Working Group and contributors to this document were:

- James Wakeley, Project Leader and Working Group Chair, Environmental Laboratory (EL), ERDC, Vicksburg, MS
- Robert Lichvar, Chair, Vegetation Subcommittee, Cold Regions Research and Engineering Laboratory, ERDC, Hanover, NH
- Chris Noble, Chair, Soils Subcommittee, EL, ERDC, Vicksburg, MS
- Terry Aho, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, West National Technology Support Center, Portland, OR
- Ed Blake, USDA Natural Resources Conservation Service, Minden, NV
- Roger Borine, USDA Natural Resources Conservation Service, Redmond, OR
- Dennis Buechler, U.S. Fish and Wildlife Service, Denver, CO (retired)
- David Cooper, Colorado State University, Fort Collins, CO
- Richard Gebhart, U.S. Army Engineer Sacramento District, Nevada Regulatory Office, Reno, NV
- Wendell Gilgert, USDA Natural Resources Conservation Service, West National Technology Support Center, Portland, OR
- Jim Goudzwaard, U.S. Army Engineer District, Portland, OR
- Bruce Henderson, U.S. Army Engineer District, Los Angeles, CA

- Bill Kirchner, National Wetlands Inventory, U.S. Fish and Wildlife Service, Portland, OR
- Perry Lund, Washington Department of Ecology, Bellevue, WA
- Daniel Martel, U.S. Army Engineer District, San Francisco, CA
- Greg Martinez, U.S. Army Engineer District, Walla Walla, WA
- Janet Morlan, Oregon Department of State Lands, Salem, OR
- John Olson, U.S. Environmental Protection Agency, Boise, ID
- Chandler Peter, U.S. Army Engineer Omaha District, Wyoming Regulatory Office, Cheyenne, WY
- Russell Pringle, USDA Natural Resources Conservation Service, Central National Technology Support Center, Fort Worth, TX
- Richard Robohm, Washington Department of Ecology, Bellevue, WA
- Ralph Thomas Rogers, U.S. Environmental Protection Agency, Seattle, WA
- David Ruiter, U.S. Environmental Protection Agency, Denver, CO
- Terri Skadeland, USDA Natural Resources Conservation Service, Lakewood, CO
- Erik Stockdale, Washington Department of Ecology, Bellevue, WA
- Tina Teed, U.S. Army Engineer District, Portland, OR
- Kristina Tong, U.S. Army Engineer District, Seattle, WA
- Van Truan, U.S. Army Engineer Albuquerque District, Colorado Regulatory Office, Pueblo, CO
- Tom Weber, USDA Natural Resources Conservation Service, Lakewood, CO
- Stephen Wille, U.S. Fish and Wildlife Service, Portland, OR

Technical reviews were provided by the following members of the National Advisory Team for Wetland Delineation: Steve Eggers, U.S. Army Engineer (USAE) District, St. Paul, MN; Karl Hipple, USDA Natural Resources Conservation Service (NRCS), National Soil Survey Center, Lincoln, NE; Dan Martel, USAE District, San Francisco, CA; Jennifer McCarthy, USAE District, New England, Concord, MA; Norman Melvin, NRCS Central National Technology Support Center, Fort Worth, TX; Paul Minkin, USAE District, New England, Concord, MA; Ralph Thomas Rogers, U.S. Environmental Protection Agency (EPA), Seattle, WA; Stuart Santos, USAE District, Jacksonville, FL; Ralph Spagnolo, EPA, Philadelphia, PA; Ralph Tiner, U.S. Fish and Wildlife Service, Hadley, MA; Katherine Trott, USAE Institute for Water Resources, Alexandria, VA; P. Michael Whited, NRCS, St. Paul, MN; and James Wood, USAE District, Albuquerque, NM. In addition, portions of this Regional Supplement that address soils issues were reviewed and endorsed by the National Technical Committee for Hydric Soils (Karl Hipple, chair).

Independent peer reviews were performed in accordance with Office of Management and Budget guidelines. The peer-review team consisted of Kathy Verble, Chair, Oregon Department of State Lands, Salem, OR; Nancy Holzhauser, Environmental Solutions LLC, Blue River, OR; Robert Huffman, Huffman-Broadway Group, Inc., San Rafael, CA; Gregory Johnson, Western EcoSystems Technology, Inc., Cheyenne, WY; and Dyanne Sheldon, OTAK, Inc., Kirkland, WA.

Technical editors for this Regional Supplement were Dr. James S. Wakeley, Robert W. Lichvar, and Chris V. Noble, ERDC. William L. James was the project proponent and coordinator at Headquarters, USACE. During the conduct of this work, Dr. Morris Mauney was Chief of the Wetlands and Coastal Ecology Branch; Dr. Edmond Russo was Chief, Ecosystem Evaluation and Engineering Division; Bob Lazor was Program Manager, WRAP; and Dr. Elizabeth Fleming was Director, EL.

COL Gary E. Johnston was Commander and Executive Director of ERDC. Dr. Jeffery P. Holland was Director.

The correct citation for this document is:

> U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

1 Introduction

Purpose and use of this regional supplement

This document is one of a series of Regional Supplements to the Corps of Engineers Wetland Delineation Manual (hereafter called the Corps Manual). The Corps Manual provides technical guidance and procedures, from a national perspective, for identifying and delineating wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act (33 U.S.C. 1344) or Section 10 of the Rivers and Harbors Act (33 U.S.C. 403). According to the Corps Manual, identification of wetlands is based on a three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. This Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Western Mountains, Valleys, and Coast Region.

This Regional Supplement is part of a nationwide effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures. Regional differences in climate, geology, soils, hydrology, plant and animal communities, and other factors are important to the identification and functioning of wetlands. These differences cannot be considered adequately in a single national manual. The development of this supplement follows National Academy of Sciences recommendations to increase the regional sensitivity of wetland-delineation methods (National Research Council 1995). The intent of this supplement is to bring the Corps Manual up to date with current knowledge and practice in the region and not to change the way wetlands are defined or identified. The procedures given in the Corps Manual, in combination with wetland indicators and guidance provided in this supplement, can be used to identify wetlands for a number of purposes, including resource inventories, management plans, and regulatory programs. The determination that a wetland is subject to regulatory jurisdiction under Section 404 or Section 10 must be made independently of procedures described in this supplement.

This Regional Supplement is designed for use with the current version of the Corps Manual (Environmental Laboratory 1987) and all subsequent versions. Where differences in the two documents occur, this Regional Supplement takes precedence over the Corps Manual for applications in the Western Mountains, Valleys, and Coast Region. Table 1 identifies specific sections of the Corps Manual that are replaced by this supplement. Other guidance and procedures given in this supplement and not listed in Table 1 are intended to augment the Corps Manual but not necessarily to replace it. The Corps of Engineers has final authority over the use and interpretation of the Corps Manual and this supplement in the Western Mountains, Valleys, and Coast Region.

Table 1. Sections of the Corps Manual replaced by this Regional Supplement for applications in the Western Mountains, Valleys, and Coast Region

Item	Replaced Portions of the Corps Manual (Environmental Laboratory 1987)	Replacement Guidance (this Supplement)
Hydrophytic Vegetation Indicators	Paragraph 35, all subparts, and all references to specific indicators in Part IV.	Chapter 2
Hydric Soil Indicators	Paragraphs 44 and 45, all subparts, and all references to specific indicators in Part IV.	Chapter 3
Wetland Hydrology Indicators	Paragraph 49(b), all subparts, and all references to specific indicators in Part IV.	Chapter 4
Growing Season Definition	Glossary	Chapter 4, Growing Season; Glossary
Hydrology Standard for Highly Disturbed or Problematic Wetland Situations	Paragraph 48, including Table 5 and the accompanying User Note in the online version of the Manual	Chapter 5, Wetlands that Periodically Lack Indicators of Wetland Hydrology, Procedure item 3(h)

Indicators and procedures given in this Supplement are designed to identify wetlands as defined jointly by the Corps of Engineers (33 CFR 328.3) and Environmental Protection Agency (40 CFR 230.3). Wetlands are a subset of the “waters of the United States” that may be subject to regulation under Section 404. One key feature of the definition of wetlands is that, under normal circumstances, they support “a prevalence of vegetation typically adapted for life in saturated soil conditions.” Many waters of the United States are unvegetated and thus are excluded from the Corps/EPA definition of wetlands, although they may still be subject to Clean Water Act regulation. Other potential waters of the United States in the Western Mountains, Valleys, and Coast Region include, but are not limited to, tidal flats and shorelines along the coast and in estuaries; lakes; rivers; seasonal ponds; and intermittent, ephemeral, and perennial stream channels. Delineation of these waters is based on the high tide line, the "ordinary high water mark" (33 CFR 328.3), or other criteria and is beyond the scope of this Regional Supplement.

Amendments to this document will be issued periodically in response to new scientific information and user comments. Between published versions, Headquarters, U.S. Army Corps of Engineers, may provide updates to this document and any other supplemental information used to make wetland determinations under Section 404 and Section 10. Wetland delineators should use the most recent approved versions of this document and supplemental information. See the Corps of Engineers Headquarters regulatory web site for information and updates (http://www.usace.army.mil/CECW/Pages/cecwo_reg.aspx). The Corps of Engineers has established an interagency National Advisory Team for Wetland Delineation whose role is to review new data and make recommendations for needed changes in wetland-delineation procedures to Headquarters, U.S. Army Corps of Engineers. Items for consideration by the team, including full documentation and supporting data, should be submitted to:

National Advisory Team for Wetland Delineation
Regulatory Branch (Attn: CECW-CO)
U.S. Army Corps of Engineers
441 G Street, N.W.
Washington, DC 20314-1000

Applicable region and subregions

This supplement is applicable to the Western Mountains, Valleys, and Coast Region, which consists of portions of 12 states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming (Figure 1). The region contains the major western mountain ranges – the Cascade Mountains, Sierra Nevada, and Rocky Mountains – and other scattered mountain ranges where the vegetation is dominated mainly by coniferous forests at lower elevations and alpine tundra at the highest elevations. The region also embraces the Willamette/Puget lowlands, and the numerous valleys, meadows, high plateaus, and parks scattered within the mountainous areas that often support grasses, forbs, or shrubs, and includes the Coast Ranges, rain forests, and coastal zone from northern California to the Canadian border. About half of the region is in Federal ownership, mostly in national forests.

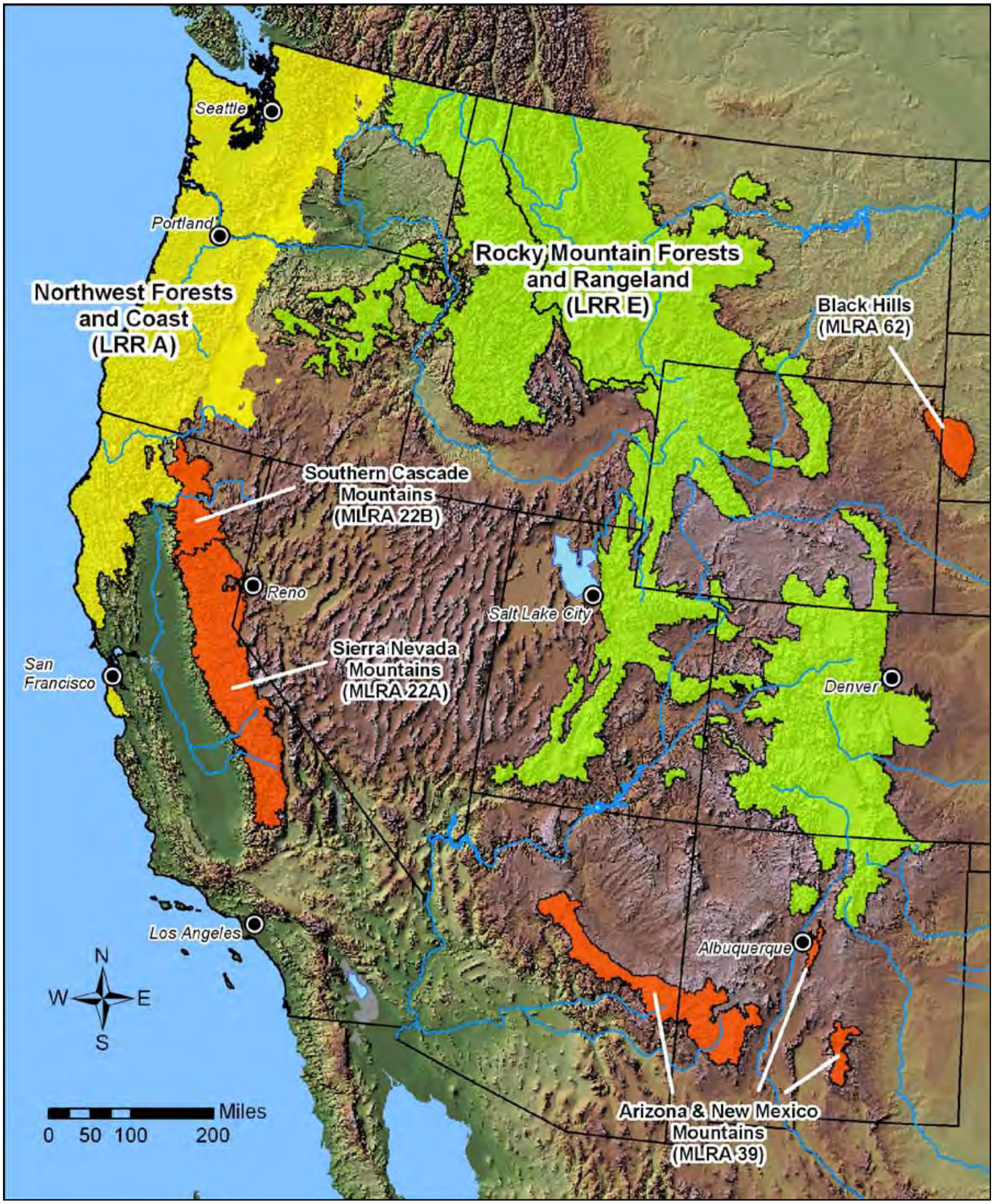


Figure 1. Generalized map of the Western Mountains, Valleys, and Coast Region. The region consists mainly of USDA Land Resource Regions (LRR) A and E, but also includes the Sierra Nevada Mountains (MLRA 22A), Southern Cascade Mountains (MLRA 22B), Arizona and New Mexico Mountains (MLRA 39), Black Hills (MLRA 62), and other mountainous areas not shown that are dominated by coniferous forests on the slopes and coniferous woodlands, hardwood riparian woodlands, shrublands, or meadows in the valleys, down to the lower limit of the ponderosa pine zone. See text for details.

The Western Mountains, Valleys, and Coast Region surrounds and is interspersed with the Arid West Region (U.S. Army Corps of Engineers 2008) but generally receives more abundant rainfall and/or snow, has lower average temperatures, higher humidity, and lower evapotranspiration rates. Streams in the region are often perennial, whereas those in the Arid West are generally intermittent or ephemeral. Many of the major streams and rivers that flow into and through the Arid West have their headwaters in the Western Mountains, Valleys, and Coast Region.

The approximate spatial extent of the Western Mountains, Valleys, and Coast Region is shown in Figure 1. This map is based mainly on a combination of Land Resource Regions (LRR) A and E recognized by the U.S. Department of Agriculture (USDA Natural Resources Conservation Service 2006a). Subregion boundaries used for certain indicators in this supplement correspond to LRRs. In addition, the region includes the following portions of LRRs B, C, D and G (Figure 1):

- Sierra Nevada Mountains (Major Land Resource Area [MLRA] 22A)
- Southern Cascade Mountains (MLRA 22B)
- Arizona and New Mexico Mountains (MLRA 39)
- Black Hills (MLRA 62)
- Other mountain ranges scattered throughout the West that support mainly coniferous forests on the slopes and open coniferous woodlands, shrublands, meadows, and hardwood riparian woodlands in the valleys, down to the lower elevational limit of the ponderosa pine (*Pinus ponderosa*) zone or its local equivalent.

Areas dominated by pinyon/juniper (e.g., *Pinus monophylla* or *P. edulis*/*Juniperus* spp.) woodlands are excluded from this region and included within the Arid West Region (U.S. Army Corps of Engineers 2008). Most of the wetland indicators presented in this supplement are applicable throughout the entire Western Mountains, Valleys, and Coast Region. However, some indicators are restricted to specific subregions (i.e., LRR) or smaller areas (i.e., MLRA).

The decision to use the Western Mountains, Valleys, and Coast Regional Supplement or the Arid West Regional Supplement on a particular field site should be based on landscape and site conditions, and not solely on map location. Figure 1 is highly generalized and does not indicate many of the smaller mountain ranges where the Western Mountains, Valleys, and

Coast supplement would be applicable. Furthermore, there are arid environments within the highlighted areas in Figure 1 where the Arid West supplement would be appropriate. Table 2 summarizes general patterns in climate, vegetation, soils, and hydrology that help to differentiate the two regions, although no one environmental characteristic is diagnostic. In many areas of the West, the transition between the two regions is indicated by the upper limit of pinyon/juniper and associated shrub-dominated communities, and the lower limit of ponderosa pine or other coniferous forests.

Table 2. Comparison of general landscape characteristics between the Arid West Region and the Western Mountains, Valleys, and Coast Region.

Landscape Characteristics	Arid West Regional Supplement	Western Mountains, Valleys, and Coast Regional Supplement
Climate	Generally hot and dry with a long summer dry season. Average annual precipitation mostly <15 in. (380 mm) except along the coast. Most precipitation falls as rain.	Cooler and more humid, with a shorter dry season. Average annual precipitation mostly >20 in. (500 mm). Except near the coast, much of the annual precipitation falls as snow, particularly at higher elevations.
Vegetation	Little or no forest cover at the same elevation as the site and, if present, usually dominated by pinyon pine (e.g., *P. monophylla* or *P. edulis*), junipers (*Juniperus*), cottonwoods (e.g., *Populus fremontii*), willows (*Salix*), or hardwoods (e.g., *Quercus, Platanus*). Landscape mostly dominated by grasses and shrubs (e.g., sagebrush [*Artemisia*], rabbitbrush [*Chrysothamnus*], bitterbrush [*Purshia*], and creosote bush [*Larrea*]). Halophytes (e.g., *Allenrolfea, Salicornia, Distichlis*) present in saline areas.	Forests at comparable elevations in the local area dominated by conifers (e.g., spruce (*Picea),* fir *(Abies),* hemlock *(Tsuga),* Douglas-fir *(Pseudotsuga),* coast redwood (*Sequoia*), or pine *(Pinus)* except pinyon) or by aspen (*Populus tremuloides*). In the Willamette Valley, Oregon ash (*Fraxinus latifolia*) and bigleaf maple (*Acer macrophyllum*) often dominate. Open areas generally dominated by grasses, sedges, shrubs (e.g., willows or alders [*Alnus*]), or alpine tundra.
Soils	Mostly dry, poorly developed, low in organic matter content, and high in carbonates. Soils sometimes highly alkaline. Surface salt crusts and efflorescences common in low areas.	Generally better developed, higher in organic matter content, and low in carbonates. Surface salt features are less common except in geothermal areas.
Hydrology	Drainage basins often lacking outlets. Temporary ponds (often saline), salt lakes, and ephemeral streams predominate. Water tables often perched. Major streams and rivers flow through but have headwaters outside the Arid West.	Streams and rivers often perennial. Open drainages with many natural, freshwater lakes. Water tables often continuous with deeper groundwater. Region serves as the headwaters of the major streams and rivers of the western United States.

Region and subregion boundaries are depicted in Figure 1 as sharp lines. However, climatic conditions and the physical and biological characteristics of landscapes do not change abruptly at the boundaries. In reality, regions and subregions often grade into one another in broad transition zones that may be tens or hundreds of miles wide. The lists of wetland indicators presented in these Regional Supplements may differ between adjoining regions or subregions. In transitional areas, the investigator must use experience and good judgment to select the supplement and indicators that are appropriate to the site based on its physical and biological characteristics. Wetland boundaries are not likely to differ between two supplements in transitional areas, but one supplement may provide more detailed treatment of certain problem situations encountered on the site. If in doubt about which supplement to use in a transitional area, apply both supplements and compare the results. For additional guidance, contact the appropriate Corps of Engineers District Regulatory Office. Contact information for District regulatory offices is available at the Corps Headquarters web site (http://www.usace.army.mil/CECW/Pages/reg_districts.aspx).

Physical and biological characteristics of the region

The Western Mountains, Valleys, and Coast Region consists of steep, rugged mountains, high plateaus, gently sloping valleys, and a narrow coastal plain. Due to rugged topography, climatic conditions are highly variable across the region. The north-south orientation of the major mountain ranges forms barriers to the prevailing westerly winds, producing more abundant rainfall on west-facing slopes and rain-shadow effects on east-facing slopes and in interior valleys. Average annual precipitation ranges from more than 250 in. (6,350 mm) in the Olympic Mountains of Washington to 15 in. (380 mm) or less in the drier valleys and east-facing slopes of the Cascade Range and southern Rocky Mountains. Winters throughout the region tend to be long and cold, except near the ocean and in valleys west of the Cascades. The frost-free period is less than 70 days in the high mountains, but approaches 365 days on the coast (Bailey 1995; USDA Natural Resources Conservation Service 2006a).

This topographic and climatic diversity is reflected in very high vegetation diversity. Mountain slopes throughout the region generally are forested, but the dominant tree species change with location, elevation, and aspect. Other vegetation types include alpine tundra, mountain meadows, valley grasslands, shrublands, and hardwood riparian systems. The region is divided into two subregions, corresponding to Land Resource Regions A and E, plus other scattered mountain ranges that support predominantly coniferous forest vegetation (Figure 1). Important characteristics of each subregion and other applicable areas are described briefly below. Further details can be found in Bailey (1995) and USDA Natural Resources Conservation Service (2006a).

Northwest Forests and Coast (LRR A)

This subregion contains the northwest Coast Ranges, Cascade Mountains, Willamette Valley, Puget Sound, and the coastal plain, bays, and estuaries bordering the Pacific Ocean (Figure 1). Average annual temperature is 45 to 55 °F (7 to 13 °C) and average annual rainfall is 45 to 60 in. (1,145 to 1,525 mm) across much of the subregion, although the Willamette/Puget lowlands and eastern slope of the Cascades are drier (USDA Natural Resources Conservation Service 2006a). The subregion extends from sea level to roughly 5,000 ft (1,500 m) in elevation in the Coast Ranges and generally 8,000 to 9,000 ft (2,400 to 2,700 m) in the Cascades. Scattered volcanic peaks punctuate the Cascade range. The highest, Mount Rainier, rises more than 14,000 ft (4,300 m) (Bailey 1995).

Common tree species throughout the subregion include Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), silver fir (*A. amabilis*), and Sitka spruce (*Picea sitchensis*). At higher elevations, mountain hemlock (*T. mertensiana*), subalpine fir (*A. lasiocarpa*), and whitebark pine (*Pinus albicaulis*) are common. In the fog belt of coastal California, the coast redwood (*Sequoia sempervirens*) is common, and ponderosa pine dominates the drier eastern slope of the Cascade Mountains. Bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), and other hardwood species are common in the Willamette/ Puget lowlands (Bailey 1995). Prairie and savanna ecosystems are also present in the lowlands, although many have been converted to agriculture.

Rocky Mountain Forests and Rangeland (LRR E)

This subregion consists of the Rocky Mountains and associated mountain ranges, plateaus, parks, and valleys from New Mexico to the Canadian border (Figure 1). The mountains are rugged and glaciated, rising up to 14,000 ft (4,300 m) in the southern part of the range. Mountain slopes throughout the subregion tend to be forested, with valleys dominated by shrubs and grasses (USDA Natural Resources Conservation Service 2006a). Average annual temperature ranges from 32 to 50 °F (0 to 10 °C) and average annual precipitation from less than 10 in. (255 mm) in the drier valleys to more than 40 in. (1,020 mm) in the mountains (Bailey 1995; USDA Natural Resources Conservation Service 2006a).

Vegetation across the subregion is distributed in altitudinal zones modified by the effects of latitude, exposure, and prevailing winds (Bailey 1995). The highest elevations are treeless and dominated by alpine tundra. Below that, the subalpine zone in many areas is dominated by Engelmann spruce (*Picea engelmannii*) and subalpine fir. Below the subalpine zone, the montane zone in the southern Rocky Mountains supports mainly Douglas-fir on the higher and/or moister sites and ponderosa pine on the lower and/or drier sites. Lodge-pole pine (*Pinus contorta*) and quaking aspen (*Populus tremuloides*) may dominate after wildfires. In the northern Rockies, the montane zone is often dominated by western red cedar and western hemlock, along with Douglas-fir, western white pine (*P. monticola*), western larch (*Larix occidentalis*), grand fir, and ponderosa pine (Bailey 1995).

Sierra Nevada Mountains (MLRA 22A)

The Sierra Nevada Mountains in California (MLRA 22A in LRR D) are included in the Western Mountains, Valleys, and Coast Region (Figure 1). The Sierra Nevada range is 50 to 80 miles (80 to 130 km) wide and approximately 400 mi (645 km) long, and rises gently on the west side to a steep eastern escarpment. The highest peaks commonly exceed 12,000 ft (3,660 m). Mount Whitney at 14,494 ft (4,419 m) is the highest in the contiguous United States. Most areas in the mountains receive 40 to 80 in. (1,015 to 2,030 mm) of precipitation each year, with less in the foothills and lower valleys. Average annual temperature ranges from 25 to 63 °F (−4 to 17 °C), and summers are dry (USDA Natural Resources Conservation Service 2006a).

The area supports coniferous forest vegetation distributed in altitudinal zones. The most abundant species in the lower montane zone include ponderosa pine, Jeffrey pine (*Pinus jeffreyi*), Douglas-fir, sugar pine (*P. lambertiana*), white fir (*Abies concolor*), California red fir (*A. magnifica*), and incense cedar (*Calocedrus decurrens*). The subalpine zone supports mountain hemlock, California red fir, lodge-pole pine, western white pine, and whitebark pine (Bailey 1995).

Southern Cascade Mountains (MLRA 22B)

This southern end of the Cascade Mountain range consists of volcanic hills and peaks rising generally to 8,200 ft (2,500 m) but as high as 14,162 ft (4,318 m) on Mount Shasta (Figure 1). Average annual precipitation is typically 15 to 80 in. (380 to 2,030 mm) and average annual temperature is 33 to 62 °F (1 to 17 °C) (USDA Natural Resources Conservation Service 2006a).

Low-elevation mixed conifer forests are dominated by ponderosa pine in association with incense cedar and California black oak (*Quercus kelloggii*) on the western slopes and Jeffrey pine on the eastern slopes. Higher elevations support white fir, sugar pine, ponderosa pine, incense cedar, Douglas-fir, California black oak, lodge-pole pine, and California red fir (USDA Natural Resources Conservation Service 2006a).

Arizona and New Mexico Mountains (MLRA 39)

This area consists of steep foothills, mountains, and plateaus formed of sedimentary and volcanic rocks (Figure 1). In general, elevation ranges from 4,000 to more than 7,500 ft (1,220 to 2,285 m) with some peaks above 11,000 ft (3,350 m). Average annual precipitation is 15 to 30 in. (380 to 760 mm) with as much as 43 in. (1,090 mm) in the mountains. Average annual temperature is 36 to 55 °F (2 to 13 °C) (USDA Natural Resources Conservation Service 2006a).

Lower elevations and south-facing slopes support a mixture of grasses, brush, oak/juniper woodlands, and pinyon/juniper woodlands. Ponderosa pine forests begin at approximately 7,000 ft (2,100 m) elevation and grade into Douglas-fir forests at higher elevations. Where present, the subalpine zone supports Engelmann spruce, corkbark fir (*Abies lasiocarpa* var. *arizonica*), limber pine (*Pinus flexilis*), and bristlecone pine (*P. aristata*) (Bailey 1995).

Black Hills (MLRA 62)

The Black Hills rise out of the surrounding plains of western South Dakota and eastern Wyoming (Figure 1). Elevation ranges generally from 3,600 to

6,600 ft (1,100 to 2,010 m) with a high of 7,242 ft (2,208 m). Average annual precipitation is 16 to 37 in. (405 to 940 mm) and average annual temperature is 36 to 48 °F (2 to 9 °C) (USDA Natural Resources Conservation Service 2006a).

Forests in the Black Hills are dominated by ponderosa pine, with white spruce (*Picea glauca*) at higher elevations. There are no significant subalpine or alpine zones. Paper birch (*Betula papyrifera*) and quaking aspen occur on burned or cleared sites (Bailey 1995; USDA Natural Resources Conservation Service 2006a).

Types and distribution of wetlands

General

In contrast to the surrounding Arid West and Great Plains Regions, the Western Mountains, Valleys, and Coast Region receives moderate to abundant precipitation. Diverse and heterogeneous landscapes produce many settings where wetlands have formed. Nonetheless, wetlands and other shallow aquatic habitats occupy only a few percent of the land surface (Dahl 1990). Regional wetland types range from tidal salt marshes, tidal freshwater wetlands, interdunal wetlands, wet pygmy forests, wet meadows and pastures, and forested wetlands in coastal areas of Washington, Oregon, and northern California to snowmelt-fed wet meadows, fens, bogs, slope wetlands, seeps, forested wetlands, and riparian wetlands in the mountains throughout the region. Intermountain valleys between major mountain ranges contain riparian wetlands, including those in abandoned river channels and oxbow cutoffs, slope wetlands, and wet prairies, many of which have been converted to agricultural production or pasture.

Salt marshes occur in protected bays and in the shallow, low-gradient reaches of coastal rivers but, due to the steep topography of the Pacific Northwest coast, they are not as extensive as those on the Atlantic coast. Salt and brackish marshes in the region often support Lyngbye's sedge (*Carex lyngbyei*), pickleweed (*Salicornia virginica*), and grasses such as saltgrass (*Distichlis spicata*), tufted hairgrass (*Deschampsia caespitosa*), bentgrass (*Agrostis* spp.), and meadow barley (*Hordeum brachyantherum*). Cordgrasses (*Spartina* spp.), not native to the region, have invaded in several areas, notably in Humboldt Bay in northern California and Willapa Bay in Washington. Most estuaries also contain many acres of diked and tide-gated former high salt marsh that was converted to pasture. These areas are now the focus of considerable wetland restoration activity. Tidal freshwater marshes and swamps have always been limited in the region due to relatively steep coastal gradients, but they have also been heavily impacted by human activities and many have been converted to other uses. For example, Sitka spruce swamps are now rare (Christy 1993; Adamus 2005).

Nontidal, freshwater wetlands in coastal areas include the fringes of coastal lagoons and lakes; shrub and forested wetlands in valleys supporting species such as red alder (*Alnus rubra*), willows (e.g., *Salix hookeriana*), water parsley (*Oenanthe sarmentosa*), skunk cabbage (*Lysichiton americanus*), salmonberry (*Rubus spectabilis*), and slough sedge (*Carex obnupta*); *Sphagnum* wetlands with trees such as shore pine (*Pinus contorta* ssp. *contorta*) and western hemlock, shrubs such as Labrador-tea (*Ledum glandulosum*), sweet gale (*Myrica gale*), and bog blueberry (*Vaccinium uliginosum*), and herbaceous plants including California pitcher-plant (*Darlingtonia californica*) and slough sedge; marshes and wet meadows (many diked or partially drained and used for pasture); riparian wetlands typically dominated by red alder; and interdunal wetlands supporting willows (*Salix* spp.), sickle-leaved rush (*Juncus falcatus*), salt rush (*J. lesueurii*), golden-eyed grass (*Sisyrinchium californicum*), and Pacific silverweed (*Argentina egedii*) (Akins and Jefferson 1973; Christy et al. 1998; Christy 2001).

The Willamette/Puget lowlands, located between the Coast Range and the Cascade Range, once supported vast expanses of wet prairie dominated by tufted hairgrass, California oatgrass (*Danthonia californica*), a variety of sedges (e.g., *Carex densa*, *C. unilateralis*), and common camas (*Camassia quamash*). These prairies were maintained by periodic burning by native Americans. The area also included extensive hardwood-forested wetlands dominated by Oregon ash, Oregon white oak (*Quercus garryana*), and bigleaf maple. Today, only remnants of these wetland systems remain. The most common wetland types today include forested or shrub wetlands dominated by Oregon ash, hardhack (*Spiraea douglasii*), Douglas and English hawthorn (*Crataegus douglasii* and *C. monogyna*), and rose (*Rosa* spp.) with numerous herbaceous species; disturbed prairie wetlands with native species such as tufted hairgrass, California oatgrass, sedges, a variety of herbaceous species such as camas, asters, mints, and buttercups (*Ranunculus* spp.), and introduced grasses; and many acres of agriculturally managed wetlands (Chappell and Christy 2004; Christy 2004).

Many wetlands in the urban and urbanizing areas of the Willamette/Puget lowlands reflect severe and recurrent disturbance. Reed canarygrass (*Phalaris arundinacea*) is well adapted to the flashy hydrology and high sediment and nutrient loads running off urban landscapes, and its prodigious mats of rhizomes exclude competitors. Opportunistic native species such as common cattail (*Typha latifolia*) and Douglas spirea are also typical of low-diversity wetlands in urban areas. Non-native weedy invaders include bittersweet nightshade (*Solanum dulcamara*), soft rush (*Juncus effusus*), creeping buttercup (*Ranunculus repens*), purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus armeniacus*), Japanese knotweed (*Polygonum cuspidatum*), giant knotweed (*Polygonum sachalinense*), and a common hybrid of the two, *Polygonum* x *bohemicum* (Cooke and Azous 2001; Zika and Jacobson 2003).

High-elevation wetlands in the Western Mountains, Valleys, and Coast Region are found in meadows, along lake shores, and along streams in steep-sided valleys that provide limited space for wetlands to form. Therefore, wetlands in the mountains, although numerous in some areas, generally are small and scattered. Areas that were subject to mountain glaciation during the Pleistocene, including the Sierra Nevada, Cascade, and Olympic mountain ranges, isolated ranges in the Great Basin, and scattered portions of the Rocky Mountains, today support numerous wetlands in glacial basins, kettle holes, along meandering streams in U-shaped valleys, around moraine-dammed lakes, and in flat areas formed by filling of moraine lakes with glacial outwash and alluvium. Near treeline throughout the mountain region, nivation depressions (formed by the weight of snow over saturated soils) and solifluction terraces (formed by down-slope movement of wet soils over seasonal ice or bedrock) form numerous small ponds and depressional wetlands (Windell et al. 1986).

At lower elevations, unglaciated V-shaped canyons incised by rushing streams and rivers generally have little floodplain development and few wetlands except, perhaps, for a narrow riparian fringe. Wetland abundance and diversity are much greater in the level to rolling alluvial deposits of intermountain basins and valleys, such as the Stanley Valley in Idaho, Jackson Hole in Wyoming, and Middle Park in Colorado. These same areas are often used intensively for agriculture, grazing, human settlement, and wildlife refuges (Windell et al. 1986).

Mountain wetlands include fens, bogs, marshes, wet meadows, and various shrub and forested wetlands (Windell et al. 1986). Fens and bogs occur on organic or organic-rich mineral soils in areas where the water table is near the surface for much of the year. Fens are common in the Rocky Mountains, Sierra Nevada, and other western mountain ranges. They receive inputs of groundwater and support herbaceous communities dominated by sedges (e.g., *Carex aquatilis* and *C. utriculata*), rushes (*Juncus* spp.), spikerushes (e.g., *Eleocharis acicularis*), and grasses (e.g., *Calamagrostis canadensis*). Some fens support a woody overstory of willows (e.g., *Salix planifolia*, *S. wolfii*) and dwarf birch (*Betula glandulosa*) (Windell et al. 1986). Bogs, on the other hand, are not common in the region but may be found in Oregon, Washington, and the northern Rocky Mountains (NatureServe 2006). They are acidic and nutrient-poor, receiving much of their water from precipitation. Bogs usually support a moss layer dominated by *Sphagnum* and ericaceous shrubs (e.g., *Ledum* spp.).

Marshes and wet meadows support herbaceous plant species and develop on mineral soils, some with high organic content, that are seasonally ponded or saturated. Marshes are wetter systems often bordering open water and may grade into wet meadows upslope. Wet meadows also lie in or below snowbeds that supply water for a few weeks each year as the snow melts. In the Rocky Mountains, freshwater marshes and wet meadows are often dominated by sedges, rushes, grasses (e.g., *Calamagrostis canadensis*, *Deschampsia caespitosa*), and herbaceous dicots (e.g., *Cardamine cordifolia*, *Erigeron peregrinus*). In saline systems in some intermountain basins, wet meadows may be dominated by salt-tolerant grasses (e.g., *Distichlis spicata*, *Sporobolus airoides*).

Narrow ribbons of wetland dominated by flowering plants exist along many small streams in the alpine, subalpine, and montane zones of western mountain ranges. Common species include larkspur (*Delphinium* spp.), monkey-flower (*Mimulus* spp.), monkshood (*Aconitum columbianum*), and groundsel (*Senecio* spp.) (Windell et al. 1986).

Shrub-dominated wetlands on mineral soils occur in floodplains and riparian zones in mountains throughout the region, and dominant species vary with location, elevation, and other factors. Common wetland shrubs in the Rocky Mountains include diamond-leaf willow (*Salix planifolia*), Geyer willow (*S. geyerana*), mountain willow (*S. monticola*), and Drummond willow (*S. drummondiana*). Forested wetlands occur in floodplains, springs, seeps, adjacent to running waters, and in other areas with high water tables. Coniferous trees such as Engelmann spruce, subalpine fir, and lodge-pole pine are sometimes found in wetlands in the Rocky Mountains. At lower elevations in intermountain basins, such as areas transitional to the Arid West or Great Plains Regions, common riparian-wetland species include narrow-leaf cottonwood (*Populus angustifolia*), balsam poplar (*P. balsamifera*), Fremont cottonwood (*P. fremontii*), and sandbar willow (*S. exigua*) (Windell et al. 1986).

Irrigated wetlands

Irrigation has been practiced in some portions of the Western Mountains, Valleys, and Coast Region for more than 125 years and has changed the natural hydrologic regime over large areas. When practiced over many years, the application of irrigation water can alter soil characteristics (e.g., color, redox features, and salt content) and vegetation of affected areas. Long-term irrigation has created new wetlands and altered existing wetlands throughout the region.

Irrigation augments the natural hydrology of the affected areas in both intended and unintended ways, through leakage of water from delivery channels and ditches, application of water to irrigated pastures and fields, and overflow of unused or excess irrigation water into other areas down gradient. The added water, over time, may create new wetlands or augment and enlarge previously existing wetlands. For example, seep wetlands may develop in former uplands due to leakage from irrigation canals and ditches; prolonged flooding and soil saturation may induce soil redoximorphic features and hydrophytic vegetation in irrigated pastures; and the accumulation of excess irrigation water in basins and swales may augment previously existing wetlands, raising their water tables and expanding their margins farther up slope. Indicators given in this Regional Supplement can be used to identify all wetlands, whether natural or created artificially by human activity. Characterizing the naturally occurring hydrology is often key to distinguishing natural from irrigation-induced wetlands, and the timing of field observations can be critical. Observations made during the early part of the growing season, when natural hydrology is often at its peak and irrigation has not yet begun, may help to differentiate natural and induced wetland features. The appropriate Corps of Engineers District Regulatory Office should be consulted when it is necessary to distinguish between naturally occurring and irrigation-induced wetlands for Clean Water Act regulatory purposes.

2 Hydrophytic Vegetation Indicators

Introduction

The Corps Manual defines hydrophytic vegetation as the assemblage of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence. The manual uses a plant-community approach to evaluate vegetation. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Hydrophytic vegetation is present when the plant community is dominated by species that require or can tolerate prolonged inundation or soil saturation during the growing season. Hydrophytic vegetation in the Western Mountains, Valleys, and Coast Region is identified by using the indicators described in this chapter.

Many factors in addition to site wetness affect the composition of the plant community in an area, including regional climate, local weather patterns, topography, soils, and plant distribution patterns at various spatial and temporal (historic to current) scales. The vegetation of the Western Mountains, Valleys, and Coast Region is characterized by high overall diversity of species, communities, and associations due in part to the greater variety of available environments and plant adaptive strategies than in other regions of the contiguous United States. Species diversity varies greatly from east to west, north to south, and along elevation gradients. The flora of the region has been shaped by the uplift of mountains and other major geologic forces, post-glacial changes in plant distribution patterns, and speciation in response to the availability of diverse habitats and climatic conditions. Western mountain ranges have acted both as corridors and barriers to plant migration (Weber 1976). Different subregions of the Western Mountains, Valleys, and Coast Region tend to have distinct vegetation but still have many shared species. Uniform climatic influences along the Pacific Ocean have created similar floristic compositions from north to south along the coastal mountain ranges. The eastern slopes and higher elevations of the Cascade and Sierra Nevada ranges have a distinct flora from that of the coastal ranges. The vegetation of the Rocky Mountains from Canada to southern New Mexico is influenced by both elevation and latitudinal gradients (Allen et al. 1991). Valleys interspersed within the mountains often have different climatic conditions and a greater variety of soil types that add to plant diversity. Finally, high-elevation areas within the major mountain ranges share many glacial relict species but also have many endemics derived from their local floras. Thus, western landscapes contain a wide variety of habitats requiring an array of adaptations for plants to survive in areas ranging from alpine tundra, mountain slopes and valleys, high plateaus, and riparian corridors to temperate rain forests, tidal systems, and coastal strand.

Coniferous forest is the dominant forest type in the region. Deciduous trees are generally restricted to young forest stands, riparian corridors, and many disturbed sites. Exceptions include large stands of aspen (*Populus tremuloides*) and oak woodlands (e.g., *Quercus gambellii*) located in montane settings. Dry summers, cold winters, and short growing seasons generally restrict the occurrence of deciduous forest in the region.

Temperate rain forests of the northern Coast Ranges are dominated by coniferous species and have complex vegetation structure and a wide range of tree sizes and ages. These forests contain many individual species that are adapted to both wetland and non-wetland sites. Heavy and frequent rainfall may be advantageous to wetland species in the rain forest but many sites may lack hydric soils or wetland hydrology indicators.

In interior foothills and intermountain basins, climatic fluctuations can produce seasonal and decadal-scale shifts in wetland species composition. Changes in species composition of woody shrubs and trees in wetlands are generally not dramatic. Decade-long drought conditions may stress woody plants but they typically survive and persist at drought-influenced wetland sites. Herbaceous wetland communities, however, respond much more quickly and dramatically. Vernal pools and other depressional wetlands, wet prairies, seeps, and springs in this region are particularly prone to shifts in species composition as a result of seasonal and longer term climatic fluctuations.

Saline wetlands and small lakes with halophytic vegetation are found throughout the region, particularly in southern intermountain valleys. Halophytes have morphological and physiological adaptations that allow them to persist in highly saline soil and water conditions. In addition, phreatophytes with long roots adapted to reach deep subsurface water tables are associated with rivers and streams throughout the region.

Although often found in wetlands, halophytes and phreatophytes located in areas with ephemeral hydrology can sometimes be misleading indicators of wetland conditions. They may dominate plant communities in areas that are highly saline but lack wetland hydrology or hydric soils, or they may occur in areas where groundwater is below the depth required to meet wetland criteria.

In summary, plant community composition reflects the adaptations of the plant species present, superimposed on a complex spatial and historical pattern of hydrologic, edaphic, and other environmental conditions. Disturbances, such as floods, wildfires, grazing, and recent site modifications, are also important. They can set back or alter the course of plant-community succession and may even change the hydrophytic status of the vegetation. See Chapter 5 for discussions of problematic wetland vegetation situations in the region.

Hydrophytic vegetation decisions are based primarily on the wetland indicator status (Reed 1988, 1993 [supplement in Region 9]; or current approved lists) of species that make up the plant community. Species in the facultative categories (FACW, FAC, and FACU) are recognized as occurring in both wetlands and non-wetlands to varying degrees. Although most wetlands are dominated mainly by species rated OBL, FACW, and FAC, some wetland communities may be dominated primarily by FACU species, such as western hemlock, and cannot be identified by dominant species alone. In those cases, other indicators of hydrophytic vegetation must also be considered, particularly where indicators of hydric soils and wetland hydrology are present. This situation is not necessarily due to inaccurate wetland indicator ratings; rather, it is due to the broad tolerances of certain plant species that allow them to be widely distributed across the moisture gradient. Therefore, for some species, it is difficult to assign a single indicator status rating that encompasses all of the various landscape and ecological settings it can occupy.

Hydrophytic vegetation indicators and procedures presented in this chapter are designed to identify the majority of wetland plant communities in the region. However, some wetland communities may lack any of these indicators. These situations are considered in Chapter 5 (Difficult Wetland Situations in the Western Mountains, Valleys, and Coast Region).

Guidance on vegetation sampling and analysis

General guidance on sampling of vegetation for wetland-delineation purposes is given in the Corps Manual. Those procedures are intended to be flexible and often need to be modified for application in a given region or on a particular site. Vegetation sampling done as part of a wetland delineation is designed to characterize the site in question rapidly without the need for detailed scientific study or statistical methods. A balance must be established between the need to accomplish the work quickly and the need to characterize the site's heterogeneity accurately and at an appropriate scale. The following guidance on vegetation sampling is intended to supplement the Corps Manual for applications in the Western Mountains, Valleys, and Coast Region.

The first step is to stratify the site so that the major landscape or vegetation units can be evaluated separately. This may be done in advance using an aerial photograph or topographic map, and/or by walking the site. In general, routine wetland determinations are based on visual estimates of percent cover of plant species that can be made either (1) within the vegetation unit as a whole, or (2) within one or more sampling plots established in representative locations within each unit. Percent cover estimates are more accurate and repeatable if taken within a defined plot. This also facilitates field verification of another delineator's work. The sizes and shapes of plots, if used, may be modified as appropriate to adapt to site conditions and should be recorded on the field data form if they deviate from those recommended in the Corps Manual. When sampling near a plant-community boundary, and particularly near the wetland boundary, it may be necessary to adjust plot size or shape to avoid overlapping the boundary and extending into an adjacent community having different vegetation, soils, or hydrologic conditions.

For wetland delineation purposes, an area is considered to be vegetated if it has 5 percent or more total plant cover at the peak of the growing season. See "Sparse and Patchy Vegetation" in Chapter 5 for a discussion of areas that contain both vegetated and unvegetated wet areas.

If it is not possible to locate one or a few plots in a way that adequately represents the vegetation unit being sampled, then percent cover estimates can be obtained by walking the unit and visually estimating the coverage of each species over a broader area. If additional quantification of cover estimates is needed, then the optional procedure for point-intercept sampling along transects (see Appendix B) may be used to characterize the vegetation unit, as long as soil and hydrologic conditions are uniform across the sampled area.

Vegetation sampling guidance presented here and in the Corps Manual should be appropriate for most situations. However, many variations in vegetation structure, diversity, and spatial arrangement exist on the landscape and not all can be addressed adequately in this supplement. A list of references is given in Table 3 for more complex sampling situations. If alternative sampling techniques are used, they should be described in field notes or in the delineation report. The basic data must include abundance values for each species present. Typical abundance measures include basal area (for trees), percent areal cover, stem density, or frequency based on point-intercept sampling. In any case, the data must be in a format that can be used in the dominance test or prevalence index for hydrophytic vegetation (see Hydrophytic Vegetation Indicators).

In this supplement, absolute percent cover is the preferred abundance measure for all species. For percent cover estimates, it is not necessary for all plants to be rooted in the plot as long as they are growing under the same soil and hydrologic conditions. It may be necessary to exclude plants that overhang the plot if they are rooted in areas having different soil and hydrologic conditions, particularly when sampling near the wetland boundary.

Table 3. Selected references to additional vegetation sampling approaches that could be used in wetland delineation.

Reference	Comment
Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. *Measuring and Monitoring Plant Populations*. Bureau of Land Management Technical Reference 1730-1. Washington, DC: U.S. Dept. of the Interior.	Clearly presented and easy-to-read information on determining sample size and adequacy.
Kent, M., and P. Coker. 1992. *Vegetation Description and Analysis: A Practical Approach.* New York, NY; Wiley.	Simple and clear methods for setting up a study, and collecting and analyzing the data. Initial chapters are helpful for data collection and sampling approaches in wetland delineation.
Mueller-Dombois, D., and H. Ellenberg. 1974. *Aims and Methods of Vegetation Ecology*. New York, NY; Wiley.	A standard text in vegetation ecology, sampling, and analysis. This reference provides many sampling and analytical methods that are helpful in complex delineations.

Definitions of strata

Vegetation strata within a plot are sampled separately when evaluating indicators of hydrophytic vegetation. The structure of vegetation varies greatly in wetland communities across the region. Throughout much of the Western Mountains, Valleys, and Coast Region, short-statured woody plants (i.e., less than 3.2 ft [1 m] high or "sub-shrubs") are a common growth form. The Corps Manual combines short woody plants and herbaceous plants into a single "herb" stratum for sampling purposes. However, in this region, more information about the plant community is gained when short shrubs and herbaceous plants are sampled separately. Therefore, the following vegetation strata are recommended for use across the region. This system places short woody shrubs in the sapling/shrub stratum and limits the herb stratum to only herbaceous plant species.

Unless otherwise noted, a stratum for sampling purposes is defined as having 5 percent or more total plant cover. If a stratum has less than 5 percent cover during the peak of the growing season, then those species and their cover values can be combined into another stratum for sampling purposes. For example, if either the tree or woody vine strata have less than 5 percent cover, then any trees or vines present may be combined with the sapling/shrub stratum.

1. *Tree stratum* – Consists of woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
2. *Sapling/shrub stratum* – Consists of woody plants less than 3 in. DBH, regardless of height.
3. *Herb stratum* – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size.
4. *Woody vines* – Consists of all woody vines, regardless of height.

Sampling wetland non-vascular plants

Background. Non-vascular plants, defined here as bryophytes (mosses, liverworts, hornworts), lichens, and fungi, often form extensive ground cover in forest, bog, and fen ecosystems in the Pacific Northwest. The non-vascular plant flora of this area is diverse and the identification of species can be challenging even to experts due to ephemeral or missing fruiting structures and minute differences in morphological characteristics. The Corps Manual does not include non-vascular plants in hydrophytic vegetation decisions. However, in this regional supplement, the presence and abundance of certain wetland non-vascular plant species may be used as an indicator of hydrophytic vegetation in certain situations where indicators of hydric soil and wetland hydrology are also present.

In the Pacific Northwest, wetlands that are dominated by western hemlock are often difficult to identify because few other vascular plant species grow under the dense canopy of western hemlock trees (a FACU species) in these habitats. However, these areas often support a well-developed and diverse ground cover of bryophytes. Lichvar et al. (2009) developed a list of common and relatively easy-to-identify bryophyte species that were highly associated with wetlands in black spruce (*Picea mariana*) forests in Alaska. The same approach was used to identify bryophyte species that were highly associated with wetlands on study sites in western hemlock forests in Oregon and Washington. Wetland-specialist bryophytes were defined as those having 67 percent or higher frequency of occurrence in wetlands. When one or more of these species comprised more than 50 percent of the total bryophyte cover, the indicator had a greater than 90 percent probability of association with wetlands. Table 4 is a list of bryophyte species used with the wetland non-vascular plant indicator.

Table 4. Bryophyte species that are highly associated with wetlands in western hemlock forests in the Pacific Northwest.

Chiloscyphus pallescens
Eurhynchium praelongum
Rhizomnium glabrescens
Rhizomnium magnifolium
Riccardia latifrons
Sphagnum angustifolium
Sphagnum palustre

Plot Size. To determine whether hydrophytic vegetation is present using the non-vascular plant layer, areal cover estimates are recorded for all bryophytes within a plot. Due to the sorting of different species on the tops of hummocks versus the swales, if present, sampling of bryophytes is restricted to the swales located between and at the bases of hummocks and utilizes a 10- by 10-in. (25- by 25-cm) quadrat. To ensure that the sampling plots adequately capture species diversity, three quadrats are suggested, if space is available. Data from these three plots can be combined and averaged to determine if the indicator is met.

Seasonal considerations and cautions

To the extent possible, the hydrophytic vegetation decision should be based on the plant community that is normally present during the wet portion of the growing season in a normal rainfall year. However, wetland determinations must often be performed at other times of year, or in years with unusual or atypical weather conditions. Except along the coast, much of the region has a highly seasonal climate, with a cool wet spring, a relatively hot dry summer, and a cold, often snowy winter. Vegetation sampling for a wetland determination can be challenging when some plants die back in response to seasonal or long-term drought, freezing temperatures, or other factors. At these times, experience and professional judgment may be required to adapt the vegetation sampling scheme or use other sources of information to determine the plant community that is normally present.

For example, late fall, winter, and early spring sampling in mountain areas may be hampered by snow and ice that cover the ground and make it impractical to identify plant species and estimate plant cover. When an on-site evaluation of the vegetation is impractical due to excessive snow and ice, one option is to use existing off-site data sources, such as National Wetlands Inventory (NWI) maps, soil surveys, and aerial photographs, to make a preliminary hydrophytic-vegetation determination. These sources may be supplemented with limited on-site data, including those plant species that can be identified. Later, when conditions are favorable, an on-site investigation must be made to verify the preliminary determination and complete the wetland delineation.

Other factors can alter the plant community on a site and affect a hydrophytic vegetation determination, including seasonal changes in species composition, intense grazing, wildfires and other natural disturbances, and human land-use practices. These factors are considered in Chapter 5.

Hydrophytic vegetation indicators

The following indicators should be applied in the sequence presented. The stepwise procedure is designed to reduce field effort by requiring that only one or two indicators, variations of the dominance test, be evaluated in the majority of wetland determinations. However, hydrophytic vegetation is present if any of the indicators is satisfied. These indicators are applicable throughout the entire Western Mountains, Valleys, and Coast Region.

Indicators of hydrophytic vegetation involve looking up the wetland indicator status of plant species on the wetland plant list (Reed [1988] or current list). For the purposes of this supplement, only the five basic levels of wetland indicator status (i.e., OBL, FACW, FAC, FACU, and UPL) are used in hydrophytic vegetation indicators. Plus (+) and minus (–) modifiers are not used (e.g., FAC–, FAC, and FAC+ plants are all considered to be FAC). For species listed as NI (reviewed but given no regional indicator) or NO (no known occurrence in the region at the time the list was compiled), apply the indicator status assigned to the species in the nearest adjacent region. If the species is listed but no adjacent regional indicator is assigned, do not use the species to calculate hydrophytic vegetation indicators. In general, species that are not listed on the wetland plant list are assumed to be upland (UPL) species. However, recent changes in plant nomenclature have resulted in a number of species that are not listed by Reed (1988) but are not necessarily UPL plants. Procedures described in Chapter 5, section on Problematic Hydrophytic Vegetation, can be used if it is believed that individual FACU, NI, NO, or unlisted plant species are functioning as hydrophytes on a particular site. For Clean Water Act purposes, wetland delineators should use the latest plant lists approved by Headquarters, U.S. Army Corps of Engineers (Figure 2) (http://www.usace.army.mil/CECW/Pages/reg_supp.aspx).

Evaluation of the vegetation can begin with a rapid field test for hydrophytic vegetation to determine if there is a need to collect more detailed vegetation data. The rapid test for hydrophytic vegetation (Indicator 1) is met if all dominant species across all strata are OBL or FACW, or a combination of the two, based on a visual assessment. If the site is not dominated solely by OBL and FACW species, proceed to the standard dominance test (Indicator 2), which is the basic hydrophytic vegetation indicator. Either Indicator 1 or 2 should be applied in every wetland determination. Most wetlands in the Western Mountains, Valleys, and Coast Region have plant communities that will meet one or both of these indicators. These are the only indicators that need to be considered in most situations. However, some wetland plant communities may fail a test based only on dominant species. Therefore, in those cases where indicators of hydric soil and wetland hydrology are present, the vegetation

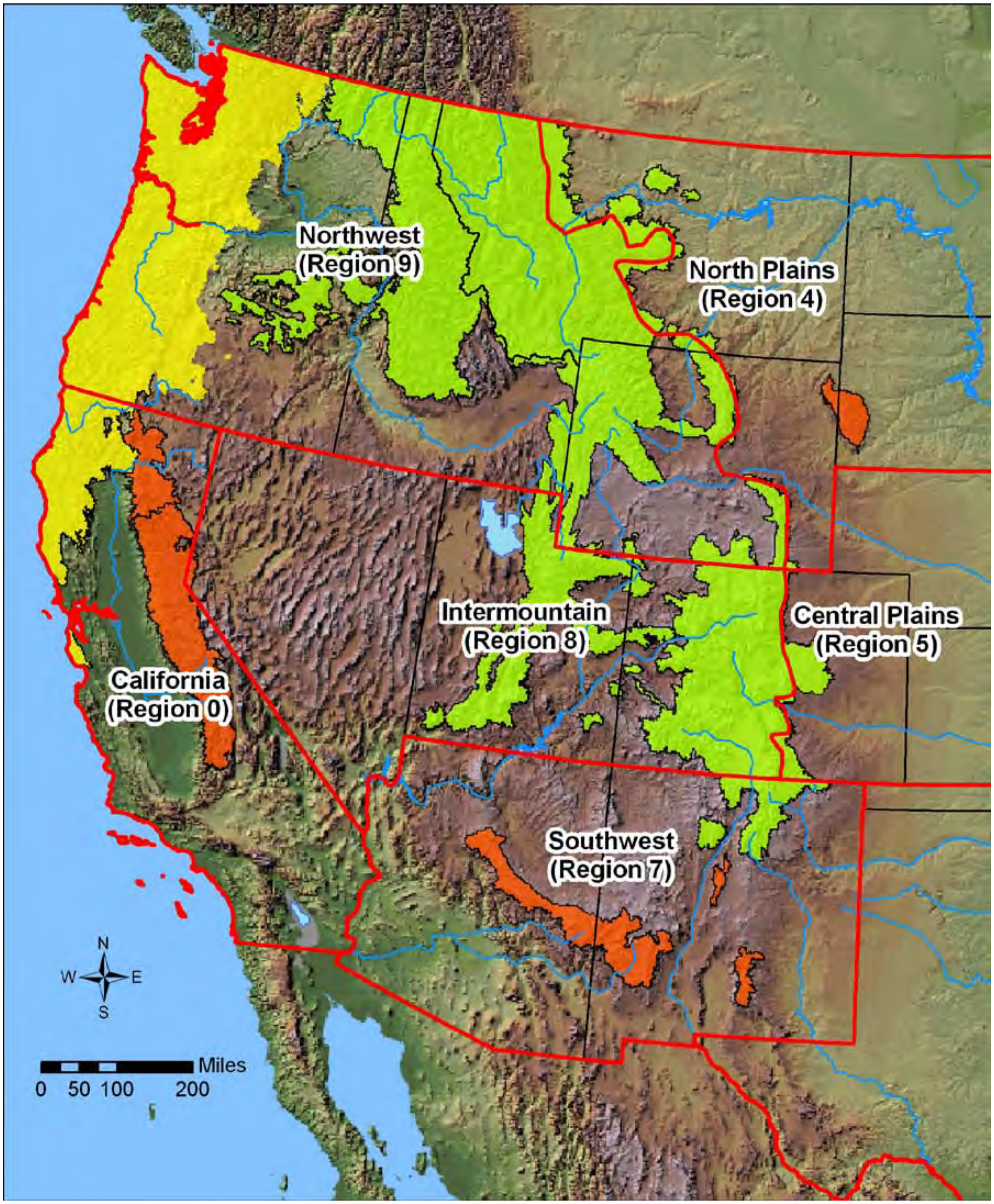


Figure 2. Plant list regional boundaries (red lines) currently used by the U.S. Fish and Wildlife Service, National Wetlands Inventory, in the Western Mountains, Valleys, and Coast Region.

should be reevaluated with the prevalence index (Indicator 3), which takes into consideration all plant species in the community, not just a few dominants. In addition, plant morphological adaptations (Indicator 4) and wetland non-vascular plants (Indicator 5) can be used to distinguish certain wetland plant communities in the region, when indicators of hydric soil and wetland hydrology are present. Finally, certain disturbed or problematic wetland situations may lack any of these indicators and are described in Chapter 5.

Procedure

The procedure for using hydrophytic vegetation indicators is as follows:

1. Apply Indicator 1 (Rapid Test for Hydrophytic Vegetation).
   a. If the plant community passes the rapid test for hydrophytic vegetation, then the vegetation is hydrophytic and no further vegetation analysis is required.
   b. If the rapid test for hydrophytic vegetation is not met, then proceed to step 2.

2. Apply Indicator 2 (Dominance Test).
   a. If the plant community passes the dominance test, then the vegetation is hydrophytic and no further vegetation analysis is required.
   b. If the plant community fails the dominance test, and indicators of hydric soil and/or wetland hydrology are absent, then hydrophytic vegetation is absent unless the site meets requirements for a problematic wetland situation (see Chapter 5).
   c. If the plant community fails the dominance test, but indicators of hydric soil and wetland hydrology are both present, proceed to step 3.

3. Apply Indicator 3 (Prevalence Index). This and the following step assume that at least one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present.
   a. If the plant community satisfies the prevalence index, then the vegetation is hydrophytic. No further vegetation analysis is required.
   b. If the plant community fails the prevalence index, proceed to step 4.

4. Apply Indicators 4 (Morphological Adaptations) and/or 5 (Wetland Non-Vascular Plants).
   a. If either indicator is satisfied, then the vegetation is hydrophytic.
   b. If none of the indicators is satisfied, then hydrophytic vegetation is absent unless indicators of hydric soil and wetland hydrology are present and the site meets the requirements for a problematic wetland situation (Chapter 5).

Indicator 1: Rapid test for hydrophytic vegetation

Description: All dominant species across all strata are rated OBL or FACW, or a combination of these two categories, based on a visual assessment.

User Notes: This test is intended as a quick confirmation in obvious cases that a site has hydrophytic vegetation, without the need for more intensive sampling. Dominant species are selected visually from each stratum of the community using the "50/20 rule" (see Indicator 2 – Dominance Test below) as a general guide but without the need to gather quantitative data. Only the dominant species in each stratum must be recorded on the data form.

Indicator 2: Dominance test

Description: More than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC.

User Notes: Use the "50/20 rule" described below to select dominant species from each stratum of the community. Combine dominant species across strata and apply the dominance test to the combined list. Once a species is selected as a dominant, its cover value is not used in the dominance test; each dominant species is treated equally. Thus, a plant community with seven dominant species across all strata would need at least four dominant species that are OBL, FACW, or FAC to be considered hydrophytic by this indicator. Species that are dominant in two or more strata should be counted two or more times in the dominance test.

Procedure for Selecting Dominant Species by the 50/20 Rule: Dominant plant species are the most abundant species in the community; they contribute more to the character of the community than do the other non-dominant species present. The 50/20 rule is a repeatable and objective procedure for selecting dominant plant species and is recommended when data are available for all species in the community.

Dominant species are chosen independently from each stratum of the community. In general, dominants are the most abundant species that individually or collectively account for more than 50 percent of the total coverage of vegetation in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total. For the purposes of this regional supplement, absolute percent cover is the recommended abundance measure for plants in all vegetation strata. See Table 5 for an example application of the 50/20 rule in evaluating a plant community. Steps in selecting dominant species by the 50/20 rule are as follows:

1. Estimate the absolute percent cover of each species in the first stratum. Since the same data may be used later to calculate the prevalence index, the data should be recorded as absolute cover and not converted to relative cover.
2. Rank all species in the stratum from most to least abundant.
3. Calculate the total coverage of all species in the stratum (i.e., sum their individual percent cover values). Absolute cover estimates do not necessarily sum to 100 percent.
4. Select plant species from the ranked list, in decreasing order of coverage, until the cumulative coverage of selected species *exceeds* 50 percent of the total coverage for the stratum. If two or more species are equal in coverage (i.e., they are tied in rank), they should all be selected. The selected plant species are all considered to be dominants. All dominants must be identified to species.
5. In addition, select any other species that, by itself, is at least 20 percent of the total percent cover in the stratum. Any such species is also considered to be a dominant and must be accurately identified.
6. Repeat steps 1-5 for any other stratum present. Combine the lists of dominant species across all strata. Note that a species may be dominant in more than one stratum (e.g., a woody species may be dominant in both the tree and sapling/shrub strata).

Table 5. Example of the selection of dominant species by the 50/20 rule and determination of hydrophytic vegetation by the dominance test.

Stratum	Species Name	Wetland Indicator Status	Absolute Percent Cover	Dominant?
Herb	*Deschampsia caespitosa*	FACW	30	Yes
	Carex unilateralis	FACW	15	Yes
	Parentucellia viscosa	FAC	15	Yes
	Danthonia californica	FACU	10	No
	Poa trivialis	FACW	10	No
	Agrostis capillaris	FAC	5	No
	Juncus tenuis	FACW	1	No
		Total cover	86	
		50/20 Thresholds: 50% of total cover = 43% 20% of total cover = 17.2%		
Sapling/shrub	*Crataegus monogyna*	FACU	25	Yes
	Crataegus douglasii	FAC	15	Yes
	Fraxinus latifolia	FACW	5	No
		Total cover	45	
		50/20 Thresholds: 50% of total cover = 22.5% 20% of total cover = 9.0%		
Tree	*Fraxinus latifolia*	FACW	25	Yes
Hydrophytic Vegetation Determination	Total number of dominant species across all strata = 6. Percent of dominant species that are OBL, FACW, or FAC = 83%. Therefore, this community is hydrophytic by Indicator 2 (Dominance Test).			

Indicator 3: Prevalence index

Description: The prevalence index is 3.0 or less.

User notes: The prevalence index ranges from 1 to 5. A prevalence index of 3.0 or less indicates that hydrophytic vegetation is present. To calculate the prevalence index, at least 80 percent of the total vegetation cover on the plot (summed across all strata) must be of species that have been correctly identified and have assigned wetland indicator statuses (Reed [1988] or current list) or are upland (UPL) species.

Procedure for calculating a plot-based prevalence index: The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot or other sampling unit, where each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and weighting is by abundance (absolute percent cover). It is a more comprehensive analysis of the hydrophytic status of the community than one based on just a few dominant species. It is particularly useful (1) in communities with only one or two dominants, (2) in highly diverse communities where many species may be present at roughly equal coverage, and (3) when strata differ greatly in total plant cover (e.g., total herb cover is 80 percent but sapling/shrub cover is only 10 percent). The prevalence index is used in this supplement to determine whether hydrophytic vegetation is present on sites where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test.

The following procedure is used to calculate a plot-based prevalence index. The method was described by Wentworth et al. (1988) and modified by Wakeley and Lichvar (1997). It uses the same field data (i.e., percent cover estimates for each plant species) that were used to select dominant species by the 50/20 rule, with the added constraint that at least 80 percent of the total vegetation cover on the plot must be of species that have been correctly identified and have an assigned indicator status (including UPL). For any species that occurs in more than one stratum, cover estimates are summed across strata. Steps for determining the prevalence index are as follows:

1. Identify and estimate the absolute percent cover of each species in each stratum of the community. Sum the cover estimates for any species that is present in more than one stratum.
2. Organize all species (across all strata) into groups according to their wetland indicator status (i.e., OBL, FACW, FAC, FACU, or UPL) and sum their cover values within groups. Do not include species that were not identified.
3. Calculate the prevalence index using the following formula:

$$PI = \frac{A_{OBL} + 2A_{FACW} + 3A_{FAC} + 4A_{FACU} + 5A_{UPL}}{A_{OBL} + A_{FACW} + A_{FAC} + A_{FACU} + A_{UPL}}$$

where:

PI = Prevalence index

A_{OBL} = Summed percent cover values of obligate (OBL) plant species;

A_{FACW} = Summed percent cover values of facultative wetland (FACW) plant species;

A_{FAC} = Summed percent cover values of facultative (FAC) plant species;

A_{FACU} = Summed percent cover values of facultative upland (FACU) plant species;

A_{UPL} = Summed percent cover values of upland (UPL) plant species.

See Table 6 for an example calculation of the prevalence index using the same data set as in Table 5. The following web link provides free public-domain software for simultaneous calculation of the 50/20 rule, dominance test, and prevalence index: http://www.crrel.usace.army.mil/rsgisc/wetshed/wetdatashed.htm.

Table 6. Example of the prevalence index using the same data as in Table 5.

Indicator Status Group	Species Name	Absolute Percent Cover by Species	Total Cover by Group	Multiply by:[1]	Product
OBL species	None	0	0	1	0
FACW species	*Deschampsia caespitosa* *Carex unilateralis* *Poa trivialis* *Juncus tenuis* *Fraxinus latifolia*[2]	30 15 10 1 30	86	2	172
FAC species	*Parentucellia viscosa* *Agrostis capillaris* *Crataegus douglasii*	15 5 15	35	3	105
FACU species	*Danthonia californica* *Crataegus monogyna*	10 25	35	4	140
UPL species	None	0	0	5	0
Sum			156 (A)		417 (B)
Hydrophytic Vegetation Determination		Prevalence Index = B/A = 417/156 = 2.67 Therefore, the prevalence index is less than 3.0 and this community is hydrophytic by Indicator 3.			

[1] Where OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5.

[2] *Fraxinus latifolia* was recorded in two strata (i.e., tree and sapling/shrub) (see Table 5), so the cover estimates for this species were summed across strata.

Indicator 4: Morphological adaptations

Description: The plant community passes either the dominance test (Indicator 2) or the prevalence index (Indicator 3) after reconsideration of the indicator status of certain plant species that exhibit morphological adaptations for life in wetlands.

User notes: Some hydrophytes in the Western Mountains, Valleys, and Coast Region develop easily recognized physical characteristics, or morphological adaptations, when they occur in wetland areas. Some of these adaptations may help them to survive prolonged inundation or saturation in the root zone; others may simply be a consequence of living under such wet conditions. Common morphological adaptations in the region include, but are not limited to, adventitious roots, multi-stemmed trunks, tussocks, and buttressing in tree species. These adaptations on FAC, FACW, or OBL species are additional evidence for the presence of a hydrophytic plant community. Morphological adaptations may also develop on FACU species when they occur in wetlands, indicating that those individuals are functioning as hydrophytes in that setting.

To apply this indicator, these morphological features must be observed on more than 50 percent of the individuals of a FACU species living in an area where indicators of hydric soil and wetland hydrology are present. Use caution in areas where buttressed tree bases and multiple stems may be due to shallow bedrock, browsing by herbivores, timber harvest, or other factors not related to wetness. Follow this procedure:

1. Confirm that the morphological feature is present mainly in the potential wetland area and is not also common on the same species in the surrounding non-wetlands.
2. For each FACU species that exhibits morphological adaptations, estimate the percentage of individuals that have the features. Record this percentage on the data form.
3. If more than 50 percent of the individuals of a FACU species have morphological adaptations for life in wetlands, that species is considered to be a hydrophyte and its indicator status on that plot should be reassigned as FAC. All other species retain their published indicator statuses. Record any supporting information on the data sheet, including a description of the morphological adaptation(s) present and any other observations of the growth habit of the species in adjacent wetland and non-wetland locations (photo documentation is recommended).

4. Recalculate the dominance test (Indicator 2) and/or the prevalence index (Indicator 3) using a FAC indicator status for this species. The vegetation is hydrophytic if either test is satisfied.

Indicator 5: Wetland non-vascular plants

Description: More than 50 percent of the total coverage of bryophytes consists of species known to be highly associated with wetlands (Table 4).

User notes: This indicator is based on the presence and abundance of a select group of wetland specialist bryophytes that are specific to forested wetlands (e.g., western hemlock swamps) in coastal Oregon and Washington. The indicator may also be applicable in other parts of the region but has not been tested there. To satisfy this indicator, the summed cover of wetland specialist bryophytes must be more than 50 percent of the total bryophyte cover in the plot. Follow this procedure:

1. Estimate the total cover of bryophytes (mosses, liverworts, and hornworts) within one or more 10- by 10-in. (25- by 25-cm) square plots placed at the base of any hummocks, if present. Lichens and fungi should not be included.
2. Estimate the percent cover for each of the wetland specialist bryophytes (Table 4) present and sum their cover values within plots.
3. Divide the summed cover value of wetland specialist bryophytes by the total bryophyte cover in the plot and multiply by 100 to convert to a percentage. Average these percentages across plots, if needed.
4. If more than 50 percent of the bryophyte cover consists of wetland specialists, then the vegetation is hydrophytic.

3 Hydric Soil Indicators

Introduction

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA Soil Conservation Service 1994). Most hydric soils exhibit characteristic morphologies that result from repeated periods of saturation or inundation for more than a few days. Saturation or inundation, when combined with microbial activity in the soil, causes the depletion of oxygen. This anaerobiosis promotes certain biogeochemical processes, such as the accumulation of organic matter and the reduction, translocation, or accumulation of iron and other reducible elements. These processes result in distinctive characteristics that persist in the soil during both wet and dry periods, making them particularly useful for identifying hydric soils in the field (USDA Natural Resources Conservation Service 2006b).

This chapter presents indicators that are designed to help identify hydric soils in the Western Mountains, Valleys, and Coast Region. Indicators are not intended to replace or relieve the requirements contained in the definition of a hydric soil. Therefore, a soil that meets the definition of a hydric soil is hydric whether or not it exhibits indicators. Guidance for identifying hydric soils that lack indicators can be found later in this chapter (see the sections on documenting the site and its soils) and in Chapter 5 (Difficult Wetland Situations in the Western Mountains, Valleys, and Coast Region).

This list of indicators is dynamic; changes and additions to the list are anticipated with new research and field testing. The indicators presented in this supplement are a subset of the NTCHS *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service [2006b] or current version) that are commonly found in the region. Any change to the NTCHS *Field Indicators of Hydric Soils in the United States* represents a change to this subset of indicators for the Western Mountains, Valleys, and Coast Region. Check the NRCS hydric soils web site (http://soils.usda.gov/use/hydric/) for updates to these indicators. To use the indicators properly, a basic knowledge of soil/landscape relationships is necessary.

Most of the hydric soil indicators presented in this supplement are applicable throughout the Western Mountains, Valleys, and Coast Region; however, some are specific to certain subregions. As used in this supplement, subregions are equivalent to the Land Resource Regions (LRR) or Major Land Resource Areas (MLRA) recognized by the USDA Natural Resources Conservation Service (2006a) (see Chapter 1, Figure 1). It is important to understand that boundaries between subregions are actually broad transition zones. Although an indicator may be noted as most relevant in a specific subregion, it may also be applicable in the transition to an adjacent subregion.

Concepts

Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. These processes and the features that develop are described in the following paragraphs.

Iron and manganese reduction, translocation, and accumulation

In an anaerobic environment, soil microbes reduce iron from the ferric (Fe^{3+}) to the ferrous (Fe^{2+}) form, and manganese from the manganic (Mn^{4+}) to the manganous (Mn^{2+}) form. Of the two, evidence of iron reduction is more commonly observed in soils. Areas in the soil where iron is reduced often develop characteristic bluish-gray or greenish-gray colors known as *gley*. Ferric iron is insoluble but ferrous iron easily enters the soil solution and may be moved or translocated to other areas of the soil. Areas that have lost iron typically develop characteristic gray or reddish-gray colors and are known as *redox depletions*. If a soil reverts to an aerobic state, iron that is in solution will oxidize and become concentrated in patches and along root channels and other pores. These areas of oxidized iron are called *redox concentrations*. Since water movement in these saturated or inundated soils can be multi-directional, redox depletions and concentrations can occur anywhere in the soil and have irregular shapes and sizes. Soils that are saturated and contain ferrous iron at the time of sampling may change color upon exposure to the air, as ferrous iron is rapidly converted to ferric iron in the presence of oxygen. Such soils are said to have a *reduced matrix* (Vepraskas 1992).

While indicators related to iron or manganese depletion or concentration are the most common in hydric soils, they cannot form in soils whose parent materials are low in Fe or Mn. Soils formed in such materials may have low-chroma colors that are not related to saturation and reduction. For such soils, features formed through accumulation of organic carbon may be present.

Sulfate reduction

Sulfur is one of the last elements to be reduced by microbes in an anaerobic environment. The microbes convert SO_4^{2-} to H_2S, or hydrogen sulfide gas. This results in a very pronounced "rotten egg" odor in some soils that are inundated or saturated for very long periods. In non-saturated or non-inundated soils, sulfate is not reduced and there is no rotten egg odor. The presence of hydrogen sulfide is a strong indicator of a hydric soil, but this indicator is found only in the wettest sites in soils that contain sulfur-bearing compounds.

Organic matter accumulation

Since the efficiency of soil microbes is considerably lower in a saturated and anaerobic environment, less organic matter and organic carbon is consumed. Therefore, in saturated or inundated soils, partially decomposed organic matter and carbon may begin to accumulate. The result in wetlands is often the development of thick organic surfaces, such as peat or muck, or dark organic-rich surface mineral layers.

Determining the texture of soil materials high in organic carbon. Material high in organic carbon could fall into three categories: organic, mucky mineral, or mineral. In lieu of laboratory data, the following estimation method can be used for soil material that is wet or nearly saturated with water. This method may be inconclusive with loamy or clayey textured mineral soils. Gently rub the wet soil material between forefinger and thumb. If upon the first or second rub the material feels gritty, it is mineral soil material. If after the second rub the material feels greasy, it is either mucky mineral or organic soil material. Gently rub the material two or three more times. If after these additional rubs it feels gritty or plastic, it is mucky mineral soil material; if it still feels greasy, it is organic soil material. If the material is organic soil material a further division should be made, as follows.

Organic soil materials are classified as sapric (muck), hemic (mucky peat), or fibric (peat). Differentiating criteria are based on the percentage of visible fibers observable with a hand lens in an undisturbed state and after rubbing between thumb and fingers 10 times (Table 7). If there is a conflict between unrubbed and rubbed fiber content, rubbed content is used. *Live roots are not considered.*

Table 7. Proportion of sample that is fibers visible with a hand lens.

Soil Texture	Unrubbed	Rubbed	Horizon Descriptor
Muck	<33%	<17%	Sapric
Mucky peat	33-67%	17-40%	Hemic
Peat	>67%	>40%	Fibric

Adapted from USDA Natural Resources Conservation Service (1999).

Another field method for determining the degree of decomposition for organic materials is a system modified from a method originally developed by L. von Post and described in detail in ASTM standard D 5715-00 (http://www.astm.org/). This method is based on a visual examination of the color of the water that is expelled and the soil material remaining in the hand after a saturated sample is squeezed (Table 8). If a conflict occurs between results for sapric, hemic, or fibric material using percent visible fiber (Table 7) and degree of humification (Table 8), then percent visible fiber should be used.

Cautions

A soil that is artificially drained or protected (for instance, by dikes or levees) is still hydric if the soil in its undisturbed state would meet the definition of a hydric soil. To be identified as hydric, these soils should generally have one or more of the indicators. However, not all areas that have hydric soils will qualify as wetlands, if they no longer have wetland hydrology or support hydrophytic vegetation.

Morphological features that do not reflect contemporary or recent conditions of saturation and anaerobiosis are called relict features. Contemporary and relict hydric soil features can be difficult to distinguish. For example, nodules and concretions that are actively forming often have gradual or diffuse boundaries, whereas relict or degrading nodules and concretions have sharp boundaries (Vepraskas 1992). Guidance for some of the most common problem hydric soils can be found in Chapter 5. When soil morphology seems inconsistent with the landscape, vegetation, or observable hydrology, it may be necessary to obtain the assistance of an experienced soil or wetland scientist to determine whether the soil is hydric.

Table 8. Determination of degree of decomposition of organic materials.

Degree of Humification	Nature of Material Extruded on Squeezing	Nature of Plant Structure in Residue	Horizon Descriptor
H1	Clear, colorless water; no organic solids squeezed out	Unaltered, fibrous, undecomposed	Fibric
H2	Yellowish water; no organic solids squeezed out	Almost unaltered, fibrous	
H3	Brown, turbid water; no organic solids squeezed out	Easily identifiable	
H4	Dark brown, turbid water; no organic solids squeezed out	Visibly altered but identifiable	Hemic
H5	Turbid water and some organic solids squeezed out	Recognizable but vague, difficult to identify	
H6	Turbid water; 1/3 of sample squeezed out	Indistinct, pasty	
H7	Very turbid water; 1/2 of sample squeezed out	Faintly recognizable; few remains identifiable, mostly amorphous	Sapric
H8	Thick and pasty; 2/3 of sample squeezed out	Very indistinct	
H9	No free water; nearly all of sample squeezed out	No identifiable remains	
H10	No free water; all of sample squeezed out	Completely amorphous	

Procedures for sampling soils

Observe and document the site

Before making any decision about the presence or absence of hydric soils, the overall site and how it interacts with the soil should be considered. The questions below, while not required to identify a hydric soil, can help to explain why one is or is not present. Always look at the landscape features of the immediate site and compare them to the surrounding areas. Try to contrast the features of wet and dry sites that are in close proximity. When observing slope features, look first at the area immediately around the sampling point. For example, a nearly level bench or depression at the sampling point may be more important to site wetness than the overall landform on which it occurs. By understanding how water moves across the site, the reasons for the presence or absence of hydric soil indicators should be clear.

If one or more of the hydric soil indicators given later in this chapter is present, then the soil is hydric. If no hydric soil indicator is present, the additional site information below may be useful in documenting whether the soil is indeed non-hydric or if it might represent a “problem” hydric soil that meets the hydric soil definition despite the absence of indicators.

- *Hydrology*–Is standing water observed on the site or is water observed in the soil pit? What is the depth of the water table in the area? Is there indirect evidence of ponding or flooding?
- *Slope*–Is the site level or nearly level so that surface water does not run off readily, or is it steeper where surface water would run off from the soil?
- *Slope shape*–Is the surface concave (e.g., depressions), where water would tend to collect and possibly pond on the soil surface? On hill-sides, are there convergent slopes (Figure 3), where surface or ground-water may be directed toward a central stream or swale? Or is the surface or slope shape convex, causing water to run off or disperse?
- *Landform*–Is the soil on a low terrace or floodplain that may be subject to seasonal high water tables or flooding? Is it at the toe of a slope (Figure 4) where runoff may tend to collect or groundwater emerge at or near the surface? Has the microtopography been altered by cultivation?
- *Soil materials*–Is there a restrictive layer in the soil that could slow or prevent the infiltration of water, perhaps resulting in a perched water table or hillslope seep? Restrictive layers could include consolidated bedrock, cemented layers such as duripans and petrocalcic horizons, layers of silt or substantial clay content, or strongly contrasting soil textures (e.g., silt over sand).
- *Vegetation*–Does the vegetation at the site indicate wetter conditions than at other nearby sites, or is it similar to what is found at nearby upland sites?

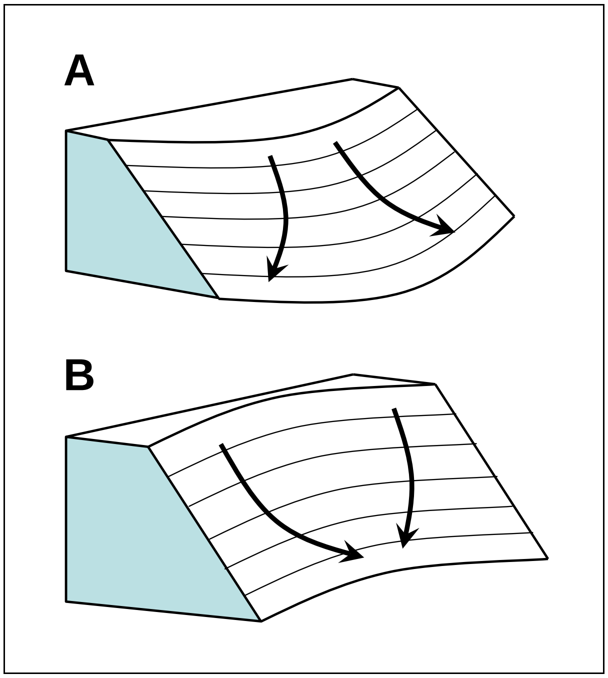


Figure 3. Divergent slopes (A) disperse surface water, whereas convergent slopes (B) concentrate water. Surface flow paths are indicated by the arrows.

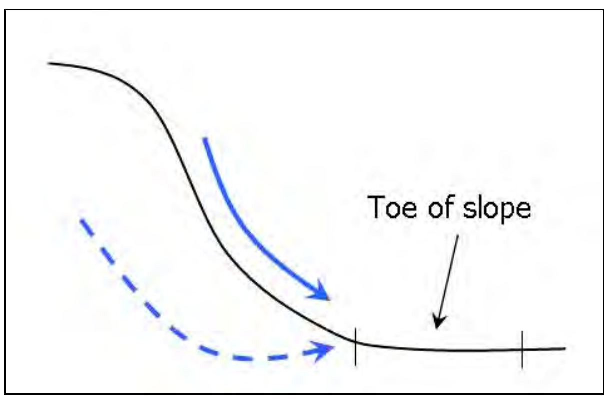


Figure 4. At the toe of a hill slope, the gradient is only slightly inclined or nearly level. Blue arrows represent flow paths of surface water (solid arrow) and groundwater (dashed arrow).

Observe and document the soil

To observe and document a hydric soil, first remove any loose leaves, needles, or bark from the soil surface. Do not remove the organic surface layers of the soil, which usually consist of plant remains in varying stages of decomposition. Dig a hole and describe the soil profile. In general, the hole should be dug to the depth needed to document an indicator or to confirm the absence of indicators. For most soils, the recommended excavation depth is approximately 20 in. (50 cm) from the soil surface, although a shallower soil pit may suffice for some indicators (e.g., A2 – Histic Epipedon). Digging may be difficult in some areas due to rocks and hardpans. Use the completed profile description to determine which hydric soil indicators have been met (USDA Natural Resources Conservation Service 2006b).

For soils with deep, dark surface layers, deeper examination may be required when field indicators are not easily seen within 20 in. (50 cm) of the surface. The accumulation of organic matter in these soils may mask redoximorphic features in the surface layers. Examination to 40 in. (1 m) or more may be needed to determine whether they meet the requirements of indicator A12 (Thick Dark Surface). A soil auger or probe may be useful for sampling soil materials below 20 in.

Whenever possible, excavate the soil deep enough to determine if there are layers or materials present that might restrict soil drainage. This will help to understand why the soil may or may not be hydric. Consider taking photographs of both the soil and the overall site, including a clearly marked measurement scale in soil pictures.

Depths used in the indicators are measured from the muck surface, or from the mineral soil surface if a muck surface is absent. For indicators A1 (Histosol), A2 (Histic Epipedon), and A3 (Black Histic), depths are measured from the top of the organic material (peat, mucky peat, or muck), or from the top of any mineral material that may overlie the organic layer.

All colors noted in this supplement refer to moist Munsell® colors (Gretag/Macbeth 2000). Dry soils should be moistened until the color no longer changes and wet soils should be allowed to dry until they no longer glisten. Care should be taken to avoid over-moistening dry soil. Soil colors specified in the indicators do not have decimal points; however, intermediate colors do occur between Munsell chips. Soil color should not be rounded to qualify as meeting an indicator. For example, a soil matrix with a chroma between 2 and 3 should be recorded as having a chroma of 2+. This soil material does not have a chroma of 2 and would not meet any indicator that requires a chroma of 2 or less. Always examine soil matrix colors in the field immediately after sampling. Ferrous iron, if present, can oxidize rapidly and create colors of higher chroma or redder hue.

Soils that are saturated at the time of sampling may contain reduced iron and/or manganese that are not detectable by eye. Furthermore, under saturated conditions, redox concentrations may be absent or difficult to see, particularly in dark-colored soils. It may be necessary to let the soil dry to a moist state (5 to 30 minutes or more) for the iron or manganese to oxidize and redox features to become visible.

Particular attention should be paid to changes in microtopography over short distances. Small changes in elevation may result in repetitive sequences of hydric/non-hydric soils, making the delineation of individual areas of hydric and non-hydric soils difficult. Often the dominant condition (hydric or non-hydric) is the only reliable interpretation (also see the section on Wetland/Non-Wetland Mosaics in Chapter 5). The shape of the local landform can greatly affect the movement of water through the landscape. Significant changes in parent material or lithologic discontinuities in the soil can affect the hydrologic properties of the soil. After a sufficient number of exploratory excavations have been made to understand the soil-hydrologic relationships at the site, subsequent excavations can be limited to the depth needed to identify hydric soil indicators.

Use of existing soil data

Soil surveys

Soil surveys are available for many areas of the Western Mountains, Valleys, and Coast Region and can provide useful information regarding soil properties and soil moisture conditions for an area. Soil surveys in the region vary considerably, however, in the mapping scale and the amount of ground-truthing used to document the survey. A list of available soil surveys is located at http://soils.usda.gov/survey/online_surveys/ and soil maps and data are available online from the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/. Most detailed soil surveys in the region are mapped at a scale of 1:24,000 (2.64 in./mile). At this scale, the smallest soil areas delineated, called map units, are about 5 acres (2 ha) in size. Map units usually contain more than one soil type or component. They often contain several minor components or include soils with properties that may be similar to or quite different from the major component. Those soils that are hydric are noted in the *Hydric Soils List* published separately from the soil survey report. Soil survey information can be valuable for planning purposes, but it is not site-specific and does not preclude the need for an on-site investigation.

Hydric soils lists

Hydric Soils Lists are developed for each detailed soil survey. Using criteria approved by the NTCHS, these lists rate each soil component as either hydric or non-hydric based on soil property data. If the soil is rated as hydric, information is provided regarding which hydric criteria are met and on what landform the soil typically occurs. Hydric Soils Lists are useful as general background information for an on-site delineation. The hydric soils list should be used as a tool, indicating that hydric soil will likely be found within a given area. However, not all areas within a polygon identified as having hydric soils may be hydric.

Hydric Soils Lists developed for individual detailed soil surveys are known as Local Hydric Soils Lists. They are available from state or county NRCS offices and over the internet from the Soil Data Mart (http://soildatamart.nrcs.usda.gov/). Local Hydric Soils Lists have been compiled into a National Hydric Soils List available at http://soils.usda.gov/use/hydric/. However, use of Local Hydric Soils Lists is preferred since they are more current and reflect local variations in soil properties.

Hydric soil indicators

Many of the hydric soil indicators were developed specifically for wetland-delineation purposes. During the development of these indicators, soils in the interior of wetlands were not always examined; therefore, there are wetlands that lack any of the approved hydric soil indicators in the wettest interior portions. Wetland delineators and other users of the hydric soil indicators should concentrate their sampling efforts near the wetland edge and, if these soils are hydric, assume that soils in the wetter, interior portions of the wetland are also hydric even if they lack an indicator.

Hydric soil indicators are presented in three groups. Indicators for “All Soils” are used in any soil regardless of texture. Indicators for “Sandy Soils” are used in soil layers with USDA textures of loamy fine sand or coarser. Indicators for “Loamy and Clayey Soils” are used with soil layers of loamy very fine sand and finer. Both sandy and loamy/clayey layers may be present in the same soil profile. Therefore, a soil that contains a loamy surface layer over sand is hydric if it meets all of the requirements of matrix color, amount and contrast of redox concentrations, depth, and thickness for a specific A (All Soils), F (Loamy and Clayey Soils), or S (Sandy Soils) indicator.

It is permissible to combine certain hydric soil indicators if all requirements of the individual indicators are met except thickness (see Hydric Soil Technical Note 4, http://soils.usda.gov/use/hydric/ntchs/tech_notes/index.html). The most restrictive requirements for thickness of layers in any indicators used must be met. Not all indicators are possible candidates for combination. For example, indicator F2 (Loamy Gleyed Matrix) has no thickness requirement, so a site would either meet the requirements of this indicator or it would not. Table 9 lists the indicators that are the most likely candidates for combining in the region.

Table 9. Minimum thickness requirements for commonly combined indicators in the Western Mountains, Valleys, and Coast Region.

Indicator	Thickness Requirement
S5 – Sandy Redox	4 in. (10 cm) thick starting within 6 in. (15 cm) of the soil surface
F1 – Loamy Mucky Mineral	4 in. (10 cm) thick starting within 6 in. (15 cm) of the soil surface
F3 – Depleted Matrix	6 in. (15 cm) thick starting within 10 in. (25 cm) of the soil surface
F6 – Redox Dark Surface	4 in. (10 cm) thick entirely within the upper 12 in. (30 cm)
F7 – Depleted Dark Surface	4 in. (10 cm) thick entirely within the upper 12 in. (30 cm)

Table 10 presents an example of a soil in which a combination of layers meets the requirements for indicators F6 (Redox Dark Surface) and F3 (Depleted Matrix). The second layer meets the morphological characteristics of F6 and the third layer meets the morphological characteristics of F3, but neither meets the thickness requirement for its respective indicator. However, the combined thickness of the second and third layers meets the more restrictive conditions of thickness for F3 (i.e., 6 in. [15 cm] starting within 10 in. [25 cm] of the soil surface). Therefore, the soil is considered to be hydric based on the combination of indicators.

Table 10. Example of a soil that is hydric based on a combination of indicators F6 and F3.

Depth (inches)	Matrix Color	Redox Concentrations			Texture
		Color	Abundance	Contrast	
0 – 3	10YR 2/1	--	--	--	Loamy/clayey
3 – 6	10YR 3/1	7.5YR 5/6	3 percent	Prominent	Loamy/clayey
6 – 10	10YR 5/2	7.5YR 5/6	5 percent	Prominent	Loamy/clayey
10 – 14	2.5Y 4/2	--	--	--	Loamy/clayey

Another common situation in which it is appropriate to combine the characteristics of hydric soil indicators is when stratified textures of sandy (i.e., loamy fine sand and coarser) and loamy/clayey (i.e., loamy very fine sand and finer) material occur in the upper 12 in. (30 cm) of the soil. For example, the soil shown in Table 11 is hydric based on a combination of indicators F6 (Redox Dark Surface) and S5 (Sandy Redox). This soil meets the morphological characteristics of F6 in the first layer and S5 in the second layer, but neither layer by itself meets the thickness requirement for its respective indicator. However, the combined thickness of the two layers (6 in. [15 cm]) meets the more restrictive thickness requirement of either indicator (4 in. [10 cm]).

Table 11. Example of a soil that is hydric based on a combination of indicators F6 and S5.

Depth (inches)	Matrix Color	Redox Concentrations			Texture
		Color	Abundance	Contrast	
0 – 3	10YR 3/1	10YR 5/6	3 percent	Prominent	Loamy/clayey
3 – 6	10YR 4/1	10YR 5/6	3 percent	Prominent	Sandy
6 – 16	10YR 4/1	--	--	--	Loamy/clayey

All soils

"All soils" refers to soils with any USDA soil texture. Use the following indicators regardless of soil texture.

Unless otherwise noted, all mineral layers above any of the layers meeting an A indicator must have a dominant chroma of 2 or less, or the layer(s) with a dominant chroma of more than 2 must be less than 6 in. (15 cm) thick to meet any hydric soil indicator. Nodules and concretions are not considered to be redox concentrations unless otherwise noted.

Indicator A1: Histosol

Technical Description: Classifies as a Histosol (except Folists)

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

Figure 5. Example of a Histosol, in which muck (sapric soil material) is greater than 3 ft (0.9 m) thick.

User Notes: In most Histosols, 16 in. (40 cm) or more of the upper 32 in. (80 cm) is organic soil material (Figure 5). Histosols also include soils that have organic soil material of any thickness over rock or fragmental soil material that has interstices filled with organic soil material. Organic soil material has an organic carbon content (by weight) of 12 to 18 percent or more, depending on the clay content of the soil. The material includes muck (sapric soil material), mucky peat (hemic soil material), or peat (fibric soil material). See the glossary of *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service 2006b) for definitions of muck, mucky peat, peat, and organic soil material. See the Concepts section of this chapter for field methods to identify organic soil materials, and Appendix A for the definition of fragmental soil material.

This indicator most often occurs in slope or groundwater-discharge wetlands in glaciated landscapes in LRR E and in depressional wetlands in LRR A that are almost always saturated to the soil surface.

Indicator A2: Histic Epipedon

Technical Description: A histic epipedon underlain by mineral soil material with a chroma of 2 or less.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Most histic epipedons are surface horizons 8 in. (20 cm) or more thick of organic soil material (Figure 6). Aquic conditions or artificial drainage are required (see *Soil Taxonomy*, USDA Natural Resources Conservation Service 1999); however, aquic conditions can be assumed if indicators of hydrophytic vegetation and wetland hydrology are present. See the glossary of *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service 2006b) for definitions. See the Concepts section of this chapter for field methods to identify organic soil materials. See indicator A1 for organic carbon requirements. Slightly lower organic carbon contents are allowed in plowed soils. This indicator is often found in wet meadows in LRR E, depressional areas, or slope wetlands that are almost always saturated to the soil surface.

Figure 6. In this soil, the organic surface layer is about 9 in. (23 cm) thick.

Indicator A3: Black Histic

Technical Description: A layer of peat, mucky peat, or muck 8 in. (20 cm) or more thick that starts within 6 in. (15 cm) of the soil surface; has a hue of 10YR or yellower, value of 3 or less, and chroma of 1 or less; and is underlain by mineral soil material with a chroma of 2 or less (Figure 7).

Figure 7. Black organic surface layer greater than 11 in. (28 cm) thick.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This indicator does not require proof of aquic conditions or artificial drainage. See the glossary of *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service 2006b) for definitions of peat, mucky peat, and muck. See the Concepts section of this chapter for field methods to identify organic soil materials. See indicator A1 for organic carbon requirements. This indicator is rare in this region.

Indicator A4: Hydrogen Sulfide

Technical Description: A hydrogen sulfide (rotten egg) odor within 12 in. (30 cm) of the soil surface.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Any time the soil smells of hydrogen sulfide (rotten egg odor), sulfur is currently being reduced and the soil is definitely in an anaerobic state. In some soils, the odor is pronounced; in others it is very fleeting as the gas dissipates rapidly. If in doubt, quickly open several small holes in the area of concern to determine if a hydrogen sulfide odor is really present. This indicator is most commonly found in areas that are permanently saturated or inundated and is almost never found at the wetland/non-wetland boundary. It can sometimes be found in fringe wetlands adjacent to lakes.

Indicator A11: Depleted Below Dark Surface

Technical Description: A layer with a depleted or gleyed matrix that has 60 percent or more chroma of 2 or less, starting within 12 in. (30 cm) of the soil surface, and having a minimum thickness of either:

- 6 in. (15 cm), or
- 2 in. (5 cm) if the 2 in. (5 cm) consists of fragmental soil material.

Loamy/clayey layer(s) above the depleted or gleyed matrix must have a value of 3 or less and chroma of 2 or less. Any sandy material above the depleted or gleyed matrix must have a value of 3 or less and chroma of 1 or less and, when observed with a 10- or 15-power hand lens, must have at least 70 percent of the visible soil particles masked with organic material. When observed without a hand lens, the material appears to be nearly 100 percent masked.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This indicator often occurs in grassland soils (Mollisols), but also applies to other soils that have dark-colored surface layers, such as umbric epipedons and dark-colored ochric epipedons (Figure 8). For soils that have dark surface layers thicker than 12 in. (30 cm), use indicator A12. Two percent or more distinct or prominent redox concentrations, including iron/manganese soft masses, pore linings, or both, are required in soils that have matrix values/chromas of 4/1, 4/2, and 5/2 (Figure A1). If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible. See the Glossary (Appendix A) for definitions of depleted matrix, gleyed matrix, distinct and prominent features, and fragmental soil material.

In some places, the gleyed matrix may change color upon exposure to air (reduced matrix). This phenomenon is included in the concept of a gleyed matrix (USDA Natural Resources Conservation Service 2002).

This indicator is commonly found at wetland boundaries in Mollisols and other dark-colored soils.

Figure 8. In this soil, a depleted matrix starts immediately below the black surface layer at approximately 11 in. (28 cm).

Indicator A12: Thick Dark Surface

Technical Description: A layer at least 6 in. (15 cm) thick with a depleted or gleyed matrix that has 60 percent or more chroma of 2 or less starting below 12 in. (30 cm) of the surface. The layer(s) above the depleted or gleyed matrix must have a value of 2.5 or less and chroma of 1 or less to a depth of at least 12 in. (30 cm) and a value of 3 or less and chroma of 1 or less in any remaining layers above the depleted or gleyed matrix. Any sandy material above the depleted or gleyed matrix, when observed with a 10- or 15-power hand lens, must have at least 70 percent of the visible soil particles masked with organic material. When observed without a hand lens, the material appears to be nearly 100 percent masked.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: The soil has a depleted matrix or gleyed matrix below a black or very dark gray surface layer 12 in. (30 cm) or more thick (Figure 9). This indicator is most often associated with overthickened soils in concave landscape positions. Two percent or more distinct or prominent redox concentrations (Table A1), including iron/manganese soft masses, pore linings, or both, are required in soils that have matrix values/chromas of 4/1, 4/2, and 5/2 (Figure A1). If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible. See the Glossary (Appendix A) for the definitions of depleted and gleyed matrix.

Figure 9. Deep observations may be necessary to identify the depleted or gleyed matrix below a thick, dark surface layer. In this example, the depleted matrix starts at 20 in. (50 cm).

In some places, the gleyed matrix may change color upon exposure to air (reduced matrix). This phenomenon is included in the concept of a gleyed matrix (USDA Natural Resources Conservation Service 2002).

In this region, this indicator is less common than indicators A11 (Depleted Below Dark Surface), F3 (Depleted Matrix), and F6 (Redox Dark Surface).

Sandy soils

"Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Use the following indicators in soil layers consisting of sandy soil materials.

Unless otherwise noted, all mineral layers above any of the layers meeting an S indicator, except for indicator S6, must have a dominant chroma of 2 or less, or the layer(s) with a dominant chroma of more than 2 must be less than 6 in. (15 cm) thick to meet any hydric soil indicator. Nodules and concretions are not considered to be redox concentrations unless otherwise noted.

Indicator S1: Sandy Mucky Mineral

Technical Description: A layer of mucky modified sandy soil material 2 in. (5 cm) or more thick starting within 6 in. (15 cm) of the soil surface (Figure 10).

Figure 10. The mucky modified sandy layer is approximately 3 in. (7.5 cm) thick. Scale in inches on the right side of ruler.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: *Mucky* is a USDA texture modifier for mineral soils. The organic carbon content is at least 5 percent and ranges to as high as 14 percent for sandy soils. The percentage requirement is dependent upon the clay content of the soil; the higher the clay content, the higher the organic carbon requirement. See the glossary of *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service 2006b) for the definition of mucky modified mineral texture. A field procedure for identifying mucky mineral soil material is presented in the Concepts section of this chapter.

This indicator is common in swales associated with coastal sand dunes in LRR A. This indicator is of limited extent in LRR E but, where it occurs, is often found at the wetland/non-wetland boundary.

Indicator S4: Sandy Gleyed Matrix

Technical Description: A gleyed matrix that occupies 60 percent or more of a layer starting within 6 in. (15 cm) of the soil surface (Figure 11).

Figure 11. In this example, the gleyed matrix begins at the soil surface.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: The gleyed matrix only has to be present within 6 in. (15 cm) of the surface. Soils with gleyed matrices are saturated for significant periods; therefore, no minimum thickness of gleyed layer is required. See the Glossary (Appendix A) for the definition of a gleyed matrix.

This indicator is rare in the Western Mountains, Valleys, and Coast Region and is only found in sandy soils that are almost continuously saturated.

Indicator S5: Sandy Redox

Technical Description: A layer starting within 6 in. (15 cm) of the soil surface that is at least 4 in. (10 cm) thick and has a matrix with 60 percent or more chroma of 2 or less with 2 percent or more distinct or prominent redox concentrations occurring as soft masses and/or pore linings (Figure 12).

Figure 12. Redox concentrations (orange areas) in sandy soil material.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Distinct and prominent are defined in the Glossary (Appendix A). Redox concentrations include iron and manganese masses (reddish mottles) and pore linings (Vepraskas 1992). Included within the concept of redox concentrations are iron/manganese bodies as soft masses with diffuse boundaries. Common (2 to less than 20 percent) to many (20 percent or more) redox concentrations (USDA Natural Resources Conservation Service 2002) are required. If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible.

For sandy soils in LRR E, this is the most common indicator for identifying the wetland/non-wetland boundary.

Indicator S6: Stripped Matrix

Figure 13. Stripped areas form a diffuse, splotchy pattern in this hydric sandy soil.

Technical Description: A layer starting within 6 in. (15 cm) of the soil surface in which iron/manganese oxides and/or organic matter have been stripped from the matrix and the primary base color of the soil material has been exposed. The stripped areas and translocated oxides and/or organic matter form a faintly contrasting pattern of two or more colors with diffuse boundaries. The stripped zones are 10 percent or more of the volume and are rounded (Figure 13).

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This indicator includes the indicator previously named streaking (Environmental Laboratory 1987). The stripped areas are typically 0.5 to 1 in. (1 to 3 cm) in size but may be larger or smaller. Commonly, the stripped areas have a value of 5 or more and chroma of 1 and/or 2 and unstripped areas have a chroma of 3 and/or 4. However, there are no specific color requirements for this indicator. The mobilization and translocation of the oxides and/or organic matter are the important processes involved in this indicator and should result in splotchy coated and uncoated soil areas. This may be a difficult pattern to recognize and is often more evident in a horizontal slice.

This indicator is very common at the wetland/non-wetland boundary in dune/swale complexes in western Oregon and in depressional areas in sandy outwash.

Loamy and clayey soils

"Loamy and clayey soils" refers to soil materials with USDA textures of loamy very fine sand and finer. Use the following indicators in soil layers consisting of loamy or clayey soil materials.

Unless otherwise noted, all mineral layers above any of the layers meeting an F indicator, except for indicator F8, must have a dominant chroma of 2 or less, or the layer(s) with a dominant chroma of more than 2 must be less than 6 in. (15 cm) thick to meet any hydric soil indicator. Nodules and concretions are not considered to be redox concentrations unless otherwise noted.

Indicator F1: Loamy Mucky Mineral

Technical Description: A layer of mucky modified loamy or clayey soil material 4 in. (10 cm) or more thick starting within 6 in. (15 cm) of the soil surface.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region, except for MLRA 1 (Northern Pacific Coast Range, Foothills, and Valleys) in LRR A (Figure 14).

User Notes: *Mucky* is a USDA texture modifier for mineral soils. The organic carbon is at least 8 percent, but can range up to 18 percent. The percentage requirement is dependent upon the clay content of the soil; the higher the clay content, the higher the organic carbon requirement. See the Concepts section of this chapter for guidance on

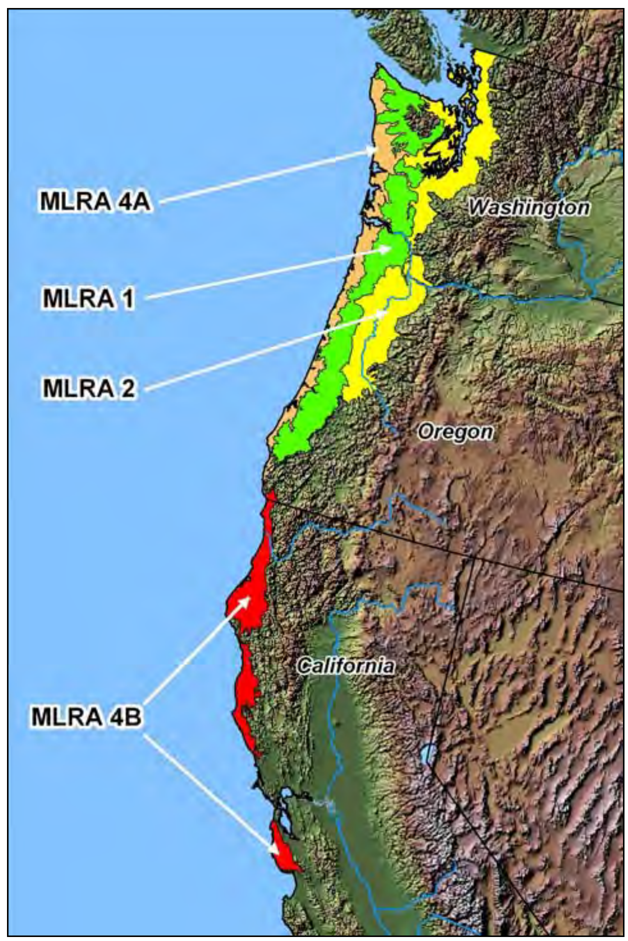


Figure 14. Location of MLRAs 1, 2, 4A, and 4B in LRR A.

identifying mucky mineral soil materials in the field; however, loamy mucky soil material is difficult to distinguish without laboratory testing.

Indicator F2: Loamy Gleyed Matrix

Technical Description: A gleyed matrix that occupies 60 percent or more of a layer starting within 12 in. (30 cm) of the soil surface (Figure 15).

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Gley colors are not synonymous with gray colors. Gley colors are those colors that are on the gley pages (Gretag/Macbeth 2000). They have hues N, 10Y, 5GY, 10GY, 5G, 10G, 5BG, 10BG, 5B, 10B, or 5PB, with a value of 4 or more. The gleyed matrix only has to be present within 12 in. (30 cm) of the surface. Soils with gleyed matrices are saturated for significant periods; therefore, no minimum thickness of gleyed layer is required. See the Glossary (Appendix A) for the definition of a gleyed matrix.

Figure 15. This soil has a gleyed matrix in the lowest layer, starting about 7 in. (18 cm) from the soil surface. The layer above the gleyed matrix has a depleted matrix.

This indicator is almost never found at the wetland/non-wetland boundary.

Indicator F3: Depleted Matrix

Technical Description: A layer that has a depleted matrix with 60 percent or more chroma of 2 or less and that has a minimum thickness of either:

- 2 in. (5 cm) if 2 in. (5 cm) is entirely within the upper 6 in. (15 cm) of the soil, or
- 6 in. (15 cm) starting within 10 in. (25 cm) of the soil surface.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This is the most commonly observed hydric soil indicator at wetland boundaries. Redox concentrations including iron/manganese soft masses or pore linings, or both, are required in soils with matrix values/ chromas of 4/1, 4/2, and 5/2 (Figures 16 and 17). If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible. Redox concentrations are not required for soils with a matrix value of 5 or more and chroma of 1, or a value of 6 or more and chroma of 2 or 1. The low-chroma matrix must be caused by wetness and not be a weathering or parent material feature. See the Glossary (Appendix A) for the definition of a depleted matrix.

Figure 16. Example of indicator F3 (Depleted Matrix), in which redox concentrations extend nearly to the surface.

Figure 17. This soil has a depleted matrix with redox concentrations in a low-chroma matrix.

Indicator F6: Redox Dark Surface

Technical Description: A layer that is at least 4 in. (10 cm) thick, is entirely within the upper 12 in. (30 cm) of the mineral soil, and has a:

- Matrix value of 3 or less and chroma of 1 or less and 2 percent or more distinct or prominent redox concentrations occurring as soft masses or pore linings, or
- Matrix value of 3 or less and chroma of 2 or less and 5 percent or more distinct or prominent redox concentrations occurring as soft masses or pore linings.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This is a very common indicator used to delineate wetland boundaries in soils with dark-colored surface layers. The layer meeting the requirements of the indicator may extend below 12 in. (30 cm) as long as at least 4 in. (10 cm) occurs within 12 in. (30 cm) of the surface. Redox concentrations are often small and difficult to see in mineral soils that have dark (value of 3 or less) surface layers due to high organic-matter content (Figure 18). The organic matter masks some or all of the concentrations that may be present; it also masks the diffuse boundaries of the concentrations and makes them appear to be more sharp. Careful examination is required to see what are often brownish redox concentrations in the darkened materials. If the soil is saturated at the time of sampling, it may be necessary to let it dry at least to a moist

Figure 18. Redox features can be small and difficult to see within a dark soil layer.

condition for redox features to become visible. In some cases, further drying of the samples makes the concentrations (if present) easier to see. A hand lens may be helpful in seeing and describing small redox concentrations. Care should be taken to examine the interior of soil peds for redox concentrations. Dry colors, if used, also must have matrix chromas of 1 or 2, and the redox concentrations must be distinct or prominent.

In soils that are wet because of subsurface saturation, the layer immediately below the dark epipedon will likely have a depleted or gleyed matrix (see Appendix A for definitions). Soils that are wet because of ponding or have a shallow, perched layer of saturation may not always have a depleted/gleyed matrix below the dark surface. This morphology has been observed in soils that have been compacted by tillage and other means. It is recommended that delineators evaluate the hydrologic source and examine and describe the layer below the dark-colored epipedon when applying this indicator.

Figure 19. Redox depletions (lighter colored areas) are scattered within the darker matrix. Scale is in centimeters.

Indicator F7: Depleted Dark Surface

Technical Description: Redox depletions with a value of 5 or more and a chroma of 2 or less in a layer that is at least 4 in. (10 cm) thick, is entirely within the upper 12 in. (30 cm) of the mineral soil (Figure 19), and has a:

- Matrix value of 3 or less and chroma of 1 or less and 10 percent or more redox depletions, or
- Matrix value of 3 or less and chroma of 2 or less and 20 percent or more redox depletions.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Care should be taken not to mistake the mixing of eluvial (highly leached) layers that have high value and low chroma (E horizon) or illuvial layers that have accumulated carbonates (calcic horizon) into the surface layer as depletions. Mixing of layers can be caused by burrowing animals or cultivation. Pieces of deeper layers that become incorporated into the surface layer are not redox depletions. Knowledge of local conditions is required in areas where light-colored eluvial layers and/or layers high in carbonates may be present. In soils that are wet because of subsurface saturation, the layer immediately below the dark surface is likely to have a depleted or gleyed matrix. Redox depletions will usually have associated microsites with redox concentrations that occur as pore linings or masses within the depletion(s) or surrounding the depletion(s).

This indicator is very rare in this region.

Indicator F8: Redox Depressions

Technical Description: In closed depressions subject to ponding, 5 percent or more distinct or prominent redox concentrations occurring as soft masses or pore linings in a layer that is 2 in. (5 cm) or more thick and is entirely within the upper 6 in. (15 cm) of the soil (Figure 20).

Figure 20. In this example, the layer of redox concentrations begins at the soil surface and is slightly more than 2 in. (5 cm) thick.

Applicable Subregions: Applicable throughout the Western Mountains, Valleys, and Coast Region.

User Notes: This indicator occurs on depressional landforms, such as vernal pools and potholes; but not microdepressions on convex landscapes. Closed depressions often occur within flats or floodplain landscapes. *Note that there is no color requirement for the soil matrix.* The layer containing redox concentrations may extend below 6 in. (15 cm) as long as at least 2 in. (5 cm) occurs within 6 in. (15 cm) of the surface. If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible. See Appendix A for definitions of distinct and prominent.

This is a common but often overlooked indicator found at the wetland/non-wetland boundary on depressional sites.

Hydric soil indicators for problem soils

The following indicators are not currently recognized for general application by the NTCHS, or they are not recognized in the specified geographic area. However, these indicators may be used in problem wetland situations in the Western Mountains, Valleys, and Coast Region where there is evidence of wetland hydrology and hydrophytic vegetation, and the soil is believed to meet the definition of a hydric soil despite the lack of other indicators of a hydric soil. To use these indicators, follow the procedure described in the section on Problematic Hydric Soils in Chapter 5. If any of the following indicators is observed, it is recommended that the NTCHS be notified by following the protocol described in the "Comment on the Indicators" section of *Field Indicators of Hydric Soils in the United States* (USDA Natural Resources Conservation Service 2006b).

Indicator A10: 2 cm Muck

Technical Description: A layer of muck 0.75 in. (2 cm) or more thick with a value of 3 or less and chroma of 1 or less, starting within 6 in. (15 cm) of the soil surface.

Applicable Subregions: For use with problem soils throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Normally the muck layer is at the soil surface; however, it may occur at any depth within 6 in. (15 cm) of the surface (Figure 21). Muck is sapric soil material with at least 12 to 18 percent organic carbon. Organic soil material is called muck if virtually all of the material has undergone sufficient decomposition to limit recognition of the plant parts. Hemic (mucky peat) and fibric (peat) soil materials do not qualify. To determine if muck is present, first remove loose leaves, needles, bark, and other easily identified plant remains. This is sometimes called leaf litter, a duff layer, or a leaf or root mat. Then examine for decomposed organic soil material. Generally, muck is black and has a greasy feel; sand grains should not be evident (see the Concepts section of this chapter for field methods to identify organic soil materials). Determination of this indicator is made below the leaf or root mat; however, root mats that meet the definition of hemic or fibric soil material are included in the decision-making process for indicators A1 (Histosol) and A2 (Histic Epipedon).

Figure 21. A layer of muck (dark material indicated by the knife point) occurs in the upper 6 in. (15 cm) of this soil.

Indicator TF2: Red Parent Material

Technical Description: In parent material with a hue of 7.5YR or redder, a layer at least 4 in. (10 cm) thick with a matrix value and chroma of 4 or less and 2 percent or more redox depletions and/or redox concentrations occurring as soft masses and/or pore linings. The layer is entirely within 12 in. (30 cm) of the soil surface. The minimum thickness requirement is 2 in. (5 cm) if the layer is the mineral surface layer.

Applicable Subregions: For use with problem soils throughout the Western Mountains, Valleys, and Coast Region.

User Notes: Redox features that are most noticeable in red material include redox depletions and soft manganese masses that are black or dark reddish black. If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible.

Indicator TF12: Very Shallow Dark Surface

Technical Description: In depressions and other concave landforms, one of the following:

- If bedrock occurs between 6 in. (15 cm) and 10 in. (25 cm), a layer at least 6 in. (15 cm) thick starting within 4 in. (10 cm) of the soil surface with a value of 3 or less and chroma of 1 or less, and the remaining soil to bedrock must have the same colors as above or any other color that has a chroma of 2 or less.
- If bedrock occurs within 6 in. (15 cm), more than half of the soil thickness must have a value of 3 or less and chroma of 1 or less, and the remaining soil to bedrock must have the same colors as above or any other color that has a chroma of 2 or less.

Applicable Subregions: For use with problem soils throughout the Western Mountains, Valleys, and Coast Region.

4 Wetland Hydrology Indicators

Introduction

Wetland hydrology indicators are used in combination with indicators of hydric soil and hydrophytic vegetation to determine whether an area is a wetland under the Corps Manual. Indicators of hydrophytic vegetation and hydric soil generally reflect a site's medium- to long-term wetness history. They provide readily observable evidence that episodes of inundation or soil saturation lasting more than a few days during the growing season have occurred repeatedly over a period of years and that the timing, duration, and frequency of wet conditions have been sufficient to produce a characteristic wetland plant community and hydric soil morphology. If hydrology has not been altered, vegetation and soils provide strong evidence that wetland hydrology is present (National Research Council 1995). Wetland hydrology indicators provide evidence that the site has a *continuing* wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a past hydrologic regime. Wetland hydrology indicators confirm that an episode of inundation or soil saturation occurred recently, but may provide little additional information about the timing, duration, or frequency of such events (National Research Council 1995).

Hydrology indicators are often the most transitory of wetland indicators. Those involving direct observation of surface water or saturated soils are usually present only during the normal wet portion of the growing season and may be absent during the dry season or during drier-than-normal years. The climate of the Western Mountains, Valleys, and Coast Region is spatially highly diverse due to variations in latitude and elevation, and rain-shadow effects. In general, average annual precipitation increases toward the north and west. In the higher mountains, much of the precipitation falls as snow and is released during spring thaw. Summers in the interior are often hot and dry. Along the northwest coast, the summer dry season is ameliorated somewhat by fog (Bailey 1995). During the annual dry season, some wetlands in the region may lack hydrology indicators. However, the lack of an indicator is not evidence for the absence of wetland hydrology. See Chapter 5 (Difficult Wetland Situations in the Western Mountains, Valleys, and Coast Region) for help in identifying wetlands that may lack wetland hydrology indicators during dry periods.

On the other hand, some indicators may be present on non-wetland sites immediately after a heavy rain or during periods of unusually high precipitation, river stages, runoff, or snowmelt. Therefore, it is important to consider weather conditions prior to the site visit to minimize both false-positive and false-negative wetland hydrology decisions. An understanding of normal seasonal and annual variations in rainfall, temperature, and other climatic conditions is essential in interpreting hydrology indicators in the region. Some useful sources of climatic data are described in Chapter 5.

Areas that have hydrophytic vegetation and hydric soils generally also have wetland hydrology unless the hydrologic regime has changed due to natural events or human activities (National Research Council 1995). Therefore, when wetland hydrology indicators are absent from an area that has indicators of hydric soil and hydrophytic vegetation, further information may be needed to determine whether or not wetland hydrology is present. If possible, one or more site visits should be scheduled to coincide with the normal wet portion of the growing season, the period of the year when the presence or absence of wetland hydrology indicators is most likely to reflect the true wetland/non-wetland status of the site. In addition, aerial photography or remote sensing data, stream gauge data, runoff estimates, scope-and-effect equations for ditches and subsurface drain lines, or groundwater modeling are tools that may help to determine whether wetland hydrology is present when indicators are equivocal or lacking (e.g., USDA Natural Resources Conservation Service 1997). Off-site procedures developed under the National Food Security Act Manual (USDA Natural Resources Conservation Service 1994), which use wetland mapping conventions developed by NRCS state offices, can help identify areas that have wetland hydrology on agricultural lands. The technique is based on wetness signatures visible on standard high-altitude aerial photographs or on annual crop-compliance slides taken by the USDA Farm Service Agency. Finally, on highly disturbed or problematic sites, direct hydrologic monitoring may be needed to determine whether wetland hydrology is present. The U.S. Army Corps of Engineers (2005) provides a technical standard for monitoring hydrology on such sites. This standard requires 14 or more consecutive days of flooding or ponding, or a water table 12 in. (30 cm) or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability) (National Research Council 1995) unless an alternative standard has been established for a particular region or wetland type. See Chapter 5 for further information on these techniques.

Growing season

Beginning and ending dates of the growing season may be needed to evaluate certain wetland indicators, such as visual observations of flooding, ponding, or shallow water tables on potential wetland sites. In addition, growing season dates are needed in the event that recorded hydrologic data, such as stream gauge or water-table monitoring data, must be analyzed to determine whether wetland hydrology is present on highly disturbed or problematic sites.

Depletion of oxygen and the chemical reduction of nitrogen, iron, and other elements in saturated soils during the growing season is the result of biological activity occurring in plant roots and soil microbial populations (National Research Council 1995). Two indicators of biological activity that are readily observable in the field are (1) above-ground growth and development of vascular plants, and (2) soil temperature as an indicator of soil microbial activity (Megonigal et al. 1996; USDA Natural Resources Conservation Service 1999). Therefore, if information about the growing season is needed and on-site data gathering is practical, the following approaches should be used in this region to determine growing season dates in a given year. The growing season has begun and is ongoing if either of these conditions is met. Therefore, the beginning of the growing season in a given year is indicated by whichever condition occurs earlier, and the end of the growing season is indicated by whichever condition persists later.

1. The growing season has begun on a site in a given year when two or more different non-evergreen vascular plant species growing in the wetland or surrounding areas exhibit one or more of the following indicators of biological activity:

   a. Emergence of herbaceous plants from the ground
   b. Appearance of new growth from vegetative crowns (e.g., in graminoids, bulbs, and corms)
   c. Coleoptile/cotyledon emergence from seed
   d. Bud burst on woody plants (i.e., some green foliage is visible between spreading bud scales)
   e. Emergence or elongation of leaves of woody plants

f. Emergence or opening of flowers

The end of the growing season is indicated when woody deciduous species lose their leaves and/or the last herbaceous plants cease flowering and their leaves become dry or brown, generally in the fall due to cold temperatures or reduced moisture availability. Early plant senescence due to the initiation of the summer dry season in some areas does not necessarily indicate the end of the growing season and alternative procedures (e.g., soil temperature) should be used.

This determination should not include evergreen species. Observations should be made in the wetland or in surrounding areas subject to the same climatic conditions (e.g., similar elevation and aspect); however, soil moisture conditions may differ. Supporting data should be reported on the data form, in field notes, or in the delineation report, and should include the species observed (if identifiable), their abundance and location relative to the potential wetland, and type of biological activity observed. A one-time observation of biological activity during a single site visit is sufficient, but is not required unless growing season information is necessary to evaluate particular wetland hydrology indicators. However, if long-term hydrologic monitoring is planned, then plant growth, maintenance, and senescence should be monitored for continuity over the same period.

2. The growing season has begun in spring, and is still in progress, when soil temperature measured at the 12-in. (30-cm) depth is 41 °F (5 °C) or higher. A one-time temperature measurement during a single site visit is sufficient, but is not required unless growing season information is necessary to evaluate particular wetland hydrology indicators. However, if long-term hydrologic monitoring is planned, then soil temperature should also be monitored to ensure that it remains continuously at or above 41 °F during the monitoring period. Soil temperature can be measured directly in the field by immediately inserting a soil thermometer into the wall of a freshly dug soil pit.

If the timing of the growing season based on vegetation growth and development and/or soil temperature is unknown and on-site data collection is not practical, such as when analyzing previously recorded stream-gauge or monitoring-well data, then growing season dates may be approximated by the median dates (i.e., 5 years in 10, or 50 percent probability) of 28 °F (−2.2 °C) air temperatures in spring and fall, based on long-term records gathered at National Weather Service meteorological stations (U.S. Army

Corps of Engineers 2005). These dates are reported in WETS tables available from the NRCS National Water and Climate Center (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) for the nearest appropriate weather station.

Wetland hydrology indicators

In this chapter, wetland hydrology indicators are presented in four groups. Indicators in Group A are based on the direct observation of surface water or groundwater during a site visit. Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features. Group C consists of other evidence that the soil is saturated currently or was saturated recently. Some of these indicators, such as oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period. Group D consists of landscape characteristics and vegetation and soil features that indicate contemporary rather than historical wet conditions. Wetland hydrology indicators are intended as one-time observations of site conditions that are sufficient evidence of wetland hydrology in areas where hydric soils and hydrophytic vegetation are present. Most of the indicators are applicable throughout the Western Mountains, Valleys, and Coast Region although some are restricted to particular subregions.

Within each group, indicators are divided into two categories – *primary* and *secondary* – based on their estimated reliability in this region. One primary indicator from any group is sufficient to conclude that wetland hydrology is present; the area is a wetland if indicators of hydric soil and hydrophytic vegetation are also present. In the absence of a primary indicator, two or more secondary indicators from any group are required to conclude that wetland hydrology is present. Indicators of wetland hydrology include, but are not necessarily limited to, those listed in Table 12 and described on the following pages. Other evidence of wetland hydrology may also be used with appropriate documentation.

Table 12. Wetland hydrology indicators for the Western Mountains, Valleys, and Coast Region.

Indicator	Category	
	Primary	Secondary
Group A – Observation of Surface Water or Saturated Soils		
A1 – Surface water	X	
A2 – High water table	X	
A3 – Saturation	X	
Group B – Evidence of Recent Inundation		
B1 – Water marks	X	
B2 – Sediment deposits	X	
B3 – Drift deposits	X	
B4 – Algal mat or crust	X	
B5 – Iron deposits	X	
B6 – Surface soil cracks	X	
B7 – Inundation visible on aerial imagery	X	
B8 – Sparsely vegetated concave surface	X	
B11 – Salt crust	X	
B13 – Aquatic invertebrates	X	
B9 – Water-stained leaves	X	X (MLRA 1, 2, 4A, and 4B)
B10 – Drainage patterns		X
Group C – Evidence of Current or Recent Soil Saturation		
C1 – Hydrogen sulfide odor	X	
C3 – Oxidized rhizospheres along living roots	X	
C4 – Presence of reduced iron	X	
C6 – Recent iron reduction in tilled soils	X	
C2 – Dry-season water table		X
C9 – Saturation visible on aerial imagery		X
Group D – Evidence from Other Site Conditions or Data		
D1 – Stunted or stressed plants	X (LRR A)	
D2 – Geomorphic position		X
D3 – Shallow aquitard		X
D5 – FAC-neutral test		X
D6 – Raised ant mounds		X (LRR A)
D7 – Frost-heave hummocks		X

Group A – Observation of Surface Water or Saturated Soils

Indicator A1: Surface water

Category: Primary

General Description: This indicator consists of the direct, visual observation of surface water (flooding or ponding) during a site visit (Figure 22).

Figure 22. Wetland with surface water present.

Cautions and User Notes: Care must be used in applying this indicator because surface water may be present in non-wetland areas immediately after a rainfall event or during periods of unusually high precipitation, runoff, tides, or river stages. Furthermore, some non-wetlands flood frequently for brief periods. Surface water observed during the non-growing season may be an acceptable indicator if experience and professional judgment suggest that wet conditions normally extend into the growing season for sufficient duration in most years. If this is questionable and other hydrology indicators are absent, a follow-up visit during the growing season may be needed. Note that surface water may be absent from a wetland during the normal dry season or during extended periods of drought. Even under normal rainfall conditions, some wetlands do not become inundated or saturated every year (i.e., wetlands are inundated or saturated at least 5 out of 10 years, or 50 percent or higher probability). In addition, groundwater-dominated wetland systems may never or rarely contain surface water.

Indicator A2: High water table

Category: Primary

General Description: This indicator consists of the direct, visual observation of the water table 12 in. (30 cm) or less below the surface in a soil pit, auger hole, or shallow monitoring well (Figure 23). This indicator includes water tables derived from perched water, throughflow, and discharging groundwater (e.g., in seeps) that may be moving laterally near the soil surface.

Figure 23. High water table observed in a soil pit.

Cautions and User Notes: Sufficient time must be allowed for water to infiltrate into a newly dug hole and to stabilize at the water-table level. The required time will vary depending upon soil texture. In some cases, the water table can be determined by examining the wall of the soil pit and identifying the upper level at which water is seeping into the pit. A water table within 12 in. of the surface observed during the non-growing season may be an acceptable indicator if experience and professional judgment suggest that wet conditions normally extend into the growing season for sufficient duration in most years. If this is questionable and other hydrology indicators are absent, a follow-up visit during the growing season may be needed. Care must be used in interpreting this indicator because water-table levels normally vary seasonally and are a function of both recent and long-term precipitation. Even under normal rainfall conditions, some wetlands do not become inundated or saturated every year (i.e., wetlands are inundated or saturated at least 5 out of 10 years, or 50 percent or higher probability). For an accurate determination of the water-table level, the soil pit, auger hole, or well should not penetrate any restrictive soil layer capable of perching water near the surface.

Indicator A3: Saturation

Category: Primary

General Description: Visual observation of saturated soil conditions 12 in. (30 cm) or less from the soil surface as indicated by water glistening on the surfaces and broken interior faces of soil samples removed from the pit or auger hole (Figure 24). This indicator must be associated with an existing water table located immediately below the saturated zone; however, this requirement is waived under episaturated conditions if there is a restrictive soil layer or bedrock within 12 in. (30 cm) of the surface.

Figure 24. Water glistens on the surface of a saturated soil sample.

Cautions and User Notes: Glistening is evidence that the soil sample was taken either below the water table or within the saturated capillary fringe above the water table. Recent rainfall events and the proximity of the water table at the time of sampling must be considered in applying and interpreting this indicator. Water observed in soil cracks or on the faces of soil aggregates (peds) does not meet this indicator unless ped interiors are also saturated. Samples should not be shaken or squeezed to force water from soil pore spaces. A water table is not required below the saturated zone under episaturated conditions if the restrictive layer or bedrock is within 12 in. (30 cm) of the surface. Note the restrictive layer in the soils section of the data form. The restrictive layer may be at the surface.

Group B – Evidence of Recent Inundation

Indicator B1: Water marks

Category: Primary

General Description: Water marks are discolorations or stains on the bark of woody vegetation, rocks, bridge supports, buildings, fences, or other fixed objects as a result of inundation (Figure 25).

Figure 25. Water mark on a boulder (upper edge indicated by the arrow).

Cautions and User Notes: When several water marks are present, the highest reflects the maximum extent of inundation. Water marks indicate a water-level elevation and can be extrapolated from nearby objects across lower elevation areas. In regulated systems, such as reservoirs, water-level records can be used to distinguish unusually high pools from normal operating levels. Use caution with water marks that may have been caused by extreme, infrequent, or very brief flooding events. Stream flows in mountain and coastal areas tend to be more consistent than those in the Arid West. Therefore, water marks along mountain and northwest coastal streams are more likely to reflect typical high flows and water elevations in adjacent wetlands and, therefore, are assigned a primary status.

Indicator B2: Sediment deposits

Category: Primary

General Description: Sediment deposits are thin layers or coatings of fine-grained mineral material (e.g., silt or clay) or organic matter (e.g., pollen), sometimes mixed with other detritus, remaining on tree bark (Figure 26), plant stems or leaves, rocks, and other objects after surface water recedes.

Figure 26. Silt deposit left after a recent high-water event forms a tan coating on these tree trunks (upper edge indicated by the arrow).

Cautions and User Notes: Sediment deposits most often occur in riverine backwater and ponded situations where water has stood for sufficient time to allow suspended sediment to settle. Sediment deposits may remain for a considerable period before being removed by precipitation or subsequent inundation. Sediment deposits on vegetation or other objects indicate the minimum inundation level. This level can be extrapolated across lower elevation areas. Use caution with sediment left after infrequent high flows or very brief flooding events. This indicator does not include thick accumulations of sand or gravel in fluvial channels that may reflect historic flow conditions or recent extreme events. Use caution in areas where silt and other material trapped in the snowpack may be deposited directly on the ground surface during spring thaw.

Indicator B3: Drift deposits

Category: Primary

General Description: Drift deposits consist of rafted debris that has been deposited on the ground surface or entangled in vegetation or other fixed objects. Debris consists of remnants of vegetation (e.g., branches, stems, and leaves), man-made litter, or other waterborne materials. Drift material may be deposited at or near the high water line in ponded or flooded areas, piled against the upstream side of trees, rocks, and other fixed objects (Figure 27), or widely distributed within the dewatered area.

Figure 27. Drift deposit on the upstream side of a sapling in a floodplain wetland.

Cautions and User Notes:
Deposits of drift material are often found adjacent to streams or other sources of flowing water in wetlands. They also occur in tidal marshes, along lake shores, and in other ponded areas. The elevation of a drift line can be extrapolated across lower elevation areas. Use caution with drift lines that may have been caused by extreme, infrequent, or very brief flooding events.

Indicator B4: Algal mat or crust

Category: Primary

General Description: This indicator consists of a mat or dried crust of algae, perhaps mixed with other detritus, left on or near the soil surface after dewatering.

Cautions and User Notes: Algal deposits include those produced by green algae (Chlorophyta) and blue-green algae (cyanobacteria). They may be attached to low vegetation or other fixed objects, or may cover the soil surface (Figures 28 and 29). Sometimes, dried threads of filamentous algae can be seen. Dried crusts of blue-green algae may crack and curl at plate margins (Figure 30). Algal deposits are most often seen in seasonally ponded depressions, interdunal swales, tidal areas, lake fringes, and low-gradient stream margins. They reflect prolonged wet conditions sufficient for algal growth and development.

Figure 28. Deposit of green algae in a seasonally inundated *Juncus* marsh.

Figure 29. Dark-colored material is benthic microflora consisting of blue-green and green algae in a hypersaline intertidal marsh.

Figure 30. Dried crust of blue-green algae on the soil surface.

Indicator B5: Iron deposits

Category: Primary

General Description: This indicator consists of a thin orange or yellow crust or gel of oxidized iron on the soil surface or on objects near the surface.

Cautions and User Notes: Iron deposits form in areas where reduced iron discharges with groundwater and oxidizes upon exposure to air. The oxidized iron forms a film or sheen on standing water (Figure 31) and an orange or yellow deposit (Figure 32) on the ground surface after dewatering. Iron sheen on water can be distinguished from an oily film by touching with a stick or finger; iron films are crystalline and will crack into angular pieces.

Figure 31. Iron sheen on the water surface may be deposited as an orange or yellow crust after dewatering.

Figure 32. Iron deposit (orange area) in a dewatered channel.

Indicator B6: Surface soil cracks

Category: Primary

General Description: Surface soil cracks consist of shallow cracks that form when fine-grained mineral or organic sediments dry and shrink, often creating a network of cracks or small polygons (Figure 33).

Cautions and User Notes: Surface soil cracks are often seen in recent fine sediments and in concave landscape positions where water has ponded long enough to destroy surface soil structure, such as in depressions, lake fringes, and floodplains. Use caution, however, as they may also occur in temporary ponds and puddles in non-wetlands; these situations are easily distinguished by the absence of hydrophytic vegetation and/or hydric soils. This indicator does not include deep cracks due to shrink-swell action in clay soils (e.g., Vertisols).

Figure 33. Surface soil cracks in a seasonally ponded wetland.

Indicator B7: Inundation visible on aerial imagery

Category: Primary

General Description: One or more recent aerial photographs or satellite images show the site to be inundated (Figure 34).

Figure 34. Aerial view showing inundated areas.

Cautions and User Notes: Care must be used in applying this indicator because surface water may be present on a non-wetland site immediately after a heavy rain or during periods of unusually high precipitation, runoff, tides, or river stages. See Chapter 5 for procedures to evaluate the normality of precipitation prior to the photo date. Surface water observed during the non-growing season may be an acceptable indicator if experience and professional judgment suggest that wet conditions normally extend into the growing season for sufficient duration in most years. Surface water may be absent from a wetland during the normal dry season or during extended periods of drought. Even under normal rainfall conditions, some wetlands do not become inundated or saturated every year (i.e., wetlands are inundated or saturated at least 5 out of 10 years, or 50 percent or higher probability). If available, it is recommended that multiple years of photography be evaluated. If 5 or more years of aerial photography are available, the procedure described by the USDA Natural Resources Conservation Service (1997, section 650.1903) is recommended (see Chapter 5, section on Wetlands that Periodically Lack Indicators of Wetland Hydrology, for additional information).

Indicator B8: Sparsely vegetated concave surface

Category: Primary

General Description: On concave land surfaces (e.g., depressions and swales), the ground surface is either unvegetated or sparsely vegetated (less than 5 percent ground cover) due to long-duration ponding during the growing season (Figure 35).

Figure 35. A sparsely vegetated, seasonally ponded depression.

Cautions and User Notes: Ponding during the growing season can limit the establishment and growth of ground-layer vegetation. Sparsely vegetated concave surfaces should contrast with vegetated slopes and convex surfaces in the same area. A woody overstory of trees or shrubs may or may not be present. If total plant cover is less than 5 percent at the annual peak of plant growth, see the section on Sparse and Patchy Vegetation in Chapter 5.

Indicator B11: Salt crust

Category: Primary

General Description: Salt crusts are hard or brittle deposits of salts formed on the ground surface due to the evaporation of saline surface water.

Cautions and User Notes: Hard or brittle salt crusts form in ponded depressions, seeps, and lake fringes when saline surface waters evaporate (Jones 1965; Boettinger 1997) (Figures 36 and 37). They may form a white ring at the high water line as the water recedes. Salt crusts are also seen in areas of geothermal activity. Salt crusts do not include fluffy or powdery salt deposits or efflorescences resulting from capillary rise and evaporation of saline groundwater that may be derived from a deep water table.

Figure 36. A hard salt crust in a dry temporary pool (25-cent coin for scale).

Figure 37. A hard salt crust on plant stems and the soil surface in a seasonally ponded area

Indicator B13: Aquatic invertebrates

Category: Primary

General Description: Presence of numerous live individuals, diapausing insect eggs or crustacean cysts, or dead remains of aquatic invertebrates, such as clams, aquatic snails, aquatic insects, ostracods, shrimp, and other crustaceans, either on the soil surface or clinging to plants or other emergent objects (Figures 38 and 39).

Figure 38. Shells of aquatic snails in a seasonally ponded fringe wetland.

Figure 39. Carapaces of tadpole shrimp (*Triops* sp.) and clam shrimp (*Leptestheria compleximanus*) in dried sediments of an ephemeral pool. Photo by Brian Lang (New Mexico Dept. of Game & Fish).

Cautions and User Notes: Examples of dead remains include clam shells, chitinous exoskeletons (e.g., dragonfly nymphs), insect head capsules, and aquatic snail shells. Invertebrates or their remains should be reasonably abundant; one or two individuals are not sufficient. Use caution in areas where invertebrate remains may have been transported by high winds, unusually high water, or other animals into non-wetland areas. Shells and exoskeletons are resistant to tillage but may be moved by equipment beyond the boundaries of the wetland. They may also persist in the soil for years after dewatering.

Indicator B9: Water-stained leaves

Category: Primary (Secondary along the Pacific coast in MLRA 1, 2, 4A, and 4B)

General Description: Water-stained leaves are fallen or recumbent dead leaves that have turned grayish or blackish in color due to inundation for long periods.

Cautions and User Notes: Water-stained leaves are usually found in depressional wetlands and along streams in shrub-dominated or forested habitats (Figure 40); however, they also occur in herbaceous communities. Staining often occurs in leaves that are in contact with the soil surface while inundated for long periods. Water-stained leaves maintain their blackish or grayish colors when dry. They should contrast strongly with fallen leaves in nearby non-wetland landscape positions. In the very wet climate of coastal California, Oregon, and Washington, water-stained leaves are less likely to be restricted to ponded areas. Therefore, they are a secondary indicator in MLRA 1 (Northern Pacific Coast Range, Foothills, and Valleys), 2 (Willamette and Puget Sound Valleys), 4A (Sitka Spruce Belt), and 4B (Coastal Redwood Belt) (USDA Natural Resources Conservation Service 2006a) (Figure 14).

Figure 40. Water-stained leaves in a temporarily ponded depression.

Indicator B10: Drainage patterns

Category: Secondary

General Description: This indicator consists of flow patterns visible on the soil surface or eroded into the soil, low vegetation bent over in the direction of flow, absence of leaf litter or small woody debris due to flowing water, and similar evidence that water flowed across the ground surface.

Cautions and User Notes: Drainage patterns are usually seen in areas where water flows broadly over the surface and is not confined to a channel, such as in areas adjacent to streams, in seeps, vegetated swales, and tidal flats (Figures 41 and 42). Use caution in areas subject to high winds or affected by recent extreme or unusual flooding events. Similar patterns may also be caused by snowmelt on non-wetland mountain slopes.

Figure 41. Drainage pattern in a slope wetland.

Figure 42. Vegetation bent over in the direction of water flow across a stream terrace.

Group C – Evidence of Current or Recent Soil Saturation

Indicator C1: Hydrogen sulfide odor

Category: Primary

General Description: A hydrogen sulfide (rotten egg) odor within 12 in. (30 cm) of the soil surface.

Cautions and User Notes: Hydrogen sulfide is a gas produced by soil microbes in response to prolonged saturation in soils where oxygen, nitrogen, manganese, and iron have been largely reduced and there is a source of sulfur. In this region, it is sometimes detected in mountain bogs, saline and brackish tidal marshes, and other wet habitats. For hydrogen sulfide to be detectable, the soil must be saturated at the time of sampling and must have been saturated long enough to become highly reduced. These soils are often permanently saturated and anaerobic at or near the surface. To apply this indicator, dig the soil pit no deeper than 12 in. to avoid release of hydrogen sulfide from deeper in the profile. Hydrogen sulfide odor serves as both an indicator of hydric soil and wetland hydrology. This observation proves that the soil meets the definition of a hydric soil (i.e., anaerobic in the upper part), plus has an ongoing wetland hydrologic regime. Often these soils have a high water table (wetland hydrology indicator A2), but the hydrogen sulfide odor provides further proof that the soil has been saturated for a long time.

Indicator C3: Oxidized rhizospheres along living roots

Category: Primary

General Description: Presence of a layer containing 2 percent or more iron-oxide coatings or plaques on the surfaces of living roots and/or iron-oxide coatings or linings on soil pores immediately surrounding living roots within 12 in. (30 cm) of the soil surface (Figures 43 and 44).

Cautions and User Notes: Oxidized rhizospheres are the result of oxygen leakage from living roots into the surrounding anoxic soil, causing oxidation of ferrous iron present in the soil solution. They are evidence of saturated and reduced soil conditions during the plant's lifetime. Iron concentrations or plaques may form on the immediate root surface or may coat the soil pore adjacent to the root. In either case, the oxidized iron must be associated with living roots to indicate contemporary wet conditions and to distinguish these features from other pore linings. Care must be taken to distinguish iron-oxide coatings from organic matter associated with plant roots. Viewing with a hand lens may help to distinguish mineral from organic material and to identify oxidized rhizospheres along fine roots and root hairs. Iron coatings sometimes show concentric layers in cross section and may transfer iron stains to the fingers when rubbed. Note the location and abundance of oxidized rhizospheres in the soil profile description or remarks section of the data form. There is no minimum thickness requirement for the layer containing oxidized rhizospheres. Oxidized rhizospheres must occupy at least 2 percent of the volume of the layer.

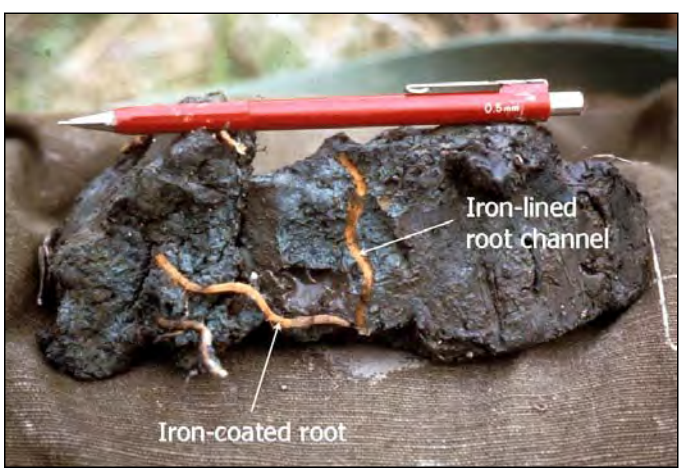


Figure 43. Iron-oxide plaque (orange coating) on a living root. Iron also coats the channel or pore from which the root was removed.

Figure 44. This soil has many oxidized rhizospheres associated with living roots.

Indicator C4: Presence of reduced iron

Category: Primary

General Description: Presence of a layer containing reduced (ferrous) iron in the upper 12 in. (30 cm) of the soil profile, as indicated by a ferrous iron test or by the presence of a soil that changes color upon exposure to the air.

Cautions and User Notes: The reduction of iron occurs in soils that have been saturated long enough to become anaerobic and chemically reduced. Ferrous iron is converted to oxidized forms when saturation ends and the soil reverts to an aerobic state. Thus, the presence of ferrous iron indicates that the soil is saturated and anaerobic at the time of sampling, and has been saturated for an extended period. The presence of ferrous iron can be verified with alpha, alpha-dipyridyl reagent (Figure 45) or by observing a soil that changes color upon exposure to air (i.e., reduced matrix). A positive reaction to alpha, alpha-dipyridyl reagent should occur over more than 50 percent of the soil layer in question. The reagent does not react when wetlands are dry; therefore, a negative test result is not evidence that the soil is not reduced at other times of year. Soil samples should be tested or examined immediately after opening the soil pit because ferrous iron may oxidize and colors change soon after the sample is exposed to the air. Avoid areas of the soil that may have been in contact with iron digging tools. Soils that contain little weatherable iron may not react even when saturated and reduced. There are no minimum thickness requirements or initial color requirements for the soil layer in question.

Figure 45. When alpha, alpha-dipyridyl is applied to a soil containing reduced iron, a positive reaction is indicated by a pink or red coloration to the treated area.

Indicator C6: Recent iron reduction in tilled soils

Category: Primary

General Description: Presence of a layer containing 2 percent or more redox concentrations as pore linings or soft masses in the tilled surface layer of soils cultivated within the last two years. The layer containing redox concentrations must be within the tilled zone or within 12 in. (30 cm) of the soil surface, whichever is shallower.

Cautions and User Notes: Cultivation breaks up or destroys redox features in the plow zone. The presence of redox features that are continuous and unbroken indicates that the soil was saturated and reduced since the last episode of cultivation (Figure 46). Redox features often form around organic material incorporated into the tilled soil. Use caution with older features that may be broken up but not destroyed by tillage. The indicator is most reliable in areas that are cultivated regularly, so that soil aggregates and older redox features are more likely to be broken up. If not obvious, information about the timing of last cultivation may be available from the land owner, other knowledgeable individuals, aerial photography, or the Farm Service Agency. A plow zone 6 to 8 in. (15 to 20 cm) in depth is typical, but it may extend deeper. There is no minimum thickness requirement for the layer containing redox concentrations.

Figure 46. Redox concentrations in the tilled surface layer of a recently cultivated soil.

Indicator C2: Dry-season water table

Category: Secondary

General Description: Visual observation of the water table between 12 and 24 in. (30 and 60 cm) below the surface during the normal dry season or during a drier-than-normal year.

Cautions and User Notes: Due to normal seasonal fluctuations, water tables in wetlands often drop below 12 in. (30 cm) during the summer dry season. A water table between 12 and 24 in. (30 and 60 cm) during the dry season, or during an unusually dry year, indicates a normal wet-season water table within 12 in. (30 cm) of the surface. Sufficient time must be allowed for water to infiltrate into a newly dug hole and to stabilize at the water-table level. The required time will vary depending upon soil texture. In some cases, the water table can be determined by examining the wall of the soil pit and identifying the upper level at which water is seeping into the pit. For an accurate determination of the water-table level, the soil pit, auger hole, or well should not penetrate any restrictive soil layer capable of perching water near the surface. Water tables in wetlands often drop well below 24 in. (60 cm) during dry periods. Therefore, a dry-season water table below 24 in. (60 cm) does not necessarily indicate a lack of wetland hydrology. See Chapter 5 (section on Wetlands that Periodically Lack Indicators of Wetland Hydrology) to determine average dry-season dates and drought periods.

Indicator C9: Saturation visible on aerial imagery

Category: Secondary

General Description: One or more recent aerial photographs or satellite images indicate soil saturation. Saturated soil signatures must correspond to field-verified hydric soils, depressions or drainage patterns, differential crop management, or other evidence of a seasonal high water table.

Cautions and User Notes: This indicator is useful when plant cover is sparse or absent and the ground surface is visible from above. Saturated areas generally appear as darker patches within the field (Figure 47). Inundated (indicator B7) and saturated areas may be present in the same field; if they cannot be distinguished, then use indicator C9 for the entire wet area. Care must be used in applying this indicator because saturation may be present on a non-wetland site immediately after a heavy rain or during periods of abnormally high precipitation, runoff, tides, or river stages. Saturation observed during the non-growing season may be an acceptable indicator if experience and professional judgment suggest that wet conditions normally extend into the growing season for sufficient duration in most years. Saturation may be absent from a wetland during the normal dry season or during extended periods of drought. Even under normal rainfall conditions, some wetlands do not become inundated or saturated every year (i.e., wetlands are inundated or saturated at least 5 out of 10 years, or 50 percent or higher probability). If available, it is recommended that multiple years of photography be evaluated. If 5 or more years of aerial photography are available, the procedure described by the USDA Natural Resources Conservation Service (1997, section 650.1903) is recommended. Use caution, as similar signatures may be caused by factors other than saturation. This indicator requires onsite verification that saturation signatures seen on photos correspond to hydric soils or other evidence of a seasonal high water table.

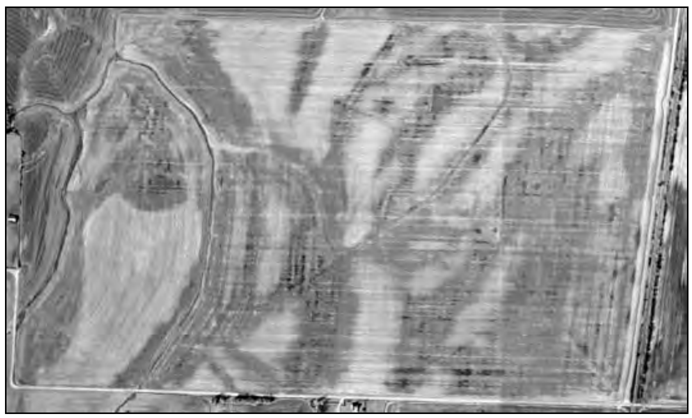


Figure 47. Aerial photograph of an agricultural field with saturated soils indicated by darker colors.

Group D – Evidence from Other Site Conditions or Data

Indicator D1: Stunted or stressed plants

Category: Primary

General Description: In agricultural or planted vegetation located in a swale or other topographically low area, this indicator is present if individuals of the same species growing in the potential wetland are clearly of smaller stature, less vigorous, or stressed compared with individuals growing in nearby drier landscape situations.

Applicable Subregion: Applicable to the Northwest Forests and Coast Subregion (LRR A).

Cautions and User Notes: Usually this indicator is associated with swales or depressions. Agricultural crops and other introduced or planted species, such as alfalfa (*Medicago* spp.), oats (*Avena* spp.), and ryegrass

(*Lolium* spp.), can become established in wetlands but often exhibit obvious stunting, yellowing, or stress in wet situations (Figure 48). Use caution in areas where stunting of plants on non-wetland sites may be caused by low soil fertility, excessively drained soils, salinity, cold temperatures, uneven application of agricultural chemicals, or other factors. For this indicator to be present, a majority of individuals in the potential wetland area must be stunted or stressed. This indicator is restricted to agricultural or planted vegetation. It is often seen where early-season germination and establishment of cultivated or planted species occur before the onset of seasonal wetland hydrology. As a result, established plants can exhibit differential growth patterns and stress between areas that have wetland hydrology and areas that are better drained.

Figure 48. Stunted corn due to wet spots in an agricultural field.

Indicator D2: Geomorphic position

Category: Secondary

General Description: This indicator is present if the area in question is located in a localized depression, swale or drainageway, concave position within a floodplain, at the toe of a slope, on an extensive flat, on the low-elevation fringe of a pond or other water body, or in an area where groundwater discharges. This indicator does not include concave positions on rapidly permeable soils (e.g., floodplains with sand and gravel substrates) that do not have wetland hydrology unless the water table is near the surface.

Cautions and User Notes: Excess water from precipitation and snowmelt naturally accumulates in certain geomorphic positions in the landscape, particularly in low-lying areas such as depressions, drainages, toe slopes, and fringes of water bodies (Figure 49). Extensive flats with poor drainage accumulate snowmelt in mountain areas. In this region, which receives relatively abundant rainfall and snowmelt, these geomorphic settings often, but not always, exhibit wetland hydrology.

Figure 49. Certain geomorphic positions, such as this estuarine fringe, are evidence of wetland hydrology.

Indicator D3: Shallow aquitard

Category: Secondary

General Description: This indicator consists of the presence of an aquitard within 24 in. (60 cm) of the soil surface that is potentially capable of perching water within 12 in. (30 cm) of the surface.

Cautions and User Notes: An aquitard is a relatively impermeable soil layer or bedrock that slows the downward infiltration of water and can produce a perched water table. In some cases, the aquitard may be at the surface (e.g., in clay soils) and cause water to pond on the surface. Potential aquitards include fragipans, cemented layers, dense glacial till, lacustrine deposits, and clay layers. An aquitard can often be identified by the limited root penetration through the layer and/or the presence of redoximorphic features in the layer(s) above the aquitard. Aquitards are generally associated with flat or depressional land forms but also occur on slopes. Local experience and professional judgment should indicate that the perched water table is likely to occur during the growing season for sufficient duration in most years. Soil layers that are seasonally frozen do not qualify as aquitards unless they are observed to perch water for long periods during the growing season.

Indicator D5: FAC-neutral test

Category: Secondary

General Description: The plant community passes the FAC-neutral test.

Cautions and User Notes: The FAC-neutral test is performed by compiling a list of dominant plant species across all strata in the community, and dropping from the list any species with a Facultative indicator status (i.e., FAC, FAC–, and FAC+). The FAC-neutral test is met if more than 50 percent of the remaining dominant species are rated FACW and/or OBL (Figure 50). This indicator may be used in communities that contain no FAC dominants. If there are an equal number of dominants that are OBL and FACW versus FACU and UPL, nondominant species should be considered. This indicator is only applicable to wetland hydrology determinations.

Step 1: Use the 50/20 rule to select dominant species from each stratum of the community.

Step 2: Combine dominant species from all strata into a single list. Determine the wetland indicator status for each dominant species (Reed (1988) or current list). For example:

Dominant Species	Stratum	Indicator Status
Gaultheria shallon	Sapling/Shrub	FACU
Pinus contorta	Sapling/Shrub	FAC
Spiraea douglasii	Sapling/Shrub	FACW
Equisetum arvense	Herb	FAC
Juncus effusus	Herb	FACW

Step 3: Drop the FAC species and sort the remaining species into two groups: FACW and OBL species, and FACU and UPL species:

FACW and OBL Species	FACU and UPL Species
Spiraea douglasii	*Gaultheria shallon*
Juncus effusus	

Step 4: Count the number of species in each group. If the number of dominant species that are FACW and OBL is greater than the number of dominant species that are FACU and UPL, the site passes the FAC-neutral test. In the example, two species (*Spiraea douglasii* and *Juncus effusus*) are FACW and/or OBL, and only one species (*Gaultheria shallon*) is FACU or UPL. Therefore, the site passes the FAC-neutral test.

Figure 50. Procedure and example of the FAC-neutral test. This Oregon example uses the 1993 plant list approved for use in the Portland District.

Indicator D6: Raised ant mounds

Category: Secondary

General Description: Presence of elevated ant mounds 6 in. (15 cm) or more in height built in response to seasonal flooding, ponding, or high water tables.

Applicable Subregions: Applicable to the Northwest Forests and Coast Subregion (LRR A).

Cautions and User Notes: In well-drained soils, ground-nesting ants build mounds that are typically less than 4 to 5 in. (10 to 12 cm) in height. However, in areas that are seasonally flooded, ponded, or have a water table near the surface, species such as the silky ant (*Formica fusca*) build exaggerated, cylindrical mounds up to 20 in. (50 cm) tall that serve to elevate the nest above water level (Landa 1977). These nests often have grasses and other plants growing on their tops and sides and may be very numerous, giving the wet area a hummocky appearance (Figure 51).

Figure 51. Raised ant mounds in a Willamette Valley, OR, wetland.

Indicator D7: Frost-heave hummocks

Category: Secondary

General Description: This indicator consists of hummocky micro-topography produced by frost action in saturated wetland soils.

Cautions and User Notes: During cold winters at high elevations, freeze/thaw action creates hummocky microtopography in saturated soils in and along the edges of wetlands (Figure 52). This indicator does not include gilgai microrelief in clay soils (e.g., Vertisols) or other factors (e.g., trampling by livestock) that can produce hummocky topography.

Figure 52. Frost-heave hummocks.

5 Difficult Wetland Situations in the Western Mountains, Valleys, and Coast Region

Introduction

Some wetlands can be difficult to identify because wetland indicators may be missing due to natural processes or recent disturbances. This chapter provides guidance for making wetland determinations in difficult-to-identify wetland situations in the Western Mountains, Valleys, and Coast Region. It includes regional examples of problem area wetlands and atypical situations as defined in the Corps Manual, as well as other situations that can make wetland delineation more challenging. Problem area wetlands are naturally occurring wetland types that lack indicators of hydrophytic vegetation, hydric soil, or wetland hydrology periodically due to normal seasonal or annual variability, or permanently due to the nature of the soils or plant species on the site. Atypical situations are wetlands in which vegetation, soil, or hydrology indicators are absent due to recent human activities or natural events. This chapter also provides a field procedure for quantifying the extent of wetlands in areas where wetlands and non-wetlands are highly interspersed in a mosaic pattern. The chapter is organized into the following sections:

- Problematic Hydrophytic Vegetation
- Problematic Hydric Soils
- Wetlands that Periodically Lack Indicators of Wetland Hydrology
- Wetland/Non-Wetland Mosaics

The list of difficult wetland situations presented in this chapter is not intended to be exhaustive and other such situations may exist in the region. See the Corps Manual for general guidance. Furthermore, more than one wetland factor (i.e., vegetation, soil, and/or hydrology) may be disturbed or problematic on a given site. In general, *wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or her professional experience and knowledge of the ecology of wetlands in the region.*

Problematic hydrophytic vegetation

Description of the problem

Many factors affect the structure and composition of plant communities in the Western Mountains, Valleys, and Coast Region, including climatic variability, ephemeral water sources in some places, superabundance of moisture in others, salinity, and human land-use practices. As a result, some wetlands may exhibit indicators of hydric soil and wetland hydrology but lack any of the hydrophytic vegetation indicators presented in Chapter 2, at least at certain times. To identify and delineate these wetlands may require special procedures or additional analysis of factors affecting the site. To the extent possible, the hydrophytic vegetation decision should be based on the plant community that is normally present during the wet portion of the growing season in a normal rainfall year. The following procedure addresses several examples of problematic vegetation situations in the Western Mountains, Valleys, and Coast Region.

Procedure

Problematic hydrophytic vegetation can be identified and delineated using a combination of observations made in the field and/or supplemental information from the scientific literature and other sources. These procedures should be applied only where indicators of hydric soil and wetland hydrology are present, unless one or both of these factors is also disturbed or problematic, but no indicators of hydrophytic vegetation are evident. The following procedures are recommended:

1. Verify that at least one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present. If indicators of either hydric soil or wetland hydrology are absent, the area is likely non-wetland unless soil and/or hydrology are also disturbed or problematic. If indicators of hydric soil and wetland hydrology are present (or are absent due to disturbance or other problem situations), proceed to step 2.

2. Verify that the area is in a landscape position that is likely to collect or concentrate water. Appropriate settings include the following. If the landscape setting is appropriate, proceed to step 3.

    a. Concave surface (e.g., depression or swale)
    b. Active floodplain or low terrace

c. Level or nearly level area (e.g., 0- to 3-percent slope)
d. Toe slope (Figure 4) or an area of convergent slopes (Figure 3)
e. Fringe of another wetland or water body
f. Area with a restrictive soil layer or aquitard within 24 in. (60 cm) of the surface
g. Area where groundwater discharges (e.g., a seep)
h. Other (explain in field notes why this area is likely to be inundated or saturated for long periods)

3. Use one or more of the approaches described in step 4 (Specific Problematic Vegetation Situations below) or step 5 (General Approaches to Problematic Hydrophytic Vegetation on page 108) to determine whether the vegetation is hydrophytic. In the remarks section of the data form or in the delineation report, explain the rationale for concluding that the plant community is hydrophytic even though indicators of hydrophytic vegetation described in Chapter 2 were not observed.

4. Specific Problematic Vegetation Situations

   a. *Temporal shifts in vegetation.* As described in Chapter 2, the species composition of some wetland plant communities in the Western Mountains, Valleys, and Coast Region can change in response to seasonal weather patterns and long-term climatic fluctuations. Wetland types that are influenced by these shifts include, but are not limited to, wet prairies, vernal pools and other seasonal depressional wetlands, coastal interdunal wetlands, seeps, and springs. Lack of hydrophytic vegetation during dry periods should not immediately eliminate a site from further consideration as a wetland. A site qualifies for further consideration if the plant community at the time of sampling does not exhibit hydrophytic vegetation indicators, but indicators of hydric soil and wetland hydrology are present. The following sampling and analytical approaches are recommended in these situations:

      (1) Seasonal Shifts in Plant Communities

         (a) If possible, return to the site during the normal wet portion of the growing season and re-examine the site for indicators of hydrophytic vegetation.

(b) Examine the site for identifiable plant remains, either alive or dead, or other evidence that the plant community that was present during the normal wet portion of the growing season was hydrophytic.

(c) Use off-site data sources to determine whether the plant community that is normally present during the wet portion of the growing season is hydrophytic. Appropriate data sources include early growing season aerial photography, NWI maps, soil survey reports, other remotely sensed data, public interviews, and previous reports about the site.

(d) If the vegetation on the site is substantially the same as that on a wetland reference site having similar soils, landscape position, and known wetland hydrology, then consider the vegetation to be hydrophytic (see step 5b in this procedure for more information).

(2) Extended Drought Conditions (i.e., lasting more than two growing seasons)

(a) Investigate climate records (e.g., WETS tables, drought indices) to determine if the area is under the influence of a drought (for more information, see the section on "Wetlands that Periodically Lack Indicators of Wetland Hydrology" later in this chapter). If so, evaluate any off-site data that provide information on the plant community that exists on the site during normal years, including aerial photography, NWI maps, other remote sensing data, soil survey reports, public interviews, and previous site reports. Determine whether the vegetation that is present during normal years is hydrophytic.

(b) If the vegetation on the drought-affected site is substantially the same as that on a wetland reference site in the same general area having similar soils and known wetland hydrology, then consider the vegetation to be hydrophytic (see step 5b in this procedure).

b. *Sparse and patchy vegetation*. Some wetlands in the Western Mountains, Valleys, and Coast Region have sparse or patchy vegetation cover. Examples include some tidal marshes, alkaline flats, kettle depressions, and interdunal swale wetlands. These areas may have indicators of hydric soils and wetland hydrology, but the vegetation is not continuous across or along the boundary of the wetland. Delineation of these areas can be confusing due to the interspersion of wetlands and other potential waters of the United States. For wetland delineation purposes, an area should be considered vegetated (and a potential wetland) if there is 5 percent or more areal cover of plants at the peak of the growing season. Unvegetated areas have less than 5 percent plant cover. Patchy vegetation is a mosaic of both vegetated and unvegetated areas (Figure 53). In some cases, the unvegetated portions of a wet site may meet the requirements for other waters of the United States. Therefore, delineation of such sites should include consideration of both wetlands and other waters. See the Arid West regional supplement (U.S. Army Corps of Engineers 2008) for further information.

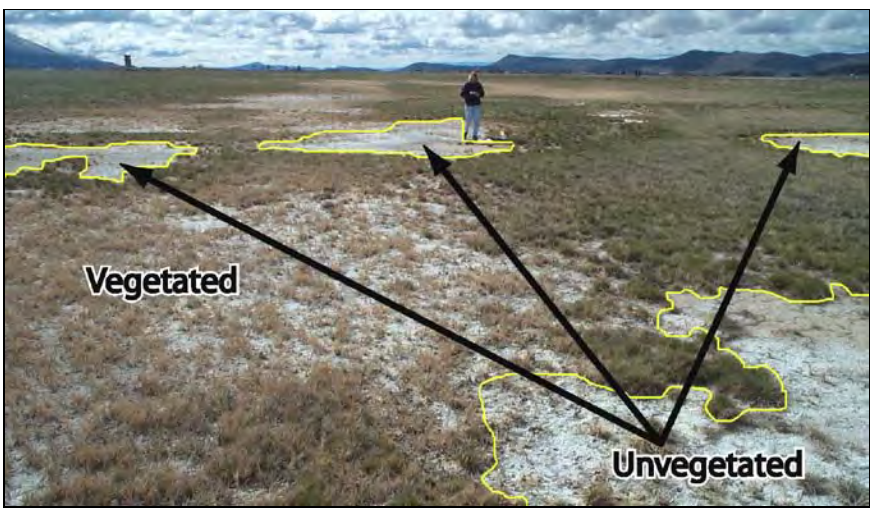


Figure 53. Example of sparse and patchy plant cover in a wetland. Areas labeled as vegetated have 5 percent or more plant cover. Unvegetated areas (less than 5 percent plant cover) may meet requirements as other waters of the United States.

c. *Riparian areas.* Riparian ecosystems are highly variable across the region, and can contain both wetland and non-wetland components. Riparian corridors can be lined with hydrophytic vegetation, upland vegetation, unvegetated areas, or a mosaic of these types. Soils may lack hydric soil indicators in recently deposited materials (i.e., Entisols) even when indicators of hydrophytic vegetation and wetland hydrology are present. Surface hydrology can vary from perennial to intermittent and, after a flooding event, water tables can drop quickly to low levels. Therefore, wetland delineation in western riparian areas is often a challenge and should consider the potential interspersion of wetlands and other potential waters of the United States. In addition, many riparian areas contain remnant stands of tree species that may have germinated during unusually high-water events or under wetter conditions than currently exist at the site (Figure 54). Examples of species that occur in these situations include narrowleaf cottonwood, willows, balsam poplar, and red alder. These areas may support phreatophytic species that, when mature, are able to exploit groundwater that is too deep to support wetlands. In such situations, there may be a hydrophytic overstory and a non-hydrophytic understory. If the soils are Entisols lacking hydric soil features and/or wetland hydrology is problematic, the hydrophytic vegetation determination should emphasize understory species, which may be more indicative of current wetland or non-wetland conditions.

Figure 54. Mature *Populus deltoides* stand on an elevated floodplain terrace with xeric understory on the South Fork of the Shoshone River, Wyoming.

d. *Areas affected by grazing.* Short- and long-term grazing can cause shifts in dominant species in the vegetation. Grazers can influence the abundance of plant species in several ways. For example, trampling by large herbivores can cause soil compaction, altering soil permeability and infiltration rates and affecting the plant community. Grazers can also influence the abundance of plant species by selectively grazing certain species or avoiding other species. Shifts in species composition due to grazing can influence a hydrophytic vegetation determination. Be aware that shifts in both directions, favoring either wetland species or non-wetland species, can occur in these situations. Limited grazing does not necessarily affect the outcome of a hydrophytic vegetation decision. However, the following approaches are recommended in cases where the hydrophytic vegetation determination would be unreliable or misleading due to the effects of grazing.

(1) Examine the vegetation on a nearby, ungrazed reference site having similar soils and hydrologic conditions. Ungrazed areas may be present on adjacent properties or in fenced exclosures or stream-side management zones. Assume that the same plant community would exist on the grazed site, in the absence of grazing.

(2) If feasible, remove livestock or fence representative livestock exclusion areas to allow the vegetation time to recover from grazing, and reevaluate the vegetation during the next growing season.

(3) If grazing was initiated recently, use offsite data sources such as aerial photography, NWI maps, and interviews with the land owner and other persons familiar with the area to determine the plant community present on the site before grazing began. If the previously ungrazed community was hydrophytic, then consider the current vegetation to be hydrophytic.

(4) If an appropriate ungrazed area cannot be located or if the ungrazed vegetation condition cannot be determined, make the wetland determination based on indicators of hydric soils and wetland hydrology.

e. *Managed plant communities*. Many natural plant communities throughout the region have been altered and are managed to meet human goals. Examples include clearing of woody vegetation on rangelands, periodic disking or plowing, planting of native and non-native species, irrigation of pastures and hayfields, suppression of wildfires, and the use of herbicides. These actions can result in elimination of certain species and their replacement with other species, changes in abundance of certain plants, and shifts in dominant species, possibly influencing a hydrophytic vegetation determination. The following approaches are recommended if the natural vegetation has been altered through management to such an extent that a hydrophytic vegetation determination may be unreliable:

(1) Examine the vegetation on a nearby, unmanaged reference site having similar soils and hydrologic conditions. Assume that the same plant community would exist on the managed site, in the absence of human alteration.

(2) For recently cleared or tilled areas (not planted or seeded), leave representative areas unmanaged for at least one growing season with normal rainfall and reevaluate the vegetation.

(3) If management was initiated recently, use offsite data sources such as aerial photography, NWI maps, and interviews with the land owner and other persons familiar with the area to determine what plant community was present on the site before the management occurred.

(4) If the unmanaged vegetation condition cannot be determined, make the wetland determination based on indicators of hydric soil and wetland hydrology.

f. *Aggressive invasive plants.* Native and non-native aggressive, invasive FACU or UPL plant species often become established in wetlands due to their adaptability and aggressive growth habits. Invasive species include planted or seeded species that have escaped and become widely established. Invasive species often prevent the establishment of other species by competing successfully for space, sunlight, or other resources. Examples of invasive species in the region include blackberry (*Rubus discolor* and *R. ursinus*), English ivy (*Hedera helix*), gorse (*Ulex europaeus*), and various pasture species, such as creeping soft grass (*Holcus mollis*) and sweet vernal grass (*Anthoxanthum odoratum*). Certain FAC and FACW species are also aggressive competitors and may dominate non-wetland areas; however, these areas are unlikely to be mistaken for wetlands due to the lack of hydric soil and/or wetland hydrology indicators. The following approaches are recommended when the site has indicators of hydric soil and wetland hydrology but the plant community is dominated by FACU or UPL aggressive, invasive plant species. To use these approaches, there must be evidence of the species' invasive nature, such as published literature or listing of the species on a state or local list of invasive plants (e.g., see the USDA Plants database http://plants.usda.gov/index.html).

(1) Examine a nearby reference site having similar soils, topography, and hydrologic conditions, and a similar plant community without or with reduced presence of the invasive species. Assume that the same plant community would exist on the original site, if invasive species were not prevalent.

(2) If feasible, remove the invasive species and reevaluate the vegetation during the next growing season. Take into consideration that many invasive species are very difficult to remove and will resprout or reemerge next season. However, even temporary removal of the invasive plant may release other species.

(3) If an appropriate reference site cannot be located and the invasive species cannot be removed and the site reevaluated next season, make the wetland determination based on indicators of hydric soil and wetland hydrology.

g. *Areas affected by fires, floods, and other natural disturbances.* Wildfires, floods, and other catastrophic disturbances can dramatically alter the vegetation on a site. Vegetation can be completely or partially removed, or its composition altered, depending upon the intensity of the disturbance. Limited disturbance does not necessarily affect the investigator's ability to determine whether the plant community is or is not hydrophytic. However, if the vegetation on a site has been removed or made unidentifiable by a recent fire, flood, or other disturbance, then one or more of the following approaches may be used to determine whether the vegetation present before the disturbance was hydrophytic. Additional guidance can be found in the Atypical Situations section of the Corps Manual.

(1) Examine the vegetation on a nearby, undisturbed reference site having similar soils and hydrologic conditions. Assume that the same plant community would exist on the disturbed site in the absence of disturbance.

(2) Use off-site information sources such as aerial photography, NWI maps, and interviews with knowledgeable individuals to determine the plant community present on the site before the disturbance.

(3) If the undisturbed vegetation condition cannot be determined, make the wetland determination based on indicators of hydric soil and wetland hydrology.

h. *Vigor and stress responses to wetland conditions.* Plant responses to wet site conditions are often easily observable. Many plants develop stress-related features, such as stunting in agricultural crops and browning or yellowing of native or planted vegetation, when subjected to long periods of soil saturation in the root zone. Crop stress in wet agricultural fields is often easily identifiable both in the field and on aerial photography. In relatively frost-free areas, such as near the Pacific coast, early-season germination of FACU and UPL species occurs in some wetlands (e.g., vernal pools) prior to the onset of seasonal hydrology. These plants may persist and dominate in wetlands during the normal wet season, but often show evidence of stress (e.g., stunting, browning, yellowing) compared to the same species growing in nearby non-wetlands. In addition, many species grow more abundantly or vigorously on wet sites, particularly later in the growing season when adjacent areas are drying out but moist soils are still present in wetlands. These responses are not species specific or easily measurable but are evident when the vegetation of wetlands and adjacent non-wetlands is compared. The following procedure can help determine whether an observed increase or decrease in plant vigor or stress is the result of growing in wetlands. The procedure assumes that indicators of hydric soil and wetland hydrology are present in the potential wetland area. Use caution in areas where variations in plant vigor or stress may be due to variations in salinity or other soil conditions, uneven application of fertilizers or herbicides, or other factors not related to wetness.

(1) Compare and describe in field notes the size, vigor, or other stress-related characteristics of individuals of the same species between the potential wetland area and the immediately surrounding non-wetlands. Emphasize features that can be measured or photographed and include this information in the field report. To qualify for this procedure, most individuals of the affected species must

show vigor/stress responses in the wet area. If there are clear differences in plant vigor/stress responses between potential wetland and adjacent non-wetland areas, proceed to step 2.

(2) Observe and describe trends in plant vigor or stress conditions along the topographic or wetness gradient from the potential wetland to the adjacent non-wetland areas. Trends in plant vigor/stress responses must reflect the distribution of hydric soils, wetland hydrology indicators, topography, and/or landscape conditions relevant to wetlands. If so, proceed to step 3.

(3) Consider the area containing indicators of hydric soil, wetland hydrology, and evidence of plant vigor or stress to be a wetland. Determine the wetland boundary based on the spatial patterns in these features plus topography and landscape characteristics.

5. General Approaches to Problematic Hydrophytic Vegetation. The following general procedures are provided to identify hydrophytic vegetation in difficult situations not necessarily associated with specific vegetation types or management practices, including wetlands dominated by FACU, NI, NO, or unlisted species that are functioning as hydrophytes. These procedures should be applied only where indicators of hydric soil and wetland hydrology are present (or are absent due to disturbance or other problem situations) but indicators of hydrophytic vegetation are not evident. The following approaches are recommended:

   a. *Direct hydrologic observations*. Verify that the plant community occurs in an area subject to prolonged inundation or soil saturation during the growing season. For example, lodge-pole pine (*Pinus contorta*), a FAC to FACU species in the region, occasionally dominates the vegetation in areas that have saturated soil conditions during the early part of the growing season. Other examples of FACU species that sometimes dominate wetlands in the region include western hemlock (Kuchler 1946; Waring and Franklin 1979), ponderosa pine, salal (*Gaultheria shallon*), Himalayan blackberry (*Rubus armeniacus = R. discolor = R. procerus*), and Kentucky bluegrass (*Poa pratensis*) (indicator status may vary by plant list region). Problematic hydrophytic vegetation can be evaluated by visiting the site at 2- to 3-day intervals during the portion of the growing season when surface water is most likely to be present or water tables are normally high.

Hydrophytic vegetation is considered to be present, and the site is a wetland, if surface water is present and/or the water table is 12 in. (30 cm) or less from the surface for 14 or more consecutive days during the growing season during a period when antecedent precipitation has been normal or drier than normal. If necessary, microtopographic highs and lows should be evaluated separately. The normality of the current year's rainfall must be considered in interpreting field results, as well as the likelihood that wet conditions will occur on the site at least every other year (for more information, see the section on "Wetlands that Periodically Lack Indicators of Wetland Hydrology" in this chapter).

b. *Reference sites.* If indicators of hydric soil and wetland hydrology are present, the site may be considered to be a wetland if the landscape setting, topography, soils, and vegetation are substantially the same as those on nearby wetland reference areas. Hydrologic characteristics of wetland reference areas should be documented through long-term monitoring or by application of the procedure described in item 5a above. Reference sites should be minimally disturbed and provide long-term access. Soils, vegetation, and hydrologic conditions should be thoroughly documented and the data kept on file in the district or field office.

c. *Technical literature.* Published and unpublished scientific literature may be used to support a decision to treat specific FACU species or species with no assigned indicator status (e.g., NI, NO, or unlisted) as hydrophytes or certain plant communities as hydrophytic. Preferably, this literature should discuss the species' natural distribution along the moisture gradient, its capabilities and adaptations for life in wetlands, wetland types in which it is typically found, or other wetland species with which it is commonly associated.

Problematic hydric soils

Description of the problem

Soils with faint or no indicators

Some soils that meet the hydric soil definition may not exhibit any of the indicators presented in Chapter 3. These problematic hydric soils exist for a number of reasons and their proper identification requires additional information, such as landscape position, presence or absence of restrictive soil layers, or information about hydrology. This section describes several soil situations in the Western Mountains, Valleys, and Coast Region that are considered to be hydric if additional requirements are met. In some cases, these hydric soils may appear to be non-hydric due to the color of the parent material from which the soils developed. In others, the lack of hydric soil indicators is due to conditions that inhibit the development of redoximorphic features despite prolonged soil saturation and anoxia. In addition, recently developed wetlands may lack hydric soil indicators because insufficient time has passed for their development. Examples of problematic hydric soils in the region include, but are not limited to, the following.

1. **Moderately to Very Strongly Alkaline Soils.** This problematic situation is limited to the Rocky Mountain Forests and Rangeland Subregion (LRR E) and is associated with depressional wetlands at lower elevations. The formation of redox concentrations and depletions requires that soluble iron, manganese, and organic matter be present in the soil. In a neutral to acidic soil, iron and manganese readily enter into solution as reduction occurs and then precipitate in the form of redox concentrations as the soil becomes oxidized. Identifiable iron or manganese features do not form readily in saturated soils with high pH. High pH (7.9 or higher) can be caused by many factors. Salt content is a common cause of high soil pH in this region. If the pH is high, indicators of hydrophytic vegetation and wetland hydrology are present, and landscape position is consistent with wetlands in the area, then the soil may be hydric even in the absence of a recognized hydric soil indicator. In the absence of an approved indicator, thoroughly document soil conditions, including pH, in addition to the rationale for identifying the soil as hydric (e.g., landscape position, vegetation, evidence of hydrology, etc.). The concept of high pH includes the USDA terms Moderately Alkaline, Strongly Alkaline, and Very Strongly Alkaline (USDA Natural Resources Conservation Service 2002).

2. **Volcanic Ash or Diatomaceous Earth.** Many of these soils have high levels of silica that naturally have high value and low chroma. These soils also are inherently low in iron, manganese, and sulfur. Many hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, or sulfur and, therefore, cannot form in these soils. In the absence of an approved indicator, soil and landscape conditions should be documented thoroughly, along with the rationale for considering the soil

to be hydric (e.g., landscape position, vegetation, evidence of hydrology, etc.). A soil scientist with local experience may be needed to help determine whether soils were developed from volcanic ash or diatomaceous earth.

3. **Vegetated Sand and Gravel Bars within Floodplains.** Coarse-textured soils commonly occur on vegetated bars above the active channel of rivers and streams. In some cases, these soils lack hydric soil indicators due to seasonal or annual deposition of new soil material, low iron or manganese content, and low organic-matter content. Redox concentrations can sometimes be found on the bottoms of coarse fragments and should be examined closely to see if they satisfy an indicator.

4. **Dark Parent Materials.** Soils formed in dark parent materials often do not exhibit easily recognizable redoximorphic features. These soils are not dark due to high organic-matter content but, rather, because they formed from parent materials such as dark shales and phyllites. In the absence of an approved indicator, soil and landscape conditions should be documented thoroughly. Describe soil characteristics of surrounding uplands that are the likely source of dark parent materials, and include the rationale for considering the soil in question to be hydric (e.g., landscape position, vegetation, evidence of hydrology, etc.).

5. **Recently Developed Wetlands.** Recently developed wetlands include mitigation sites, wetland management areas (e.g., for waterfowl), other wetlands intentionally or unintentionally produced by human activities, and naturally occurring wetlands that have not been in place long enough to develop hydric soil indicators.

6. **Seasonally Ponded Soils.** Seasonally ponded, depressional wetlands occur in basins and valleys throughout the Western Mountains, Valleys, and Coast Region. Most are perched systems, with water ponding above a restrictive soil layer, such as a hardpan or clay layer that is at or near the surface (e.g., Vertisols). Some of these wetlands lack hydric soil indicators due to limited saturation depth, saline conditions, or other factors.

Soils with relict hydric soil indicators

Some soils in the region exhibit redoximorphic features and hydric soil indicators that formed in the recent or distant past when conditions may have been wetter than they are today. These features have persisted even though wetland hydrology may no longer be present. Examples include soils associated with abandoned river courses and areas adjacent to deeply incised stream channels. In addition, wetlands that were drained for agricultural purposes starting in the 1800s may contain persistent hydric soil features. Wetland soils drained during historic times are still considered to be hydric but they may no longer support wetlands.

Relict hydric soil features may be difficult to distinguish from contemporary features. However, if indicators of hydrophytic vegetation and wetland hydrology are present, then hydric soil indicators can be assumed to be contemporary.

Procedure

Soils that are thought to meet the definition of a hydric soil but do not exhibit any of the indicators described in Chapter 3 can be identified by the following recommended procedure. This procedure should be used only where indicators of hydrophytic vegetation and wetland hydrology are present (or are absent due to disturbance or other problem situations) but indicators of hydric soil are not evident.

1. Verify that one or more indicators of hydrophytic vegetation are present or that the vegetation is disturbed or problematic. If so, proceed to step 2.

2. Verify that at least one primary or two secondary indicators of wetland hydrology are present or that indicators are absent due to disturbance or other factors. If so, proceed to step 3. If indicators of hydrophytic vegetation and/or wetland hydrology are absent, then the area is probably non-wetland and no further analysis is required.

3. Thoroughly describe and document the soil profile and landscape setting. Verify that the area is in a landscape position that is likely to collect or concentrate water. Appropriate settings are listed below. If the landscape setting is appropriate, proceed to step 4.

    a. Concave surface (e.g., depression or swale)
    b. Active floodplain or low terrace
    c. Level or nearly level area (e.g., 0- to 3-percent slope)
    d. Toe slope (Figure 4) or an area of convergent slopes (Figure 3)
    e. Fringe of another wetland or water body

f. Area with a restrictive soil layer or aquitard within 24 in. (60 cm) of the surface
g. Area where groundwater discharges (e.g., a seep)
h. Other (explain in field notes why this area is likely to be inundated or saturated for long periods)

4. Use one or more of the following approaches to determine whether the soil is hydric. In the remarks section of the data form or in the delineation report, explain why it is believed that the soil lacks any of the NTCHS hydric soil indicators described in Chapter 3 and why it is believed that the soil meets the definition of a hydric soil.

a. Determine whether one or more of the following indicators of problematic hydric soils is present. Descriptions of each indicator are given in Chapter 3. If one or more indicators is present, then the soil is hydric.

(1) 2 cm Muck (A10)
(2) Red Parent Material (TF2)
(3) Very Shallow Dark Surface (TF12)

b. Determine whether one or more of the following problematic soil situations is present. If present, consider the soil to be hydric.

(1) Moderately to Very Strongly Alkaline Soils (LRR E)
(2) Volcanic Ash or Diatomaceous Earth
(3) Vegetated Sand and Gravel Bars within Floodplains
(4) Dark Parent Materials
(5) Recently Developed Wetlands
(6) Seasonally Ponded Soils
(7) Other (in field notes, describe the problematic soil situation and explain why it is believed that the soil meets the hydric soil definition)

c. Soils that have been saturated for long periods and have become chemically reduced may change color when exposed to air due to the rapid oxidation of ferrous iron (Fe^{2+}) to Fe^{3+} (i.e., a reduced matrix) (Figures 55 and 56). If the soil contains sufficient iron, this can result in an observable color change, especially in hue or chroma. The soil is hydric if a mineral layer 4 in. (10 cm) or more thick starting within

12 in. (30 cm) of the soil surface that has a matrix value of 4 or more and chroma of 2 or less becomes redder by one or more pages in hue and/or increases one or more in chroma when exposed to air within 30 minutes (Vepraskas 1992).

Care must be taken to obtain an accurate color of the soil sample immediately upon excavation. The colors should be observed closely and examined again after several minutes. Do not allow the sample to become dry. Dry soils usually have a different color than wet or moist soils. As always, do not obtain colors while wearing sunglasses. Colors must be obtained in the field under natural light and not under artificial light.

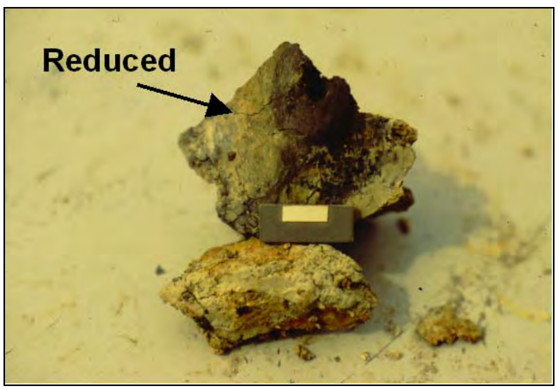


Figure 55. This soil exhibits colors associated with reducing conditions. Scale is 1 cm.

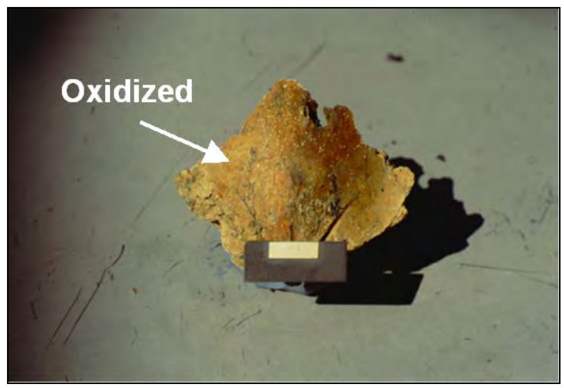


Figure 56. The same soil as in Figure 55 after exposure to the air and oxidation has occurred.

d. If the soil is saturated at the time of sampling, alpha, alpha-dipyridyl reagent can be used in the following procedure to determine if reduced (ferrous) iron is present. If ferrous iron is present as described below, then the soil is hydric.

Alpha, alpha-dipyridyl is a reagent that reacts with reduced iron. In some cases, it can be used to provide evidence that a soil is hydric when it lacks other hydric soil indicators. The soil is likely to be hydric if application of alpha, alpha-dipyridyl to mineral soil material in at least 60 percent of a layer at least 4 in. (10 cm) thick within a depth of 12 in. (30 cm) of the soil surface results in a positive reaction within 30 seconds evidenced by a pink or red coloration to the reagent during the growing season.

Using a dropper, apply a small amount of reagent to a freshly broken ped face to avoid any chance of a false positive test due to iron contamination from digging tools. Look closely at the treated soil for evidence of color change. If in doubt, apply the reagent to a sample of known upland soil and compare the reaction to the sample of interest. A positive reaction will not occur in soils that lack iron and may not occur in soils with high pH. The lack of a positive reaction to the reagent does not preclude the presence of a hydric soil. Specific information about the use of alpha, alpha-dipyridyl can be found in NRCS Hydric Soils Technical Note 8 (http://soils.usda.gov/use/hydric/ntchs/tech_notes/index.html).

e. Using gauge data, water-table monitoring data, or repeated direct hydrologic observations (see item 5a in the procedure for Problematic Hydrophytic Vegetation in this chapter), determine whether the soil is ponded or flooded, or the water table is 12 in. (30 cm) or less from the surface, for 14 or more consecutive days during the growing season in most years (at least 5 years in 10, or 50 percent or higher probability) (U.S. Army Corps of Engineers 2005). If so, then the soil is hydric. Furthermore, any soil that meets the NTCHS hydric soil technical standard (NRCS Hydric Soils Technical Note 11, http://soils.usda.gov/use/hydric/ntchs/tech_notes/index.html) is hydric.

Wetlands that periodically lack indicators of wetland hydrology

Description of the problem

Wetlands are areas that are flooded or ponded, or have soils that are saturated with water, for long periods during the growing season in most years. If the site is visited during a time of normal precipitation amounts and it is inundated or the water table is near the surface, then the wetland hydrology determination is straightforward. However, much of the Western Mountains, Valleys, and Coast Region is characterized by long, hot summer dry seasons. During the dry season, surface water recedes from wetland margins, water tables drop, and many wetlands dry out completely. Superimposed on this seasonal cycle is a long-term pattern of multi-year droughts alternating with years of higher-than-average rainfall. Wetlands in general are inundated or saturated in most years (at least 5 years in 10, or 50 percent or higher probability) over a long-term record. However, some wetlands in the region do not become inundated or saturated in some years and, during drought cycles, may not inundate or saturate for several years in a row.

Wetland hydrology determinations are based on indicators, many of which were designed to be used during dry periods when the direct observation of surface water or a shallow water table is not possible. However, some wetlands may lack any of the listed hydrology indicators, particularly during the dry season or in a dry year. The evaluation of wetland hydrology requires special care on any site where indicators of hydrophytic vegetation and hydric soil are present but hydrology indicators appear to be absent. Among other factors, this evaluation should consider the timing of the site visit in relation to normal seasonal and annual hydrologic variability, and whether the amount of rainfall prior to the site visit has been normal. This section describes a number of approaches that can be used to determine whether wetland hydrology is present on sites where indicators of hydrophytic vegetation and hydric soil are present but hydrology indicators may be lacking due to normal variations in rainfall or runoff, human activities that destroy hydrology indicators, and other factors.

Procedure

1. Verify that indicators of hydrophytic vegetation and hydric soil are present, or are absent due to disturbance or other problem situations. If so, proceed to step 2.

2. Verify that the area is in a landscape position that is likely to collect or concentrate water. Appropriate settings are listed below. If the landscape setting is appropriate, proceed to step 3.

   a. Concave surface (e.g., depression or swale)
   b. Active floodplain or low terrace
   c. Level or nearly level area (e.g., 0- to 3-percent slope)
   d. Toe slope (Figure 4) or an area of convergent slopes (Figure 3)
   e. Fringe of another wetland or water body
   f. Area with a restrictive soil layer or aquitard within 24 in. (60 cm) of the surface
   g. Area where groundwater discharges (e.g., a seep)
   h. Other (explain in field notes why this area is likely to be inundated or saturated for long periods)

3. Use one or more of the following approaches to determine whether wetland hydrology is present and the site is a wetland. In the remarks section of the data form or in the delineation report, explain the rationale for concluding that wetland hydrology is present even though indicators of wetland hydrology described in Chapter 4 were not observed.

   a. *Site visits during the dry season*. Determine whether the site visit occurred during the normal annual "dry season." The dry season, as used in this supplement, is the period of the year when soil moisture is normally being depleted and water tables are falling to low levels in response to decreased precipitation and/or increased evapotranspiration, usually during late spring and summer. It also includes the beginning of the recovery period in late summer or fall. The Web-Based Water-Budget Interactive Modeling Program (WebWIMP) is one source for approximate dates of wet and dry seasons for any terrestrial location based on average monthly precipitation and estimated evapotranspiration (http://climate.geog.udel.edu/~wimp/). In general, the dry season in a typical year is indicated when potential evapotranspiration exceeds precipitation (indicated by negative values of DIFF in the WebWIMP output), resulting in drawdown of soil moisture storage (negative values of DST) and/or a moisture deficit (positive values of DEF, also called the unmet atmospheric demand for moisture). Actual dates for the dry season may vary by locale and year.

      In many wetlands, direct observation of flooding, ponding, or a shallow water table would be unexpected during the dry season. Wetland hydrology indicators, if present, would most likely be limited to indirect evidence, such as water marks, drift deposits, or surface cracks. In some situations, hydrology indicators may be absent during the dry season. If the site visit occurred during the dry season on a site that contains hydric soils and hydrophytic vegetation and no significant hydrologic manipulation (e.g., no dams, levees, water diversions, land grading, etc., and the site is not within the zone of influence of any drainage ditches or subsurface drains), then consider the site to be a wetland. If necessary, re-visit the site during the normal wet season and check again for the presence or absence of wetland hydrology indicators. If wetland hydrology indicators are absent during the wet portion of the growing season in a normal or wetter-than-normal rainfall year, the site is probably non-wetland.

b. *Periods with below-normal rainfall*. Determine whether the amount of rainfall that occurred in the 2 to 3 months preceding the site visit was normal, above normal, or below normal based on the normal range reported in WETS tables. WETS tables are provided by the NRCS National Water and Climate Center (http://www.wcc.nrcs.usda.gov/climate/wetlands.html) and are calculated from long-term (30-year) weather records gathered at National Weather Service meteorological stations. To determine whether precipitation was normal prior to the site visit, actual rainfall in the current month and previous 2 to 3 months should be compared with the normal ranges for each month given in the WETS table (USDA Natural Resources Conservation Service 1997; Sprecher and Warne 2000). The lower and upper limits of the normal range are indicated by the columns labeled "30% chance will have less than" and "30% chance will have more than" in the WETS table. The USDA Natural Resources Conservation Service (1997, Section 650.1903) also gives a procedure that can be used to weight the information from each month and determine whether the entire period was normal, wet, or dry. Average precipitation amounts can vary considerably over short distances, particularly in mountainous areas. Therefore, use caution in areas where elevation, aspect, rain shadow effects, or other conditions differ between the site and the location of the nearest weather station. Sometimes a more distant station is more representative of the site in question.

When precipitation has been below normal, wetlands may not flood, pond, or develop shallow water tables even during the typical wet portion of the growing season and may not exhibit other indicators of wetland hydrology. Therefore, if precipitation was below normal prior to the site visit, and the site contains hydric soils and hydrophytic vegetation and no significant hydrologic manipulation (e.g., no dams, levees, water diversions, land grading, etc., and the site is not within the zone of influence of any drainage ditches or subsurface drains), it should be identified as a wetland. If necessary, the site can be revisited during a period of normal rainfall and checked again for hydrology indicators.

c. *Drought years*. Determine whether the area has been subject to short- or long-term drought. Droughts lasting two to several years in a row are common in the region, particularly in interior portions away from the Pacific coast. Drought periods can be identified by comparing annual rainfall totals with the normal range of annual rainfall given in WETS tables or by examining trends in drought indices, such as the Palmer Drought Severity Index (PDSI) (Sprecher and Warne 2000). PDSI takes into account not only precipitation but also temperature, which affects evapotranspiration, and soil moisture conditions. The index is usually calculated on a monthly basis for major climatic divisions within each state. Therefore, the information is not site-specific. PDSI ranges generally between –6 and +6 with negative values indicating dry periods and positive values indicating wet periods. An index of –1.0 indicates mild drought, –2.0 indicates moderate drought, –3.0 indicates severe drought, and –4.0 indicates extreme drought. Time-series plots of PDSI values by month or year are available from the National Climatic Data Center (http://www.ncdc.noaa.gov/oa/climate/onlineprod/drought/xmgr.html#ds). If wetland hydrology indicators appear to be absent on a site that has hydrophytic vegetation and hydric soils, no significant hydrologic manipulation (e.g., no dams, levees, water diversions, land grading, etc., and the site is not within the zone of influence of any drainage ditches or sub-surface drains), and the region has been affected by drought, then the area should be identified as a wetland.

d. *Years with unusually low winter snowpack*. Determine whether the site visit occurred following a winter with unusually low snowpack. Some wetlands in mountain areas depend upon the melting winter snowpack as a major water source. In areas where the snowpack persists throughout the winter, water availability in spring and early summer depends in part on winter water storage in the form of snow and ice. Therefore, springtime water availability in a given year can be evaluated by comparing the liquid equivalent of snowfall over the previous winter (e.g., October through April) against 30-year averages calculated for NRCS Snowpack Telemetry (SNOTEL) sites (http://www.wcc.nrcs.usda.gov/factpub/ads/) or for National Weather Service meteorological stations (may require a fee, http://lwf.ncdc.noaa.gov/oa/ncdc.html). This procedure may not be reliable in areas where the snowpack is not persistent and water is released intermittently throughout the winter.

In years when winter snowpack is appreciably less than the long-term average, wetlands that depend on snowmelt as an important water source may not flood, pond, or develop shallow water tables and may not exhibit other wetland hydrology indicators. Under these conditions, a site that contains hydric soils and hydrophytic vegetation and no significant hydrologic manipulation (e.g., no dams, levees, water diversions, land grading, etc., and the site is not within the zone of influence of any drainage ditches or subsurface drains) should be considered to be a wetland. If necessary, the site can be re-visited following a winter with normal snowpack conditions and checked again for wetland hydrology indicators.

e. *Reference sites*. If indicators of hydric soil and hydrophytic vegetation are present on a site that lacks wetland hydrology indicators, the site may be considered to be a wetland if the landscape setting, topography, soils, and vegetation are substantially the same as those on nearby wetland reference areas. Hydrology of wetland reference areas should be documented through long-term monitoring (see item h below) or by application of the procedure described in item 5a on page 108 (Direct Hydrologic Observations) of the procedure for Problematic Hydrophytic Vegetation in this chapter. Reference sites should be minimally disturbed and provide long-term access. Soils, vegetation, and hydrologic conditions should be thoroughly documented and the data kept on file in the District or field office.

f. *Hydrology tools*. The “Hydrology Tools” (USDA Natural Resources Conservation Service 1997) is a collection of methods that can be used to determine whether wetland hydrology is present on a potential wetland site that lacks indicators due to disturbance or other reasons, particularly on lands used for agriculture. Generally they require additional information, such as aerial photographs or stream-gauge data, or involve hydrologic modeling and approximation techniques. They should be used only when an indicator-based wetland hydrology determination is not possible or would give misleading results. A hydrologist may be needed to help select and carry out the proper analysis. The seven tools are used to:

(1) Analyze stream and lake gauge data
(2) Estimate runoff volumes to determine duration and frequency of ponding in depressional areas
(3) Evaluate the frequency of wetness signatures on aerial photography (see item g below for additional information)

(4) Model water-table fluctuations in fields with parallel drainage systems using the DRAINMOD model
(5) Estimate the "scope and effect" of ditches or subsurface drain lines
(6) Estimate the effectiveness of agricultural drainage systems using NRCS state drainage guides
(7) Analyze data from groundwater monitoring wells (see item h below for additional information)

g. *Evaluating multiple years of aerial photography*. Each year, the Farm Service Agency (FSA) takes low-level aerial photographs in agricultural areas to monitor the acreages planted in various crops for USDA programs. NRCS has developed an off-site procedure that uses these photos, or repeated aerial photography from other sources, to make wetland hydrology determinations (USDA Natural Resources Conservation Service 1997, Section 650.1903). The method is intended for use on agricultural lands where human activity has altered or destroyed other wetland indicators. However, the same approach may be useful in other environments.

The procedure uses five or more years of growing-season photography and evaluates each photo for wetness signatures that are listed in "wetland mapping conventions" developed by NRCS state offices. Wetland mapping conventions can be found in the electronic Field Office Technical Guide (eFOTG) for each state (http://www.nrcs.usda.gov/technical/efotg/). From the national web site, choose the appropriate state, then select any county (the state's wetland mapping conventions are the same in every county). Wetland mapping conventions are listed among the references in Section I of the eFOTG. However, not all states have wetland mapping conventions, particularly in the West.

Wetness signatures for a particular state may include surface water, saturated soils, flooded or drowned-out crops, stressed crops due to wetness, differences in vegetation patterns due to different planting dates, inclusion of wet areas into set-aside programs, unharvested crops, isolated areas that are not farmed with the rest of the field, patches of greener vegetation during dry periods, and other evidence of wet conditions (see Part 513.30 of USDA Natural Resources Conservation Service 1994). For each photo, the procedure described in item b above is used to determine whether the amount of rainfall in the 2 to 3 months prior to the date of the photo was normal, below normal, or above normal. Only photos taken in normal rainfall years, or an equal number of wetter-than-normal and drier-than-normal years, are used in the analysis. If wetness signatures are observed on photos in more than half of the years included in the analysis, then wetland hydrology is present. Data forms that may be used to document the wetland hydrology determination are given in section 650.1903 of USDA Natural Resources Conservation Service (1997).

h. *Long-term hydrologic monitoring.* On sites where the hydrology has been manipulated by man (e.g., with ditches, dams, levees, water diversions, land grading) or where natural events (e.g., downcutting of streams, volcanic activity) have altered conditions such that hydrology indicators may be missing or misleading, direct monitoring of surface and groundwater may be needed to verify the presence or absence of wetland hydrology. The U.S. Army Corps of Engineers (2005) provides minimum standards for the design, construction, and installation of water-table monitoring wells, and for the collection and interpretation of groundwater monitoring data, in cases where direct hydrologic measurements are needed to determine whether wetlands are present on highly disturbed or problematic sites. This standard calls for 14 or more consecutive days of flooding, ponding, or a water table 12 in. (30 cm) or less below the soil surface during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability), unless a different standard has been established for a particular geographic area or wetland type. A disturbed or problematic site that meets this standard has wetland hydrology. This standard is not intended (1) to overrule an indicator-based wetland determination on a site that is not disturbed or problematic, or (2) to test or validate existing or proposed wetland indicators.

Wetland/non-wetland mosaics

Description of the problem

In this supplement, “mosaic” refers to a landscape where wetland and non-wetland components are too closely associated to be easily delineated or mapped separately. These areas often have complex microtopography, with repeated small changes in elevation occurring over short distances. The horizontal distance from trough to ridge may be 1 ft (30 cm) or less in some areas, to 10 ft (3 m) or more in broadly hummocky areas. Ridges and hummocks supporting non-hydrophytic species are often interspersed throughout a wetland matrix having clearly hydrophytic vegetation, hydric soils, and wetland hydrology.

Care must be taken to differentiate wetland/non-wetland mosaics from natural wetland types that at first may appear to be a mosaic. For example, coastal Sitka spruce wetlands often support a significant component of non-hydrophytic vegetation that is rooted on top of large tree roots or downed logs rather than in the soil substrate. Plants not rooted in the soil should not be considered in hydrophytic vegetation decisions. Also, anthropogenic factors, such as grazing, may create small ridges that support non-hydrophytic vegetation.

Wetland components of a mosaic are often not difficult to identify. The problem for the wetland delineator is that microtopographic features are too small and intermingled, and there are too many such features per acre, to delineate and map them accurately. Instead, the following sampling approach is designed to estimate the percentage of wetland in the mosaic. From this, the number of acres of wetland on the site can be calculated, if needed.

Procedure

This section identifies two recommended procedures. Other appropriate sampling methods may also be used. Document the method and the rationale for selecting it.

The first step is to identify and flag all contiguous areas of either wetland or non-wetland on the site that are large enough to be delineated and mapped separately. The remaining area should be mapped as "wetland/ non-wetland mosaic" and the approximate percentage of wetland within the area determined by the following procedure.

1. Establish one or more continuous line transects across the mosaic area, as needed. Measure the total length of each transect. A convenient method is to stretch a measuring tape along the transect and leave it in place while sampling. If the site is shaped appropriately and multiple transects are used, they should be arranged in parallel with each transect starting from a random point along one edge of the site. However, other arrangements of transects may be needed for oddly shaped sites.
2. Use separate data forms for the swales or troughs and for the ridges or hummocks. Sampling of vegetation, soil, and hydrology should follow the

general procedures described in the Corps Manual and this supplement. Plot sizes and shapes for vegetation sampling must be adjusted to fit the microtopographic features on the site. Plots intended to sample the troughs should not overlap adjacent hummocks, and vice versa. Only one or two data forms are required for each microtopographic position, and do not need to be repeated for similar features or plant communities. If there are different wetland or non-wetland plant communities, however, each must be represented by one or more plots and data forms.

3. Identify every wetland boundary in every trough or swale encountered along each transect. Each boundary location may be marked with a pin flag or simply recorded as a distance along the stretched tape.
4. Determine the total distance along each transect that is occupied by wetland and non-wetland until the entire length of the line has been accounted for. Sum these distances across transects, if needed. Determine the percentage of wetland in the wetland/non-wetland mosaic by the following formula.

$$\%\ wetland = \frac{Total\ wetland\ distance\ along\ all\ transects}{Total\ length\ of\ all\ transects} \times 100$$

An alternative approach involves point-intercept sampling at fixed intervals along transects across the area designated as wetland/non-wetland mosaic. This method avoids the need to identify wetland boundaries in each swale, and can be carried out by pacing rather than stretching a measuring tape across the site. The investigator uses a compass or other means to follow the selected transect line. At a fixed number of paces (e.g., every two steps) the wetland status of that point is determined by observing indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. Again, a completed data form is not required at every point but at least one representative swale and hummock should be documented with completed forms. After all transects have been sampled, the result is a number of wetland sampling points and a number of non-wetland points. Estimate the percentage of wetland in the wetland/non-wetland mosaic with the following formula:

$$\%\ wetland = \frac{Number\ of\ wetland\ points\ along\ all\ transects}{Total\ number\ of\ points\ sampled\ along\ all\ transects} \times 100$$

References

Adamus, P. R. 2005. *Science review and data analysis for tidal wetlands of the Oregon Coast*. Report to the Coos Watershed Association. Salem, OR: U.S. Environmental Protection Agency and Oregon Department of State Lands.

Akins, G. J., and C. A. Jefferson. 1973. *Coastal wetlands of Oregon*. Salem, OR: Oregon Coastal Conservation and Development Commission.

Allen, R. B., R. K. Peet, and W. L. Baker. 1991. Gradient analysis of latitudinal variation in southern Rocky Mountain forest. *Journal of Biogeography* 18: 123-139.

Bailey, R. G. 1995. *Description of the ecoregions of the United States, second edition*. Miscellaneous Publication 1391 (revised). Washington, DC: U.S. Department of Agriculture, Forest Service. (http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html)

Boettinger, J. L. 1997. Aquisalids (Salorthids) and other wet saline and alkaline soils: Problems identifying aquic conditions and hydric soils. eds. M. J. Vepraskas and S. W. Sprecher. In *Aquic conditions and hydric soils: The problem soils*. Special Publication Number 50, 79-97. Madison, WI: Soil Science Society of America.

Chappell, C., and J. Christy. 2004. Willamette Valley–Puget Trough–Georgia Basin ecoregion terrestrial ecological system EO specs and EO rank specs. Appendix 11 in *Willamette Valley-Puget Trough-Georgia Basin ecoregional assessment*. eds. J. Floberg, M. Goering, G. Wilhere, C. MacDonald, C. Chappell, C. Rumsey, Z. Ferdana, A. Holt, P. Skidmore, T. Horsman, E. Alverson, C. Tanner, M. Bryer, P. Iachetti, A. Harcombe, B. McDonald, T. Cook, M. Summers, and D. Rolph. Report prepared by The Nature Conservancy with support from The Nature Conservancy of Canada, Washington Department of Fish and Wildlife, Washington Department of Natural Resources (Natural Heritage and Nearshore Habitat Programs), Oregon State Natural Heritage Information Center, and the British Columbia Conservation Data Centre. (http://conserveonline.org/docs/2004/06/WPG_Ecoregional_Assessment.pdf)

Christy, J. A. 1993. *Classification and catalog of native wetland plant communities in Oregon*. Portland, OR: Oregon Natural Heritage Program. (http://oregonstate.edu/ornhic/publications.html)

Christy, J. A. 2001. *Low-elevation Sphagnum mires in western Oregon*. Report to the U.S. Environmental Protection Agency, Region 10. Portland, OR: Oregon Natural Heritage Program.

Christy, J. A. 2004. *Native freshwater wetland plant associations of Northwestern Oregon*. Oregon Natural Heritage Information Center. Corvallis, OR: Oregon State University. (http://oregonstate.edu/ornhic/publications.html)

Christy, J. A., J. S. Kagan, and A. M. Wiedemann. 1998. *Plant associations of the Oregon Dunes National Recreation Area*. Technical Paper R6-NR-ECOL-TP-09-98. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. (http://oregonstate.edu/ornhic/publications.html)

Cooke, S., and A. Azous. 2001. Characterization of central Puget Sound basin palustrine wetland vegetation. Chapter 3 in *Wetlands and urbanization: Implications for the future*. eds. A. Azous and R. Horner. Boca Raton, FL: CRC Press.

Dahl, T. E. 1990. *Wetlands losses in the United States, 1780s to 1980s*. Washington, DC: U.S. Fish and Wildlife Service.

Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. *Measuring and monitoring plant populations*. Technical Reference 1730-1. Washington, DC: U.S. Department of the Interior, Bureau of Land Management.

Environmental Laboratory. 1987. *Corps of Engineers wetlands delineation manual.* Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. (http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf)

Freeze, R. A., and J. A. Cherry. 1979. *Groundwater*. Englewood Cliffs, NJ: Prentice-Hall.

Gretag/Macbeth. 2000. *Munsell® color*. New Windsor, NY.

Jones, B. F. 1965. *The hydrology and mineralogy of Deep Springs Lake, Inyo County, California*. Professional Paper 502-A. Washington, DC: U.S. Geological Survey.

Kent, M., and P. Coker. 1992. *Vegetation description and analysis: A practical approach.* New York, NY: Wiley.

Kuchler, A. W. 1946. The broadleaf forests of the Pacific Northwest. *Annals of the Association of American Geographers* 36: 122-147.

Landa, E. R. 1977. An unusual ant nest morphology for the ant *Formica fusca* Linne in western Oregon (Hymenoptera: Formicidae). *Pan-Pacific Entomologist* 53: 250-252.

Lichvar, R. W., G. A. Laursen, R. D. Seppelt, and W. R. Ochs. 2009. Selecting and testing cryptogam species for use in wetland delineation in Alaska. *Arctic* 62: 201-211.

Megonigal, J. P., S. P. Faulkner, and W. H. Patrick. 1996. The microbial activity season in southeastern hydric soils. *Soil Science Society of America Journal* 60: 1263-1266.

Mueller-Dombois, D., and H. Ellenberg. 1974. *Aims and methods of vegetation ecology.* New York, NY: Wiley.

National Research Council. 1995. *Wetlands: Characteristics and boundaries.* Washington, DC: National Academy Press.

NatureServe. 2006. *NatureServe Explorer: An online encyclopedia of life [web application], Version 4.7*. Arlington, VA. (http://www.natureserve.org/explorer).

Reed, P. B., Jr. 1988. *National list of plant species that occur in wetlands: 1988 national summary*. Biological Report 88(24). Washington, DC: U.S. Fish and Wildlife Service. (http://www.usace.army.mil/CECW/Documents/cecwo/reg/plants/list88.pdf)

Reed, P. B., Jr. 1993. *1993 supplement to the list of vascular species that occur in wetlands: Northwest (Region 9)*. Supplement to Biological Report 88(26.9). Washington, DC: U.S. Fish and Wildlife Service. (http://www.usace.army.mil/CECW/Documents/cecwo/reg/plants/list88.pdf)

Sprecher, S. W., and A. G. Warne. 2000. *Accessing and using meteorological data to evaluate wetland hydrology*. ERDC/EL TR-WRAP-00-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center. (http://el.erdc.usace.army.mil/elpubs/pdf/wrap00-1/wrap00-1.pdf)

Tiner, R. W. 1999. *Wetland indicators: A guide to wetland identification, delineation, classification, and mapping*. Boca Raton, FL: Lewis Publishers.

U.S. Army Corps of Engineers. 2005. *Technical standard for water-table monitoring of potential wetland sites*. ERDC TN-WRAP-05-02. Vicksburg, MS: U.S. Army Engineer Research and Development Center. (http://el.erdc.usace.army.mil/wrap/pdf/tnwrap05-2.pdf)

U.S. Army Corps of Engineers. 2008. *Regional supplement to the Corps of Engineers wetland delineation manual: Arid west region (Version 2.0)*. ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U. S. Army Engineer Research and Development Center. (http://el.erdc.usace.army.mil/elpubs/pdf/trel08-28.pdf)

USDA Natural Resources Conservation Service. 1994. *National food security act manual, third edition* (as amended). Washington, DC. (http://www.nrcs.usda.gov/programs/compliance/index.html)

USDA Natural Resources Conservation Service. 1997. Hydrology tools for wetland determination. Chapter 19 in *Engineering Field Handbook*. Fort Worth, TX: U.S. Department of Agriculture, NRCS. (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17556.wba)

USDA Natural Resources Conservation Service. 1999. *Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys*. Agricultural Handbook 436. Washington, DC. (http://soils.usda.gov/technical/classification/taxonomy/)

USDA Natural Resources Conservation Service. 2002. *Field book for describing and sampling soils, Version 2.0*. ed. P. J. Schoeneberger, D. A. Wysocki, E. C. Benham, and W. D. Broderson. Lincoln, NE: National Soil Survey Center. (http://soils.usda.gov/technical/fieldbook/)

USDA Natural Resources Conservation Service. 2005. *National soil survey handbook, part 629, glossary*. Washington, DC: U. S. Department of Agriculture. (ftp://ftp-fc.sc.egov.usda.gov/NSSC/Soil_Survey_Handbook/629_glossary.pdf)

USDA Natural Resources Conservation Service. 2006a. *Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin*. Agriculture Handbook 296. Washington, DC: U. S. Department of Agriculture. (http://soils.usda.gov/survey/geography/mlra/index.html)

USDA Natural Resources Conservation Service. 2006b. *Field indicators of hydric soils in the United States, version 6.0*. ed. G. W. Hurt and L. M. Vasilas. Fort Worth, TX: USDA NRCS in cooperation with the National Technical Committee for Hydric Soils. (http://soils.usda.gov/use/hydric/)

USDA Soil Conservation Service. 1994. Changes in hydric soils of the United States. *Federal Register* 59(133): 35680-35681, July 13, 1994.

Vepraskas, M. J. 1992. *Redoximorphic features for identifying aquic conditions*. Technical Bulletin 301. Raleigh, NC: North Carolina Agricultural Research Service, North Carolina State University.

Vepraskas, M. J., and S. W. Sprecher. 1997. *Aquic conditions and hydric soils: The problem soils*. Special Publication Number 50. Madison, WI: Soil Science Society of America.

Wakeley, J. S., and R. W. Lichvar. 1997. Disagreement between plot-based prevalence indices and dominance ratios in evaluations of wetland vegetation. *Wetlands* 17: 301-309.

Waring, R. H., and J. F. Franklin. 1979. Evergreen coniferous forests of the Pacific Northwest. *Science* 204: 1380-1386.

Weber, W. A. 1976. *Rocky Mountain flora*. Niwot, CO: University Press of Colorado.

Wentworth, T. R., G. P. Johnson, and R. L. Kologiski. 1988. Designation of wetlands by weighted averages of vegetation data: A preliminary evaluation. *Water Resources Bulletin* 24: 389-396.

Windell, J. T., B. E. Willard, D. J. Cooper, S. Q. Foster, C. F. Knud-Hansen, L. P. Rink, and G. N. Kiladis. 1986. *An ecological characterization of Rocky Mountain montane and subalpine wetlands*. Biological Report 86(11). Washington, DC: U.S. Fish and Wildlife Service.

Zika, P., and A. L. Jacobson. 2003. An overlooked hybrid Japanese knotweed (*Polygonum cuspidatum* x *sachalinense*; Polygonaceae) in North America. *Rhodora* 105(922): 143-152.

Appendix A: Glossary

This glossary is intended to supplement those given in the Corps Manual and other available sources. See the following publications for terms not listed here:

- Corps Manual (Environmental Laboratory 1987) (http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf).
- Field Indicators of Hydric Soils in the United States (USDA Natural Resources Conservation Service 2006b) (http://soils.usda.gov/use/hydric/).
- National Soil Survey Handbook, Part 629 (USDA Natural Resources Conservation Service 2005) (ftp://ftp-fc.sc.egov.usda.gov/NSSC/Soil_Survey_Handbook/629_glossary.pdf).

Absolute cover. In vegetation sampling, the percentage of the ground surface that is covered by the aerial portions (leaves and stems) of a plant species when viewed from above. Due to overlapping plant canopies, the sum of absolute cover values for all species in a community or stratum may exceed 100 percent. In contrast, “relative cover” is the absolute cover of a species divided by the total coverage of all species in that stratum, expressed as a percent. Relative cover cannot be used to calculate the prevalence index.

Aquitard. A layer of soil or rock that retards the downward flow of water and is capable of perching water above it. For the purposes of this supplement, the term aquitard also includes the term aquiclude, which is a soil or rock layer that is incapable of transmitting significant quantities of water under ordinary hydraulic gradients.

Contrast. The color difference between a redox concentration and the dominant matrix color. Differences are classified as faint, distinct, or prominent and are defined in the glossary of USDA Natural Resources Conservation Service (2006b) and illustrated in Table A1.

Table A1. Tabular key for contrast determinations using Munsell notation.

Hues are the same (Δ h = 0)			Hues differ by 2 pages (Δ h = 2)		
Δ Value	**Δ Chroma**	**Contrast**	**Δ Value**	**Δ Chroma**	**Contrast**
0	≤1	Faint	0	0	Faint
0	2	Distinct	0	1	Distinct
0	3	Distinct	0	≥2	Prominent
0	≥4	Prominent	1	≤1	Distinct
1	≤1	Faint	1	≥2	Prominent
1	2	Distinct	≥2	---	Prominent
1	3	Distinct			
1	≥4	Prominent			
≤2	≤1	Faint			
≤2	2	Distinct			
≤2	3	Distinct			
≤2	≥4	Prominent			
3	≤1	Distinct			
3	2	Distinct			
3	3	Distinct			
3	≥4	Prominent			
≥4	---	Prominent			
Hues differ by 1 page (Δ h = 1)			**Hues differ by 3 or more pages (Δ h ≥ 3)**		
Δ Value	**Δ Chroma**	**Contrast**	**Δ Value**	**Δ Chroma**	**Contrast**
0	≤1	Faint	Color contrast is prominent, except for low chroma and value.		Prominent
0	2	Distinct			
0	≥3	Prominent			
1	≤1	Faint			
1	2	Distinct			
1	≥3	Prominent			
2	≤1	Distinct			
2	2	Distinct			
2	≥3	Prominent			
≥3	---	Prominent			

Note: If both colors have values of ≤3 and chromas of ≤2, the color contrast is *Faint* (regardless of the difference in hue).

Adapted from USDA Natural Resources Conservation Service (2002)

Depleted matrix. The volume of a soil horizon or subhorizon from which iron has been removed or transformed by processes of reduction and translocation to create colors of low chroma and high value. A, E, and calcic horizons may have low chromas and high values and may therefore be mistaken for a depleted matrix. However, they are excluded from the concept of depleted matrix unless common or many, distinct or prominent redox concentrations as soft masses or pore linings are present. In some places the depleted matrix may change color upon exposure to air (reduced matrix); this phenomenon is included in the concept of depleted matrix. The following combinations of value and chroma identify a depleted matrix:

- Matrix value of 5 or more and chroma of 1, with or without redox concentrations occurring as soft masses and/or pore linings, or
- Matrix value of 6 or more and chroma of 2 or 1, with or without redox concentrations occurring as soft masses and/or pore linings, or
- Matrix value of 4 or 5 and chroma of 2, with 2 percent or more distinct or prominent redox concentrations occurring as soft masses and/or pore linings, or
- Matrix value of 4 and chroma of 1, with 2 percent or more distinct or prominent redox concentrations occurring as soft masses and/or pore linings (USDA Natural Resources Conservation Service 2006b).

Common (2 to less than 20 percent) to many (20 percent or more) redox concentrations (USDA Natural Resources Conservation Service 2002) are required in soils with matrix colors of 4/1, 4/2, and 5/2 (Figure A1). Redox concentrations include iron and manganese masses and pore linings (Vepraskas 1992). See “contrast” in this glossary for the definitions of “distinct” and “prominent.”

Diapause. A period during which growth or development is suspended and physiological activity is diminished, as in certain aquatic invertebrates in response to drying of temporary wetlands.

Diatomaceous earth. A limnic layer composed dominantly of skeletons of dead diatoms. If not previously dried, has a matrix color value of 3, 4, or 5, which changes irreversibly upon drying as a result of the shrinkage of organic-matter coatings on diatoms. See USDA Natural Resources Conservation Service (1999) for complete definition.

Figure A1. Illustration of values and chromas that require 2 percent or more distinct or prominent redox concentrations and those that do not, for hue 10YR, to meet the definition of a depleted matrix. *Due to inaccurate color reproduction, do not use this page to determine soil colors in the field.* Background image from the Munsell Soil Color Charts reprinted courtesy of Munsell Color Services Lab, a part of X-Rite, Inc.

Distinct. See Contrast.

Episaturation. Condition in which the soil is saturated with water at or near the surface, but also has one or more unsaturated layers below the saturated zone. The zone of saturation is perched on top of a relatively impermeable layer.

Fragmental soil material. Soil material that consists of 90 percent or more rock fragments; less than 10 percent of the soil consists of particles 2 mm or smaller (USDA Natural Resources Conservation Service 2006b).

Gilgai. Microtopography that is produced by the expansion and contraction of certain clay soils upon repeated wetting and drying.

Gleyed matrix. A gleyed matrix has one of the following combinations of hue, value, and chroma and the soil is not glauconitic (Figure A2):

- 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB with value of 4 or more and chroma of 1; or
- 5G with value of 4 or more and chroma of 1 or 2; or
- N with value of 4 or more (USDA Natural Resources Conservation Service 2006b).

Growing season. In the Western Mountains, Valleys, and Coast Region, growing season dates are determined through onsite observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature (see Chapter 4 for details). If onsite data gathering is not practical, growing season dates may be approximated by using WETS tables available from the NRCS National Water and Climate Center to determine the median dates of 28 °F (−2.2 °C) air temperatures in spring and fall based on long-term records gathered at the nearest appropriate National Weather Service meteorological station.

Halophyte. A plant adapted to saline or alkaline soils.

High pH. pH of 7.9 or higher. Includes Moderately Alkaline, Strongly Alkaline, and Very Strongly Alkaline (USDA Natural Resources Conservation Service 2002).

Nodules and concretions. Irregularly shaped, firm to extremely firm accumulations of iron and manganese oxides. When broken open, nodules have uniform internal structure whereas concretions have concentric layers (Vepraskas 1992).

Phreatophyte. A deep-rooted plant that obtains water from the water table or permanent groundwater source.

Prominent. See Contrast.

Reduced matrix. Soil matrix that has a low chroma in situ due to presence of reduced iron, but whose color changes in hue or chroma when exposed to air as Fe^{2+} is oxidized to Fe^{3+} (Vepraskas 1992).

Saturation. For wetland delineation purposes, a soil layer is saturated if virtually all pores between soil particles are filled with water (National Research Council 1995; Vepraskas and Sprecher 1997). This definition includes part of the capillary fringe above the water table (i.e., the tension-saturated zone) in which soil water content is approximately equal to that below the water table (Freeze and Cherry 1979).

Throughflow. Lateral movement of groundwater in saturated substrates, such as on sloping terrain.

Figure A2. For hydric soil determinations, a gleyed matrix has the hues and chroma identified in this illustration with a value of 4 or more. *Due to inaccurate color reproduction, do not use this page to determine soil colors in the field.* Background image from the Munsell Soil Color Charts reprinted courtesy of Munsell Color Services Lab, a part of X-Rite, Inc.

Appendix B: Point-Intercept Sampling Procedure for Determining Hydrophytic Vegetation

The following procedure for point-intercept sampling is an alternative to plot-based sampling methods to estimate the abundance of plant species in a community. The approach may be used with the approval of the appropriate Corps of Engineers District to evaluate vegetation as part of a wetland delineation. Advantages of point-intercept sampling include better quantification of plant species abundance and reduced bias compared with visual estimates of cover. The method is useful in communities with high species diversity, and in areas where vegetation is patchy or heterogeneous, making it difficult to identify representative locations for plot sampling. Disadvantages include the increased time required for sampling and the need for vegetation units large enough to permit the establishment of one or more transect lines within them. The approach also assumes that soil and hydrologic conditions are uniform across the area where transects are located. In particular, transects should not cross the wetland boundary. Point-intercept sampling is generally used with a transect-based prevalence index (see below) to determine whether vegetation is hydrophytic.

In point-intercept sampling, plant occurrence is determined at points located at fixed intervals along one or more transects established in random locations within the plant community or vegetation unit. If a transect is being used to sample the vegetation near a wetland boundary, the transect should be placed parallel to the boundary and should not cross either the wetland boundary or into other communities. Usually a measuring tape is laid on the ground and used for the transect line. Transect length depends upon the size and complexity of the plant community and may range from 100 to 300 ft (30 to 90 m) or more. Plant occurrence data are collected at fixed intervals along the line, for example every 2 ft (0.6 m). At each interval, a "hit" on a species is recorded if a vertical line at that point would intercept the stem or foliage of that species. Only one "hit" is recorded for a species at a point even if the same species would be intercepted more than once at that point. Vertical intercepts can be determined using a long pin or rod protruding into and through the various vegetation layers, a sighting device (e.g., for the canopy), or an imaginary vertical line. The total number of "hits" for each species along the transect is then determined. The result is a list of species and their frequencies of occurrence along the line (Mueller-Dombois and Ellenberg 1974; Tiner 1999). Species are then categorized by wetland indicator status (i.e., OBL, FACW, FAC, FACU, or UPL), the total number of hits determined within each category, and the data used to calculate a transect-based prevalence index. The formula is similar to that given in Chapter 2 for the plot-based prevalence index (see Indicator 3), except that frequencies are used in place of cover estimates. The community is hydrophytic if the prevalence index is 3.0 or less. To be valid, more than 80 percent of "hits" on the transect must be of species that have been identified correctly and placed in an indicator category.

The transect-based prevalence index is calculated using the following formula:

$$PI = \frac{F_{OBL} + 2F_{FACW} + 3F_{FAC} + 4F_{FACU} + 5F_{UPL}}{F_{OBL} + F_{FACW} + F_{FAC} + F_{FACU} + F_{UPL}}$$

where:

PI = Prevalence index
F_{OBL} = Frequency of obligate (OBL) plant species
F_{FACW} = Frequency of facultative wetland (FACW) plant species
F_{FAC} = Frequency of facultative (FAC) plant species
F_{FACU} = Frequency of facultative upland (FACU) plant species
F_{UPL} = Frequency of upland (UPL) plant species.

Appendix C: Data Form

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: ________________ City/County: ____________ Sampling Date: ________

Applicant/Owner: ________________________ State: ______ Sampling Point: ________

Investigator(s): ________________ Section, Township, Range: ________________

Landform (hillslope, terrace, etc.): ____________ Local relief (concave, convex, none): ________ Slope (%): ____

Subregion (LRR): ____________ Lat: ________ Long: ________ Datum: ______

Soil Map Unit Name: ________________________ NWI classification: __________

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ____	**Is the Sampled Area within a Wetland?**	**Yes ____ No ____**
Hydric Soil Present?	Yes ____ No ____		
Wetland Hydrology Present?	Yes ____ No ____		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ________)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ________)			
1.			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ______			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ 5 - Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks:

SOIL

Sampling Point: ____________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ No ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): ____________

Water Table Present? Yes _____ No _____ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
May 2010	Final report	

4. TITLE AND SUBTITLE

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

U.S. Army Corps of Engineers

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Engineer Research and Development Center
Environmental Laboratory
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

8. PERFORMING ORGANIZATION REPORT NUMBER

ERDC/EL TR-10-3

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Headquarters, U.S. Army Corps of Engineers
Washington, DC 20314-1000

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved to public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This document is one of a series of Regional Supplements to the Corps of Engineers Wetland Delineation Manual, which provides technical guidance and procedures for identifying and delineating wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. The development of Regional Supplements is part of a nationwide effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures. This supplement is applicable to the Western Mountains, Valleys, and Coast Region, which consists of portions of 12 states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming.

15. SUBJECT TERMS

Delineation	Plant communities	Vegetation
Hydrology	Soil	Wetlands

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED		152	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. 239.18

MEMO

TO	Town Council
FROM	Tom Hawkinson, Building Official
THROUGH	James Shockey, Community Development Director
DATE	March 19, 2024
RE	2023 Colorado Electric Ready and Solar Ready Code with Amendments

Overview:
The code which is being proposed for adoption is: The 2023 Colorado Electric Ready and Solar Ready Code.

Colorado House Bill 2022-1362 ("HB 1362") required the Colorado Energy Office and the Colorado Department of Local Affairs to create an Energy Code Board to review, approve, and recommend energy codes for new buildings and retrofits to existing buildings. The code, proposed for adoption, was created by the Energy Code Board. The Town is required to adopt the model electric ready and solar ready code since we recently updated the building codes to the 2021 version.

The code has already been adopted in Granby and is being proposed for adoption in Fraser as well.

Staff Recommendation:
Staff recommends approval of Ordinance No. 619, Series 2024 amending Title 6, Chapter 1, Sections 1-9 of the Town of Winter Park Town Code to provide for the 2023 Colorado Electric Ready and Solar Ready Code for buildings, structures, and uses thereof, and providing for an effective date of April 21, 2024

Staff Recommendation:
Staff recommends the Town Council approve Ordinance No. 619, Series 2024 amending Title 6, Chapter 1, Sections 1-9 of the Town of Winter Park Town Code to provide for the 2023 Colorado Electric Ready and Solar Ready Code for buildings, structures, and uses thereof, and providing for an effective date of April 21, 2024.

However, this is a decision for the Council to make, and the Council may choose to approve or deny based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Council can rely on or the decision the Council makes.

<u>Sample Motion for Approval:</u>
I move to approve Ordinance No. 619, Series 2024 amending Title 6, Chapter 1, Sections 1-9 of the Town of Winter Park Town Code to provide for the 2023 Colorado Electric Ready and Solar Ready Code for buildings, structures, and uses thereof, and providing for an effective date of April 21, 2024.

<u>Sample Motion for Denial:</u>
I move to deny Ordinance No. 619, Series 2024 amending Title 6, Chapter 1, Sections 1-9 of the Town of Winter Park Town Code, specifically: *[articulate specific reasons for denial].*

TOWN OF WINTER PARK
ORDINANCE NO. 619
SERIES OF 2024

AN ORDINANCE OF THE TOWN COUNCIL OF THE TOWN WINTER PARK, COLORADO, ADOPTING BY REFERENCE THE 2023 COLORADO ELECTRIC READY AND SOLAR READY CODE, WITH AMENDMENTS, RELATED DEFINITIONS, AND SETTING FORTH PENALTIES FOR VIOLATIONS THEREOF

WHEREAS, Colorado House Bill 2022-1362 ("HB 1362") required the Colorado Energy Office and the Colorado Department of Local Affairs to create an Energy Code Board to review, approve, and recommend energy codes for new buildings and retrofits to existing buildings;

WHEREAS, because the Town updated its building codes after July 1, 2023, HB 1362 requires the Town to adopt the model electric ready and solar ready code promulgated by the Energy Code Board;

WHEREAS, Town Council finds it necessary to adopt this ordinance providing minimum standards to safeguard the health, property, and welfare of the citizens of Winter Park by regulating and controlling the use, occupancy, maintenance, repair, design, construction and quality of materials for buildings and structures within the Town;

WHEREAS, C.R.S. § 31-16-201, *et seq.* sets forth certain requirements for the adoption of codes by reference;

WHEREAS, pursuant to C.R.S. § 31-16-203 and C.R.S. § 31-16-205, the Town introduced the adopting ordinance with a first reading held on March 19, 2024 and a second reading held on April 16, 2024, and shall publish such ordinance in full upon its passage;

WHEREAS, pursuant to C.R.S. § 31-16-203, the Town held a properly noticed public hearing on the adopting ordinance by publishing such notice once at least fifteen days before the public hearing and once at least eight days before the public hearing, with such notice stating the time and place of the hearing and all other information required by law; and

WHEREAS, pursuant to C.R.S. § 31-16-204, the adopting ordinance specifically sets forth penalties for violations thereof.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL FOR THE TOWN OF WINTER PARK, COLORADO, THAT:

Section 1. Section 6-1-1 of the Winter Park Municipal Code is amended to read as follows:

6-1-1: CODES ADOPTED BY REFERENCE:

A. The following codes are adopted by reference:

International Building Code, 2021 Edition

International Residential Code, 2021 Edition

International Plumbing Code, 2021 Edition

International Mechanical Code, 2021 Edition

International Fuel Gas Code, 2021 Edition

International Energy Conservation Code, 2021 Edition

International Fire Code Including All Appendices, 2021 Edition

International Existing Building Code, 2021 Edition

National Electrical Code, 2020 Edition

Colorado Electric Ready and Solar Ready Code, 2023 Edition

B. All International Codes are published by the International Code Council, 4051 Flossmoor Road, Country Club Hills, IL 60478, except the National Electrical Code is published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, and the Colorado Electric Ready and Solar Ready Code is jointly published by the Colorado Energy Office and the Colorado Department of Local Affairs, 1600 Broadway, Suite 1960, Denver, CO 80202. All codes adopted by reference herein and all amendments to said codes are available for inspection at the office of the Town Clerk of Winter Park during normal business hours.

Section 2. Section 6-1-11 of the Winter Park Municipal Code is hereby repealed in its entirety and reenacted to read as follows:

6-1-11: COLORADO ELECTRIC READY AND SOLAR READY CODE AMENDMENTS:

The following sections of the 2023 *Colorado Electric Ready and Solar Ready Code*, adopted by reference in Section 6-1-1 of this Chapter, are hereby amended as follows:

Section 101.1 is amended to read as follows:

101.1 Title. This code shall be known as the Electric Ready and Solar Ready Code of the Town of Winter Park and shall be cited as such. It is referred to herein as "this code."

Section 102.1.2 is amended to read as follows:

102.1.2 Buildings Impacted by a Natural Disaster. The Town of Winter Park is permitted to authorize, upon appeal in specific cases, a waiver from the requirements of this code where, owing to a declared natural disaster that has destroyed buildings or resulted in other exceptional and extraordinary circumstances as determined by the

Town of Winter Park, and the Town of Winter Park determines enforcement of the provisions of this code will result in unnecessary hardship.

Section 102.2 is amended to read as follows:

102.2 Substantial Cost Differential Waiver. The Town of Winter Park shall be permitted to authorize, upon appeal, a waiver from the requirements of this code for an applicant that asserts that compliance with this code will result in a substantial cost differential. The Town of Winter Park, when authorizing such a waiver, shall be permitted to waive certain requirements of this code only until the cost differential for compliance with the remaining requirements reaches one percent or less. The burden of proof is upon the applicant to provide substantiation of a cost differential, such as quotes or other licensed design professional analyses as *approved* by the Town of Winter Park.

Section 108.4 is amended to read as follows:

108.4 Failure to Comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the Town of Winter Park.

Section 109.3 is amended to read as follows:

109.2 Qualifications. The board of appeals shall consist of members who are qualified by experience and training and are not employees of the Town of Winter Park.

Section 202 is amended by the addition of the following definition, to appear in alphabetical order:

Major Renovations and Additions. A substantial change to a building's interior configuration, energy system, or major building system of an existing building.

Section 3. A new Section 6-1-12 of the Winter Park Municipal Code is hereby enacted to read as follows:

6-1-12: VIOLATION AND PENALTY:

A. It is unlawful to violate any provision of this Chapter.

B. Violations of this Chapter shall be subject to the penalties set forth in Chapter 4 of Title 1 of this Code. Each day of violation shall be a separate offense.

INTRODUCED, APPROVED ON FIRST READING, AND ORDERED PUBLISHED IN FULL this ___ day of __________, 2024. A public hearing shall be held at the regular meeting of the Winter Park Town Council on the ___ day of ___________, 2024 at 5:30 p.m., or as soon thereafter as possible, at the Winter Park Town Hall.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

READ, ADOPTED AND ORDERED PUBLISHED on second and final reading by a vote of ______ to ______ on the ___ day of ____________, 2024.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

MEMO

TO Town Council

FROM James Shockey, Community Development Director

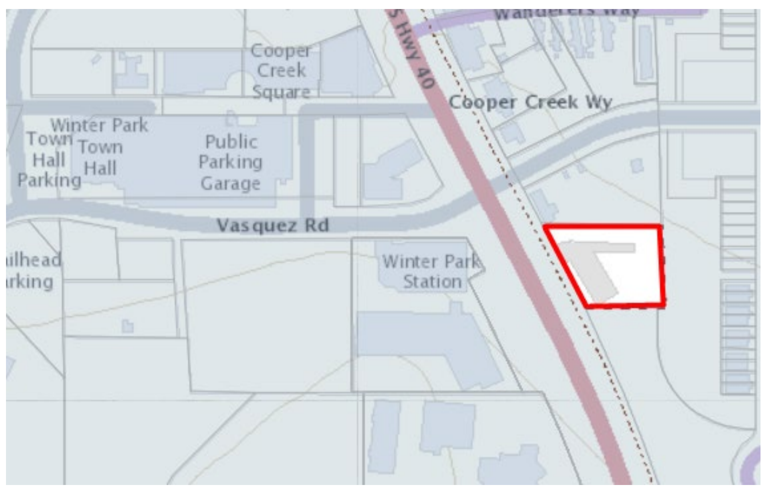
THROUGH Keith Riesberg, Town Manager

DATE April 16, 2024

RE Ordinance 620, Series 2024 – Annexing 0.57 Acre Parcel – Valley Hi Enclave

Background

The property commonly referred to as Valley Hi is a half-acre enclave within the Town of Winter Park. There are currently two businesses located on the property, the Valley Hi Motel and Serene Wellness, a marijuana shop that recently closed. When Roam was annexed in 2017, this property became an enclave similar to Beaver Village Condominiums, Cooper Creek Village and the Rogers Property. The property has been identified as eligible for annexation in the Town's Three Mile Plan.



The Town has successfully annexed most of the enclaves in Town and is now proposing to annex this property as it has been eligible for annexation since 2021. C.R.S. § 31-12-106 allows a municipality to annex property that is entirely contained with the boundaries of a municipality if such property has been contained for more than three years.

At the March 5, 2024 meeting the Town Council adopted Resolution 2123 declaring the intent to annex the 0.57 acre parcel into the Town of Winter Park. Following the adoption of Resolution 2123, Town staff began publication of the required notices, sent notices to the required parties and initiated the process to assign zoning to the property to be annexed. The ordinance being presented for Town Council consideration will annex the property into the Town of Winter Park. It is anticipated the ordinance will have second reading and public hearing at the May 7, 2024 Town Council meeting.

Staff Recommendation

All the findings required by State Statutes have been met for this annexation and staff recommends approval of Ordinance 620 annexing as an enclave a 0.57-acre parcel of land located in unincorporated Grand County known as Valley Hi Enclave. This action was contemplated by Resolution 2123 approved by Council on March 5, 2024. Should the Town Council wish to approve this Ordinance, the following motion should be made:

> I move to approve Ordinance 620 annexing as an enclave a 0.57-acre parcel of land located in unincorporated Grand County known as Valley Hi Enclave as presented.

Should the Town Council wish to deny the ordinance, the following motion should be made:

> I move to deny Ordinance 620 annexing as an enclave a 0.57-acre parcel of land located in unincorporated Grand County known as Valley Hi Enclave as presented.

In the event Ordinance 620 is not approved, staff should be provided with direction on actions to be taken regarding the enclave.

TOWN OF WINTER PARK
ORDINANCE NO. 620
SERIES 2024

AN ORDINANCE OF THE TOWN OF WINTER PARK, COLORADO ANNEXING AS AN ENCLAVE A 0.57 ACRE PARCEL OF LAND LOCATED IN UNINCORPORATED GRAND COUNTY KNOWN AS THE VALLEY HI ENCLAVE

WHEREAS, pursuant to C.R.S. § 31-12-106, when any unincorporated area is entirely contained within the boundaries of a municipality, the governing body may by ordinance annex such enclave in accordance with the Municipal Annexation Act of 1965, C.R.S. § 31-12-101, *et seq*. (the "Act") and Section 30(1)(c) of Article II of the State Constitution if said area has been so surrounded for a period of not less than three (3) years;

WHEREAS, as set forth in Resolution No. 2123, Series of 2024 (the "Resolution"), the Town determined the territory more particularly described in **Exhibit A**, attached hereto and incorporated herein (the "Valley Hi Enclave"), is an enclave as defined by the Act and is eligible for annexation to the Town;

WHEREAS, in the Resolution and as required by the Act, the Town declared its intent to annex the Valley Hi Enclave;

WHEREAS, notice of the Town's intended annexation of the Valley Hi Enclave was published in compliance with the Act once a week for four (4) successive weeks, with the first publication being at least thirty (30) days prior to consideration of this Annexation Ordinance;

WHEREAS, notice of the Town's intended annexation of the Valley Hi Enclave was given by registered mail to the Clerk of the Board of County Commissioners, the County Attorney, the school district and to any special district having territory in the area to be annexed;

WHEREAS, the Valley Hi Enclave measures 0.57 acres of land, and, as such no annexation impact report is required under C.R.S. § 31-12-108.5; and

WHEREAS, pursuant to Section 4.10 of the Town Charter, there are two (2) readings of all ordinances, with the public hearing occurring at second reading.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL FOR THE TOWN OF WINTER PARK, COLORADO, THAT:

Section 1. The Valley Hi Enclave is hereby annexed to the Town, and upon the effective date of this Ordinance, the Valley Hi Enclave is subject to the jurisdiction of the Town.

Section 2. Effective Date of Annexation.

a. The Town Clerk shall file one (1) copy of the Annexation Map along with the original of this Ordinance in the Town Clerk's office.

b. The Town Clerk shall file for recording three (3) certified copies of this Ordinance and three (3) copies of the Annexation Map with the Grand County Clerk and Recorder.

c. The Town Clerk shall file one (1) certified copy of this Ordinance and one (1) copy of the Annexation Map with the Division of Local Government of the Department of Local Affairs.

d. Except as set forth herein, pursuant to C.R.S. § 31-12-113(2)(b), the annexation of the Valley Hi Enclave shall take effect five (5) days after publication of this Ordinance following adoption on second reading, provided the filing and recording described herein is complete.

e. As required by C.R.S. § 31-12-113(3), for purposes of general taxation, the annexation of the Valley Hi Enclave shall be effective January 1, 2025.

INTRODUCED, APPROVED ON FIRST READING, AND ORDERED PUBLISHED IN FULL this ____ day of ____________, 2024. A public hearing shall be held at the regular meeting of the Winter Park Town Council, on the ____ day of ____________, 2024 at 5:30pm, or as soon thereafter as possible, at the Winter Park Town Hall.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

READ, ADOPTED AND ORDERED PUBLISHED on second and final reading by a vote of ___ to ___on the __________________________.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

Exhibit A
Legal Description

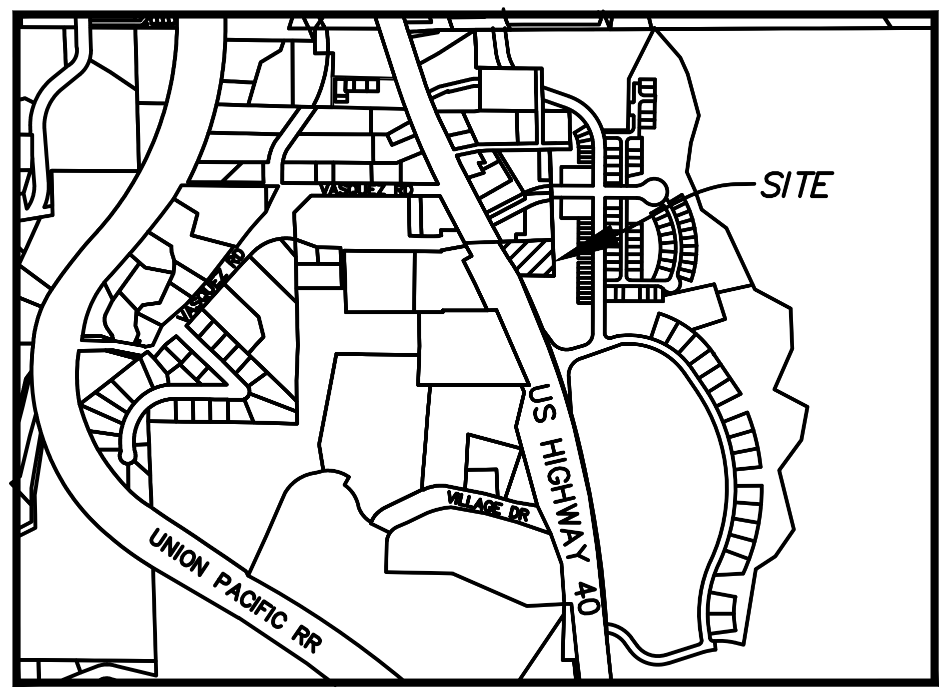
Part of Lots 10, 11, and 12 in Block 1, Hideaway Park, together with vacated portion of U.S. Highway 40 all which is described as follows:

Beginning at the Northeast corner of Lot 10 in Block 1 of Hideaway Park, thence N89°20'W a distance of 215.97 feet thence South 27°14'05" East a distance of 112.75 feet·, thence South 21 °37'30" East a distance of 55.09 feet; thence South 89°29' East a distance of 146.59 feet to the Southeast corner of Lot 12 in said Block 1; thence North 01°53' West along the East line of Lots 12, 11 and 10 in Block 1 Hideaway Park, a distance of 150.0 feet, more or less, to the point of beginning.

ANNEXATION MAP

BEING LOTS 10, 11, AND 12, HIDEAWAY PARK,
AND LYING WITHIN THE NE 1/4 OF SECTION 33, TOWNSHIP 1 SOUTH, RANGE 75 WEST
OF THE 6TH P.M., TOWN OF WINTER PARK, IN GRAND COUNTY, COLORADO

VICINITY MAP



STATEMENT OF OWNERSHIP

KNOW ALL MEN BY THESE PRESENTS:
THAT WE, THE UNDERSIGNED, ARE THE OWNERS OF THAT REAL PROPERTY DESCRIBED SEPARATELY HEREON.

____

BY: ____________________

AS: ____________________

STATE OF COLORADO)
)SS
COUNTY OF ___________)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY OF __________ 2023, BY _______________ ON BEHALF OF ____.

LEGAL DESCRIPTION:

A PARCEL OF LAND BEING ALL OF LOTS 10, 11, AND 12, BLOCK 1, HIDEAWAY PARK, A SUBDIVISION PLAT RECORDED AT RECEPTION NO. 48279, IN THE RECORDS OF THE GRAND COUNTY CLERK AND RECORDER'S OFFICE AND LYING WITHIN THE NORTHEAST QUARTER OF SECTION 33, TOWNSHIP 1 SOUTH, RANGE 75 WEST, OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF WINTER PARK, COUNTY OF GRAND, STATE OF COLORADO.

COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 33, FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 33 BEARS S89°33'13"E (BASIS OF BEARINGS); THENCE N06°48'57"E, A DISTANCE OF 2690.91 FEET TO THE SOUTH EAST CORNER OF SAID LOT 12 AND THE POINT OF BEGINNING;

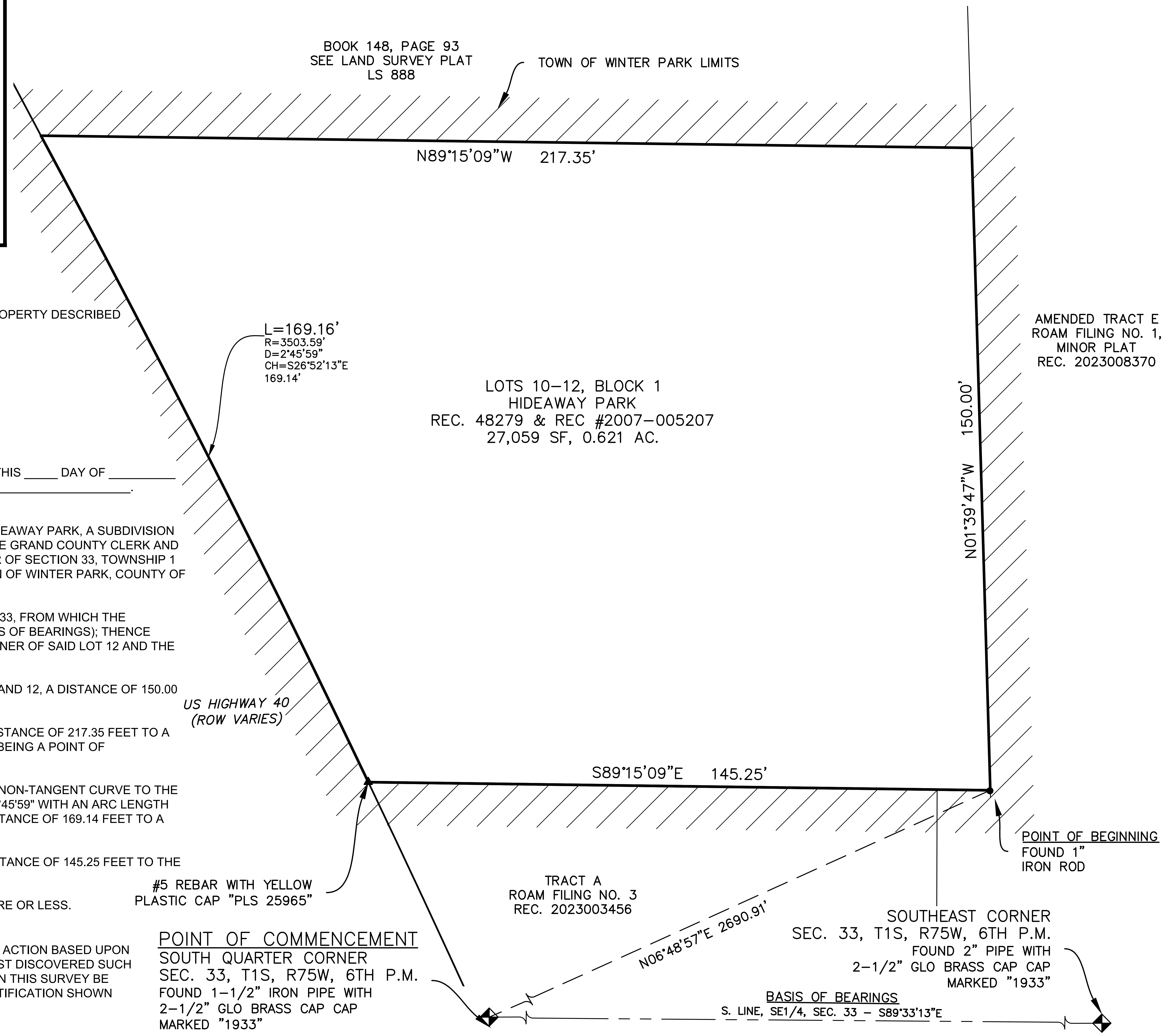
THENCE N01°39'47"W, ALONG THE EAST LINES OF SAID LOTS 10, 11, AND 12, A DISTANCE OF 150.00 FEET TO THE NORTHEAST CORNER OF SAID LOT 10;

THENCE N89°15'09"W, ALONG THE NORTH LINE OF SAID LOT 10, A DISTANCE OF 217.35 FEET TO A POINT ON THE EAST RIGHT-OF-WAY LINE OF US HIGHWAY 40, ALSO BEING A POINT OF NON-TANGENT CURVATURE;

THENCE ALONG SAID EAST RIGHT-OF-WAY LINE AND THE ARC OF A NON-TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 3503.59 FEET, A CENTRAL ANGLE OF 02°45'59" WITH AN ARC LENGTH OF 169.16 FEET, WITH A CHORD OF WHICH BEARS S26°52'13"E, A DISTANCE OF 169.14 FEET TO A POINT ON THE SOUTH LINE OF SAID LOT 12;

THENCE S89°15'09"E, ALONG THE SOUTH LINE OF SAID LOT 12, A DISTANCE OF 145.25 FEET TO THE POINT OF BEGINNING.

CONTAINING AN AREA OF 27056 SQUARE FEET OR 0.621 ACRES, MORE OR LESS.



NOTICE:

ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVERED SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

SURVEYOR'S CERTIFICATE:

I, L. BRAD OSWALD, A DULY LICENSED LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS ANNEXATION MAP WAS MADE BY ME OR UNDER MY DIRECT SUPERVISION AND IS A CORRECT DELINEATION OF THE DESCRIBED PARCEL OF LAND AND THAT LEAST ONE SIXTH (1/6) OF THE PERIPHERAL BOUNDARY OF SAID TRACT IS CONTIGUOUS TO THE PRESENT BOUNDARY OF THE TOWN OF WINTER PARK, COUNTY OF GRAND, STATE OF COLORADO.

PRELIMINARY

NOT FOR USE AS A FINAL SURVEY DOCUMENT

____
L. BRAD OSWALD, CO PLS 38510
DATE: 4/2/2024
FOR AND ON BEHALF OF WSB LLC.

ANNEXATION DATA:

TOTAL ACREAGE OF PROPERTY:	0.621 ACRES
TOTAL PERIMETER OF PROPERTY:	681.76 FEET
MIN. REQUIRED CONTIGUOUS PERIMETER AT 1/6TH:	113.63 FEET
CONTIGUOUS PERIMETER WITH THE TOWN OF WINTER PARK:	681.76 FEET

TOWN OF WINTER PARK CERTIFICATE:

THIS ANNEXATION MAP IS TO BE KNOWN AS "LOTS 10, 11, AND 12, HIDEAWAY PARK" TO THE TOWN OF WINTER PARK AND IS APPROVED AND ACCEPTED BY ORDINANCE NO. __________, SERIES 20___, PASS AND ADOPTED AT THE REGULAR MEETING OF THE COUNCIL OF WINTER PARK, HELD ON ___________ _________________, 202_____.

____________________ NICK KUTRUMBOS, TOWN MAYOR

____________________ DANIELLE JARDEE, TOWN CLERK

NOTES:

1.) BEARINGS SHOWN ON THE ACCOMPANYING ANNEXATION MAP ARE BASED ON THE ASSUMPTION THAT THE SOUTH LINE OF THE SE1/4 OF SECTION 33, T1S, R75W OF THE 6TH P.M., BEARS N89°33'13"W, AS MONUMENTED AND SHOWN HEREON.

2.) THE U.S. SURVEY FOOT WAS USED FOR ALL MEASUREMENTS ON THIS SURVEY. PURSUANT TO C.R.S. 38-52.103(2) METRIC CONVERSION IS: ONE METER EQUALS 3937/1200 FEET.

wsb

Crew: NA
Checked: LBO
Drawn: KS
Drawing date: 04/02/2024
Project No.: 024110-000

Revisions:

N
0' 10' 20'

ANNEXATION MAP
GRAND, COLORADO

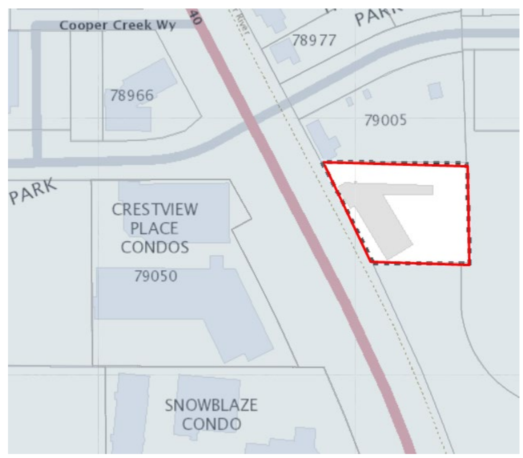
Call 48 Hours before digging:
COLORADO One Call
CALL: (303) 232-1991 or 811

Sheet: 1 of 1

MEMO

TO	Town Council
FROM	James Shockey, Community Development Director
THROUGH	Keith Riesberg, Town Manager
DATE	April 16, 2024
RE	Zoning Request – Annexation – Valley Hi Enclave (PLN24-023)

Background:
The Town (the "Applicant") is annexing the Valley Hi Motel property as an enclave annexation. The 0.57-acre property is located in the downtown core just south of Vasquez Road. On March 5, 2024, Town Council adopted a resolution declaring its intent to consider a proposed annexation ordinance to annex the property (Resolution 2123, Series 2024). The next step is to establish the property's proposed zoning ahead of annexing the property into the Town limits. Pursuant to § 5-C-2 of the Unified Development Code (the "UDC") the Planning Commission studies and makes recommendations regarding any proposed amendment to the Town's adopted zoning.



Analysis of Existing Conditions:
Existing Land Use
The property is currently zoned Tourist by Grand County and is located within the Growth Area for the Town of Winter Park as identified in the 2011 Grand County Master Plan. The property has two businesses, the Valley Hi Motel and Serene Wellness, a marijuana shop that recently closed.

Surrounding Land Use
The parcel is surrounded to the south and east by Roam, to the west by Main Street, and north by a vacant parcel. The Town's boundaries surround the property. Roam is zoned Planned Development, Destination Center (P-D, D-C) and the vacant property is zoned Destination Center (D-C).

Service and Infrastructure Capacity
The area is already served by water, sewer, electric and gas services. The property is located within the Grand County Water and Sanitation District No. 1 service boundaries.

Transportation and Traffic
The property is accessed from Highway 40. The Town's Transit Service, the LIFT, has a regular service line that stops just north of the property.

Requested Zoning for the Property:
The Applicant requests the property be zoned Destination Center (D-C). The purpose of the D-C District is to create a "planned mixture of high density and upper-floor residential and commercial uses in horizontal and vertical formats that are arranged to create a walkable pedestrian environment" (UDC, Table 2-A-4, *Zoning Districts)*.

Compliance with Comprehensive Plan and Three-Mile Plan:
The proposed zoning requested for this property conforms with the Comprehensive Plan, i.e., the Imagine Winter Park Plan, and the Three-Mile Plan.

§ 5-B-8 Public Notice Requirements:
This rezoning request has had proper public notification pursuant to § 5-B-8 of the UDC. A Newspaper Publication (PUB) was published in the Middle Park Times on March 27, 2024, providing notification of the meeting and requesting comments. A Surrounding Property Owners Mailing (ML) was sent to property owners within 300' of the property on March 27, 2024. A Property Posting (PO) was posted on the same day.

No comments have been received as of April 10, 2024.

Planning Commission Recommendation
The Planning Commission reviewed the Applicant's request for Destination Center (D-C) zoning classification on April 19, 2024 and recommended approval with the findings outlined below. The Commission felt the property meets the objectives for the D-C district and is consistent with the requisite principles for annexation outlined in the Three Mile Plan.

Staff Recommendation:
Staff recommends Town Council approve Ordinance 621, Series 2024, an ordinance zoning upon annexation certain property within the Town known as Valley Hi Enclave to the Destination Center (D-C) as it has been determined the zoning is appropriate because the criteria in § 5-C-2(f) of the UDC is met, specifically the zoning:

a. Is due to new growth trends;
b. Serves an area and community need;
c. Is compatible with and provides benefits to the surrounding area;
d. Is in conformance with the policies, intents, and requirements of the UDC and Town's Comprehensive Plan; and
e. Provides adequate facilities to serve the type and scope of the proposed development.

Should the Town Council wish to approve this Ordinance, the following motion should be made:

I move to approve Ordinance 621 an ordinance zoning upon annexation certain property within the Town known as Valley Hi Enclave to the Destination Center (D-C) as it has been determined the zoning is appropriate because the criteria in § 5-C-2(f) of the UDC.

Should the Town Council wish to deny the ordinance, the following motion should be made:

I move to deny Ordinance 621 an ordinance zoning upon annexation certain property within the Town known as Valley Hi Enclave to the Destination Center (D-C) as it has been determined the zoning is appropriate because the criteria in § 5-C-2(f) of the UDC.

TOWN OF WINTER PARK
ORDINANCE NO. 621
SERIES 2024

AN ORDINANCE OF THE TOWN OF WINTER PARK, COLORADO ZONING UPON ANNEXATION CERTAIN PROPERTY WITHIN THE TOWN KNOWN AS THE VALLEY HI ENCLAVE TO DESTINATION CENTER DISTRICT (D-C)

WHEREAS**,** the Town of Winter Park (the "Town") desires to zone upon annexation certain property located in the Town known as the Valley Hi Enclave and more particularly described in **Exhibit A** (the "Property"), to establish Town zoning for the Property pursuant to Section 5-C-3 of the Winter Park Unified Development Code (the "UDC");

WHEREAS, a duly noticed public hearing was conducted before the Planning Commission at its regular meeting on April 9, 2024, following which the Planning Commission found that the application satisfied the requirements of the applicable Sections of the UDC and recommended approval of the application; and

WHEREAS**,** on May 7, 2024, a duly noticed public hearing on the application was conducted before the Town Council at its regular meeting, during which the Town Council heard testimony and received evidence, including reports from the Planning Commission and the Town staff.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL FOR THE TOWN OF WINTER PARK, COLORADO, THAT:

Section 1. The Town Council hereby finds that the zoning upon annexation of the Property to the Destination Center (D-C), is appropriate, because the criteria in Section 5-C-2(f) of the UDC is met. Specifically, the zoning:

a. Provides substantial public benefits;

b. Serves the transitioning character of the surrounding area;

c. Is compatible with and provides benefits to the surrounding area;

d. Provides adequate facilities to serve the type and scope of the proposed development; and

e. Is in conformance with, and does not modify, the policies, intents and requirements of the UDC, the Town's Comprehensive Plan or the Town's Code of Ordinances.

Section 2. As a part of such approval, the Town Council hereby amends the Town's Zoning Map to show D-C zoning for the Property.

Section 3. Pursuant to Section 4.9 of the Town Charter, this Ordinance shall take effect five (5) days after publication following adoption on second reading.

INTRODUCED, APPROVED ON FIRST READING, AND ORDERED PUBLISHED IN FULL this ____ day of ____________, 2024. A public hearing shall be held at the regular meeting of the Winter Park Town Council, on the ____ day of ____________, 2024 at 5:30pm, or as soon thereafter as possible, at the Winter Park Town Hall.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

READ, ADOPTED AND ORDERED PUBLISHED on second and final reading by a vote of ______ to _____on the ______ day of ________________, 2024.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

Exhibit A
Property Legal Description

Part of Lots 10, 11, and 12 in Block 1, Hideaway Park, together with vacated portion of U.S. Highway 40 all which is described as follows:

Beginning at the Northeast corner of Lot 10 in Block 1 of Hideaway Park, thence N89°20'W a distance of 215.97 feet thence South 27°14'05" East a distance of 112.75 feet·, thence South 21 °37'30" East a distance of 55.09 feet; thence South 89°29' East a distance of 146.59 feet to the Southeast corner of Lot 12 in said Block 1; thence North 01°53' West along the East line of Lots 12, 11 and 10 in Block 1 Hideaway Park, a distance of 150.0 feet, more or less, to the point of beginning.

VALLEY HI MOTEL ENCLAVE ANNEXATION EXHIBIT A: EXISTING AND PROPSOED TOWN BOUNDARY

Valley Hi

This property is commonly referred to as the Valley Hi parcel. It is located along Main Street near the intersection of Vasquez Road.

Land Use:

The property is currently zoned Tourist District by Grand County and is located within the Growth Area for the Town of Winter Park as identified in the 2011 Grand County Master Plan. It is an enclave within the Town of Winter Park. The 0.371 acre parcel is developed with the Valley Hi Motel and Serene Wellness, a retail marijuana business.

Transportation:

The property is accessed from Main Street near the intersection of Vasquez Road.

Utility Provisions:

The property is already served with water, sewer, electric and gas services.

Community Services:

This section lies within the East Grand Fire District and the East Grand School District. Police protection is currently provided by the Grand County Sheriff's Department with mutual aid from the Fraser Winter Park Police Department. Fire protection and the school district boundaries would remain the same in the event of any annexation. Police protection, however, would be provided exclusively by the Fraser Winter Park Police Department upon annexation

Open Space, Parks & Recreation:

There is no open space associated with this commercial lot.

Water Availability:

This property is located within the Grand County Water and Sanitation District No. 1 district boundaries. Water service is provided to the existing motel and retail shop.

Annexation Considerations:

If it were to be annexed into the Town, appropriate zoning for this parcel would be DC – Destination Center District due to its proximity to the downtown.

MEMO

TO	Town Council
FROM	James Shockey, AICP, Community Development Director
DATE	April 16, 2024
RE	PUBLIC HEARING: Major Site Plan – 820 Ski Idlewild Road – Idlewild Park – Tract A, Rendezvous at Winter Park Sub Ex No. 2 and Tract A, Idlewild Sub Ex No. 1 (PLN23-115)

Applicant: Jeffrey Vogel of Vogel and Associates

Property Owner: Town of Winter Park

Architect: NEO Studio and DHM Design

Address: 820 Ski Idlewild Road (the "Property")

Legal Description:
Tract A, Rendezvous at Winter Park Subdivision Exemption No. 2 and Tract A, Idlewild Subdivision Exemption No. 1

Zoning:
R-2, P-D (Multiple Family Residential, Planned Development) (Rendezvous Final Development Plan (FDP), 1st Amendment, Reception No. 2020007456), Planning Area ("PA") 4

Authority:
This is a major site plan application for development of the Town's Idlewild Park. Construction is required by the Rendezvous at Winter Park Final Development Plan (FDP). Pursuant to § 5-B-3 of the Winter Park Unified Development Code (the "UDC"), the Planning Commission considers building configurations, colors, materials and general compatibility of proposed structures and outdoor advertising within the Town of Winter Park. Major Site Plan approval is required before building permit issuance.

Pursuant to UDC § 5-E-1(G)(2)(f), the Planning Commission shall have the authority to determine that a major site plan could affect the character of the surrounding neighborhood and refer review and approval to the Town Council. If such determination is made, the major site plan shall be placed on the next agenda for the Town Council. The Town Council shall have the authority to call up any site plan for review and approval.

Site Plan Approval Criteria:
The site plan shall be evaluated and may be approved in accordance with the following criteria:

1. Comprehensive Plan. Conformance with the Comprehensive Plan;
2. This UDC. Conformance with the standards of this UDC; and
3. Design Guidelines. Conformance with the Design Guidelines in Appendix A.

Procedure:
UDC § 5-E-1(G)(2)(e): Planning Commission Action. After agency and DRC comments have been resolved and proper public notice posted, the Planning Commission shall:

1. By majority vote, approve, approve with conditions, or deny the site plan as outlined in Sec 5-A-3(C), Procedures.
2. Hold a public hearing prior to taking action on the proposed site plan; and
3. Receive a written recommendation from the Director regarding the proposed site plan.

At the Planning Commission's April 9, 2024 meeting, the Planning Commission voted to recommend approval of the Major Site Plan. The Planning Commission also determined, pursuant to Section 5-E-1(G)(2)(f) of the UDC, that, due to the future financial obligations involved in maintaining the park, this major site plan approval could affect the character of the surrounding neighborhood and should be referred to the Town Council for consideration at their next meeting.

§ 5-B-8 Public Notice Requirements:
This application has had proper public notification pursuant to § 5-B-8 of the UDC. A Newspaper Publication (PUB) was published in the Middle Park Times on March 27, 2024, providing notification of the hearing and requesting comments. A Surrounding Property Owners Mailing (ML) was sent to property owners within 300' of the property on March 21, 2024. A Property Posting (PO) was posted on March 26, 2024.

No public comments have been received as of April 10, 2024.

Project Overview:
Construction of a new Town-owned public neighborhood park in conformance with the Rendezvous at Winter Park Final Development Plan (FDP). The Park includes a playground equipment, restrooms, a recreation field, a shade structure, and a firepit.

Variances:
No Administrative or Board of Adjustment variance requests are included with the application.

Homeowner and Master Association Review:
N/A, no HOA or master association governs the Property.

Construction Plans:
Satisfactory. There is one minor change required to the Drainage Plan that can be addressed administratively.

Material and Color:
Satisfactory.

Outdoor Lighting:
Partially satisfactory. Three (3) fixtures are proposed, and all contain the International Dark Sky Association (IDA) approval stamp as required in Article 3.K, Outdoor Lighting. Each fixture is limited to 1,500 lumens and shall have a BUG (backlight, uplight, and glare) Rating that doesn't exceed B1 U0 G1. Staff is unable to determine the BUG rating as manufacturer specification sheets were not provided.

Photometric plans are required for nonresidential and multifamily projects. The Applicant submitted a compliant photometric plan.

Fixture Name	Proposed # of Fixtures	Proposed Lumens per Fixture	Total Proposed Lumens	Proposed CCT
C1. Ballard Designs Jett Outdoor Wall Sconce		693	4,158	2700K
VOLT 12" LED Hardscape Light	?	?	?	2700K
B1. Kuzco Lighting Nordic 6" Round Direct Ceiling/Wall Mount Light	6	519	?	?
A1. Cooper Lighting Solutions Fail Safe B95 Wall Light	8	974	7,792	4000K

- Applicant shall submit manufacturer specification sheet for VOLT 12" LED Hardscape Light as required in § 3-K-4, Non-Residential and Multifamily Lighting Requirements.
- Applicant shall indicate BUG ratings for each fixture.
- Applicant shall update the Outdoor Lighting Tabulation on the Major Site Plan Application Form.
- Applicant shall indicate quantity and lumen levels for VOLT 12" LED Hardscape Light.

Setbacks:
N/A. PA-4 has no setback requirements.

Building Coverage:
N/A. PA-4 has no building coverage requirements.

Building Height:
N/A. PA-4 has no building height limit. However, staff needs to measure building height to verify heights match between this Major Site Plan Application and the forthcoming Building Permit Application. Existing and proposed grades are not indicated on building elevations so staff cannot properly measure building height.

- Applicant shall submit building elevations showing existing and proposed grades so staff can properly measure building height.

Access:
Satisfactory. Access is via Ski Idlewild Road.

Parking:
Satisfactory. The FDP required a minimum of six (6) parking spaces for the Park. The site plan shows ten (10).

Off-Street Loading:
N/A.

Bufferyards and Revegetation:
Satisfactory. The FDP, Section 9.2, Subdivision of Phases, requires Rendezvous to follow the Town of Winter Park Landscape Design Regulations and Guidelines.

- No site clearing shall be permitted until the Building Division has verified the Pre-Disturbance Checklist has been implemented on the site.
- Any disturbed areas on the site shall be revegetated with the seed mix recommended by the Grand County Natural Resource Conservation Service, which mix composition is described in Section 7.4 of the Standards and Specifications for Design and Construction.

Snow Storage:
Satisfactory. The snow storage calculations are provided on the site plan. Greater than 25% is provided.

Erosion Control / Drainage Plan / Drainage Report / Grading / Engineer Review:
Satisfactory. The Town Engineer reviewed and approved the Grading Plan.

- Approved drainage and erosion control shall be in place prior to and throughout site preparation and construction and through successful revegetation.

Trash Enclosures:
Satisfactory. Trash enclosures are provided throughout the Park.

Signage:
N/A. Signage is not contemplated.

Inspection:
Building Division staff have not performed a Pre-Disturbance inspection of the property.

Development Improvements Agreement (DIA):
Satisfactory.

Planning Commission Recommendation:
At the Planning Commission's April 9, 2024 meeting, the Planning Commission voted to recommend approval of the Major Site Plan. The Planning Commission also determined, pursuant to Section 5-E-1(G)(2)(f) of the UDC, that, due to the future financial obligations involved in maintaining the park, this major site plan approval could affect the character of the surrounding neighborhood and should be referred to the Town Council for consideration at their next meeting, i.e. Tuesday, April 16, 2024. Motion carried 6,0.

Staff Recommendation:
Staff recommends the Town Council approve Resolution 2135, Series 2024, a resolution approving the Major Site Plan for 820 Ski Idlewild Road (PLN23-115), finding it in conformance with § 5-E-1 of the UDC and finding that all criteria set forth in UDC Section 5-E-1(H) have been met. Staff's recommended conditions of approval are below:

1. Applicant shall submit manufacturer specification sheets for VOLT 12" LED Hardscape Light as required in § 3-K-4, Non-Residential and Multifamily Lighting Requirements.
2. Applicant shall indicate BUG ratings for each fixture.
3. Applicant shall update the Outdoor Lighting Tabulation on the Major Site Plan Application Form.
4. Applicant shall indicate quantity and lumen levels for VOLT 12" LED Hardscape Light.
5. Applicant shall submit building elevations showing existing and proposed grades so staff can properly measure building height.
6. No site clearing shall be permitted until the Building Division has verified the Pre-Disturbance Checklist has been implemented on the site.
7. Any disturbed areas on the site shall be revegetated with the seed mix recommended by the Grand County Natural Resource Conservation Service, which mix composition is described in Section 7.4 of the Standards and Specifications for Design and Construction.
8. Approved drainage and erosion control shall be in place prior to and throughout site preparation and construction and through successful revegetation.

However, this is a decision for the Council to make, and the Council may choose to approve or deny based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Council can rely on or the decision the Council makes.

Sample Motion for Approval:
I move to approve Resolution 2135, Series 2024, a resolution approving the Major Site Plan, finding it in conformance with § 5-E-1 of the UDC, as set forth in the staff memo with the conditions outlined in the staff recommendation.

Sample Motion for Denial:
I move to deny Resolution 2135, Series 2024, a resolution approving the Major Site Plan, finding the applicant has failed to meet the criteria required in § 5-E-1 of the UDC, specifically: ***[articulate specific reasons for denial for failure to conform with the Comprehensive Plan; the UDC; or Design Guidelines]***

Required Permits:

- ✓ Building Permit

TOWN OF WINTER PARK
RESOLUTION NO. 2135
SERIES OF 2024

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF WINTER PARK APPROVING A MAJOR SITE PLAN FOR 820 SKI IDLEWILD ROAD, IDLEWILD PARK (PLN23-115)

WHEREAS, the Town owns Tract A, Rendezvous at Winter Park Subdivision Exemption No. 2 and Tract A, Idlewild Subdivision Exemption No. 1, also known as 820 Ski Idlewild Road or Idlewild Park (the "Property");

WHEREAS, pursuant to the Rendezvous at Winter Park Final Development Plan and related agreements, the developer of the Rendezvous Community shall design, construct and install Idlewild Park as a public park;

WHEREAS, on behalf of the Rendezvous Community, Vogel and Associates applied for Major Site Plan approval for the Property (the "Application");

WHEREAS, major site plan process and approval criteria are set forth in Section 5-E-1(H) of the Town's Unified Development Code (the "UDC");

WHEREAS, at its April 9, 2024, meeting the Planning Commission considered the Application and recommended approval of it with certain enumerated conditions, finding it in conformance with Section 5-E-1(H) of the UDC;

WHEREAS, at that time, the Planning Commission also determined, pursuant to Section 5-E-1(G)(2)(f) of the UDC, that, due to the future financial obligations involved in maintaining the park, this major site plan approval could affect the character of the surrounding neighborhood and should be referred to the Town Council for consideration; and

WHEREAS, on April 16, 2024, the Town Council considered the Application; and

WHEREAS, after considering the recommendation from the Planning Commission and Town staff, and any public comment, the Town Council finds and determines as provided below.

NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Winter Park, Colorado, as follows:

Section 1. Findings. The Town Council hereby finds and determines that the Application meets all of the applicable criteria set forth in Section 5-E-1(H) of the UDC, Approval Criteria, as (1) the Application is in conformance with the Comprehensive Plan, (2) the Application is in conformance with the standards of the UDC, and (3) the Application is in conformance with the Design Guidelines set forth as Appendix A to the UDC.

Section 2. Decision. Based on the foregoing findings, Town Council hereby approves the Application subject to the following conditions prior to submittal of a building permit:

a. Applicant shall submit manufacturer specification sheets for VOLT 12" LED Hardscape Light as required in § 3-K-4, Non-Residential and Multifamily Lighting Requirements.
b. Applicant shall indicate BUG ratings for each fixture.
c. Applicant shall update the Outdoor Lighting Tabulation on the Major Site Plan Application Form.
d. Applicant shall indicate quantity and lumen levels for VOLT 12" LED Hardscape Light.
e. Applicant shall submit building elevations showing existing and proposed grades so staff can properly measure building height.
f. No site clearing shall be permitted until the Building Division has verified the Pre-Disturbance Checklist has been implemented on the site.
g. Any disturbed areas on the site shall be revegetated with the seed mix recommended by the Grand County Natural Resource Conservation Service, which mix composition is described in Section 7.4 of the Standards and Specifications for Design and Construction.
h. Approved drainage and erosion control shall be in place prior to and throughout site preparation and construction and through successful revegetation.

PASSED, ADOPTED AND APPROVED this ___ day of April 2024.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

TOWN OF winter park

MEMO

TO	Planning Commission
FROM	James Shockey, AICP, Community Development Director
DATE	April 9, 2024
RE	PUBLIC HEARING: Major Site Plan – 820 Ski Idlewild Road – Idlewild Park – Tract A, Rendezvous at Winter Park Sub Ex No. 2 and Tract A, Idlewild Sub Ex No. 1 (PLN23-115)

Applicant: Jeffrey Vogel of Vogel and Associates

Property Owner: Town of Winter Park

Architect: NEO Studio

Address: 820 Ski Idlewild Road (the "Property")

Legal Description:
Tract A, Rendezvous at Winter Park Subdivision Exemption No. 2 and Tract A, Idlewild Subdivision Exemption No. 1

Zoning:
R-2, P-D (Multiple Family Residential, Planned Development) (Rendezvous Final Development Plan (FDP), 1st Amendment, Reception No. 2020007456), Planning Area ("PA") 4

Authority:
Pursuant to § 5-B-3 of the Winter Park Unified Development Code (the "UDC"), the Planning Commission considers building configurations, colors, materials and general compatibility of proposed structures and outdoor advertising within the Town of Winter Park. Major Site Plan approval is required before building permit issuance.

Site Plan Approval Criteria:
The site plan shall be evaluated and may be approved in accordance with the following criteria:

1. Comprehensive Plan. Conformance with the Comprehensive Plan;
2. This UDC. Conformance with the standards of this UDC; and
3. Design Guidelines. Conformance with the Design Guidelines in Appendix A.

§ 5-B-8 Public Notice Requirements:
This application has had proper public notification pursuant to § 5-B-8 of the UDC. A Newspaper Publication (PUB) was published in the Middle Park Times on March 27, 2024, providing notification of the hearing and requesting comments. A Surrounding Property Owners Mailing (ML) was sent to property owners within 300' of the property on March 21, 2024. A Property Posting (PO) was posted on March 26, 2024.

No public comments have been received as of April 5, 2024.

Project Overview:
Construction of a new public neighborhood park in conformance with the Rendezvous at Winter Park Final Development Plan (FDP). The Park includes a playground, restrooms, a recreation field, a shade structure, and a firepit.

Variances:
No Administrative or Board of Adjustment variance requests are included with the application.

Homeowner and Master Association Review:
N/A, no HOA or master association governs the Property.

Construction Plans:
Satisfactory. There is one minor change required to the Drainage Plan that can be addressed administratively.

Material and Color:
Satisfactory.

Outdoor Lighting:
Partially satisfactory. Three (3) fixtures are proposed, and all contain the International Dark Sky Association (IDA) approval stamp as required in Article 3.K, Outdoor Lighting. Each fixture is limited to 1,500 lumens and shall have a BUG (backlight, uplight, and glare) Rating that doesn't exceed B1 U0 G1. Staff is unable to determine the BUG rating as manufacturer specification sheets were not provided.

Photometric plans are required for nonresidential and multifamily projects. The Applicant submitted a compliant photometric plan.

Fixture Name	Proposed # of Fixtures	Proposed Lumens per Fixture	Total Proposed Lumens	Proposed CCT
Jett Outdoor Wall Sconce	6	693	4158	2700K
VOLT 12" LED Hardscape Light	8	693	?	2700K
6" Round Direct Ceiling/Wall Mount Light	2	519	?	?

- Applicant shall submit manufacturer specification sheets for outdoor lighting fixtures as required in § 3-K-4, Non-Residential and Multifamily Lighting Requirements.
- Applicant shall indicate BUG ratings for each fixture.
- Applicant shall update the Outdoor Lighting Tabulation on the Major Site Plan Application Form.

Setbacks:
N/A. PA-4 has no setback requirements.

Building Coverage:
N/A. PA-4 has no building coverage requirements.

Building Height:
N/A. PA-4 has no building height limit. However, staff needs to measure building height to verify heights match between this Major Site Plan Application and the forthcoming Building Permit Application. Existing and proposed grades are not indicated on building elevations so staff cannot properly measure building height.

- Applicant shall submit building elevations showing existing and proposed grades so staff can properly measure building height.

Access:
Satisfactory. Access is via Ski Idlewild Road.

Parking:
Satisfactory. The FDP required a minimum of six (6) parking spaces for the Ppark. The site plan shows ten (10).

Off-Street Loading:
N/A.

Bufferyards and Revegetation:
Satisfactory. The FDP, Section 9.2, Subdivision of Phases, requires Rendezvous to follow the Town of Winter Park Landscape Design Regulations and Guidelines.

- No site clearing shall be permitted until the Building Division has verified the Pre-Disturbance Checklist has been implemented on the site.
- Any disturbed areas on the site shall be revegetated with the seed mix recommended by the Grand County Natural Resource Conservation Service, which mix composition is described in Section 7.4 of the Standards and Specifications for Design and Construction.

Snow Storage:
Satisfactory. The snow storage calculations are provided on the site plan. Greater than 25% is provided.

Erosion Control / Drainage Plan / Drainage Report / Grading / Engineer Review:
Satisfactory. The Town Engineer reviewed and approved the Grading Plan.

- Approved drainage and erosion control shall be in place prior to and throughout site preparation and construction and through successful revegetation.

Trash Enclosures:
Satisfactory. Trash enclosures are provided throughout the Park.

Signage:
N/A. Signage is not contemplated.

Inspection:
Building Division staff have not performed a Pre-Disturbance inspection of the property.

Development Improvements Agreement (DIA):
Satisfactory.

Staff Recommendation:
Due to the future financial obligations associated with the Park, staff recommends the Planning Commission provide a recommendation of approval and send it to the Town Council for review and final approval at their meeting on Tuesday, April 16, 2024 at 5:30pm.

Staff recommends the Planning Commission provide a favorable recommendation of approval with the recommended staff conditions, finding that all criteria set forth in UDC Section 5-E-1(H) have been met. Staff's recommended conditions of approval are below:

1. Applicant shall submit manufacturer specification sheets for outdoor lighting fixtures as required in § 3-K-4, Non-Residential and Multifamily Lighting Requirements.
2. Applicant shall indicate BUG ratings for each fixture.
3. Applicant shall update the Outdoor Lighting Tabulation on the Major Site Plan Application Form.
4. Applicant shall submit building elevations showing existing and proposed grades so staff can properly measure building height.
5. No site clearing shall be permitted until the Building Division has verified the Pre-Disturbance Checklist has been implemented on the site.
6. Any disturbed areas on the site shall be revegetated with the seed mix recommended by the Grand County Natural Resource Conservation Service, which mix composition is described in Section 7.4 of the Standards and Specifications for Design and Construction.
7. Approved drainage and erosion control shall be in place prior to and throughout site preparation and construction and through successful revegetation.

However, this is a decision for the Commission to make, and the Commission may choose to approve or deny based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Commission can rely on or the decision the Commission makes.

Sample Motion Recommending Approval:
I move to recommend approval to the Town Council for the Major Site Plan, finding it in conformance with § 5-E-1 of the UDC, as set forth in the staff memo with the conditions outlined in the staff recommendation.

Sample Motion Recommending Denial:
I move to recommend denial to the Town Council for the Major Site Plan, finding the applicant has failed to meet the criteria required in § 5-E-1 of the UDC, specifically: ***[articulate specific reasons for denial for failure to conform with the Comprehensive Plan; the UDC; or Design Guidelines]***

Required Permits:

✓ Building Permit

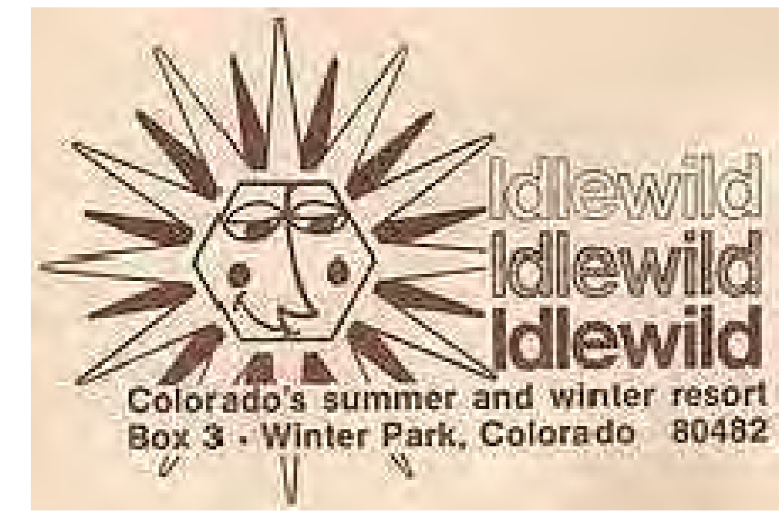
LEGEND

1. NATURE THEMED PLAYGROUND
2. SILOAM STONE RETAINING WALL
3. PICNIC SHELTER WITH TABLES
4. RESTROOM FACILITIES WITH WATER & SEWER (TWO ROOM)
5. PARALLEL PARKING AREA (10 TOTAL SPACES)
6. MULTI-PURPOSE PLAY FIELD (BLUEGRASS TURF)
7. SMALL WINTER SLEDDING HILL FOR KIDS
8. INTEGRAL COLOR CONCRETE PAVING AT SHADE STRUCTURE
9. NATURAL GRAY CONCRETE PAVING WALKWAY (ADA ACCESSIBLE ROUTE)
10. SAFETY RAILING

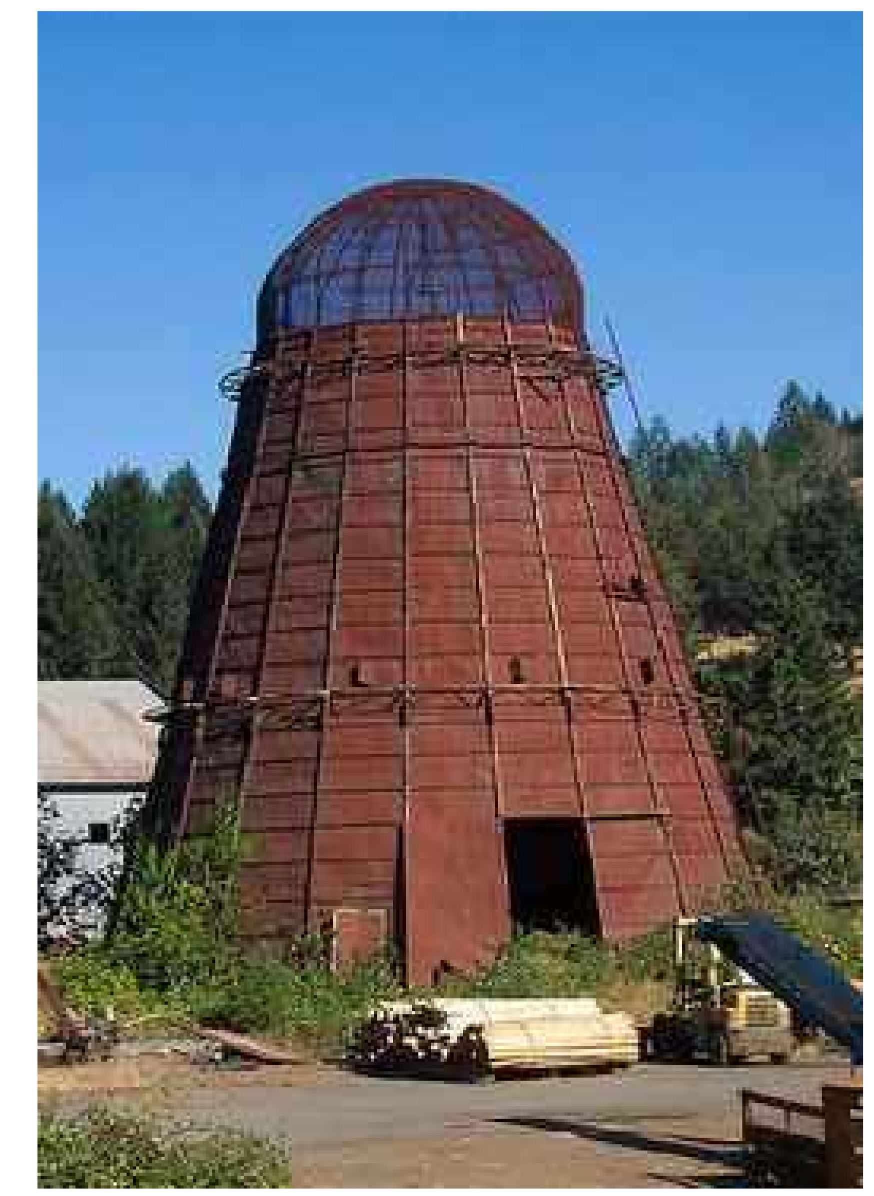
LEGEND

11. DECOMPOSED GRANITE PAVING TRAIL
12. TRAIL CONNECTION TO EXISTING 'YANKEE TRAIL'
13. PROPOSED SHADE AND ACCENT TREES
14. RIPARIAN VEGETATION IN CHANNEL
15. NATIVE PLANTING AREA
16. ALL INCLUSIVE PLAYGROUND (2-12 YEARS OLD)
17. LEGACY WALL WITH INTERPRETIVE SIGNAGE
18. OUTDOOR FIRE PIT AREA WITH SEATING
19. SECOND PARALLEL PARKING AREA (4 TOTAL SPACES)
20. TRAIL-HEAD INTERPRETIVE SIGNAGE
21. 'SKI-LIFT' CUSTOM CHAIR
22. LOGGING FLUME BRIDGE
23. LOGGING SAWDUST BURNER WITH VIEWING DECK AND SLIDE
24. BRIDGE CONNECTION TO UPPER DECK
25. BICYCLE RACK
26. PICNIC TABLE
27. ACCESSIBLE RAMP TO FIRE PIT AREA

SITE INSPIRATION AND INTERPRETIVE



RECREATIONAL



PLAYGROUND

This illustrative site plan is a conceptual representation of the proposed park. Design and municipal approvals have not been completed. The final design may be subject to change.

February 1, 2023

Idlewild Park Concept Plan

Rendezvous Community
Winter Park, Colorado

GRAPHIC SCALE: 1" = 20'-0"
0 10 20 40

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting
475 W. 12th Avenue - Suite E - Denver, Colorado 80204-3688 - (303) 893-4288

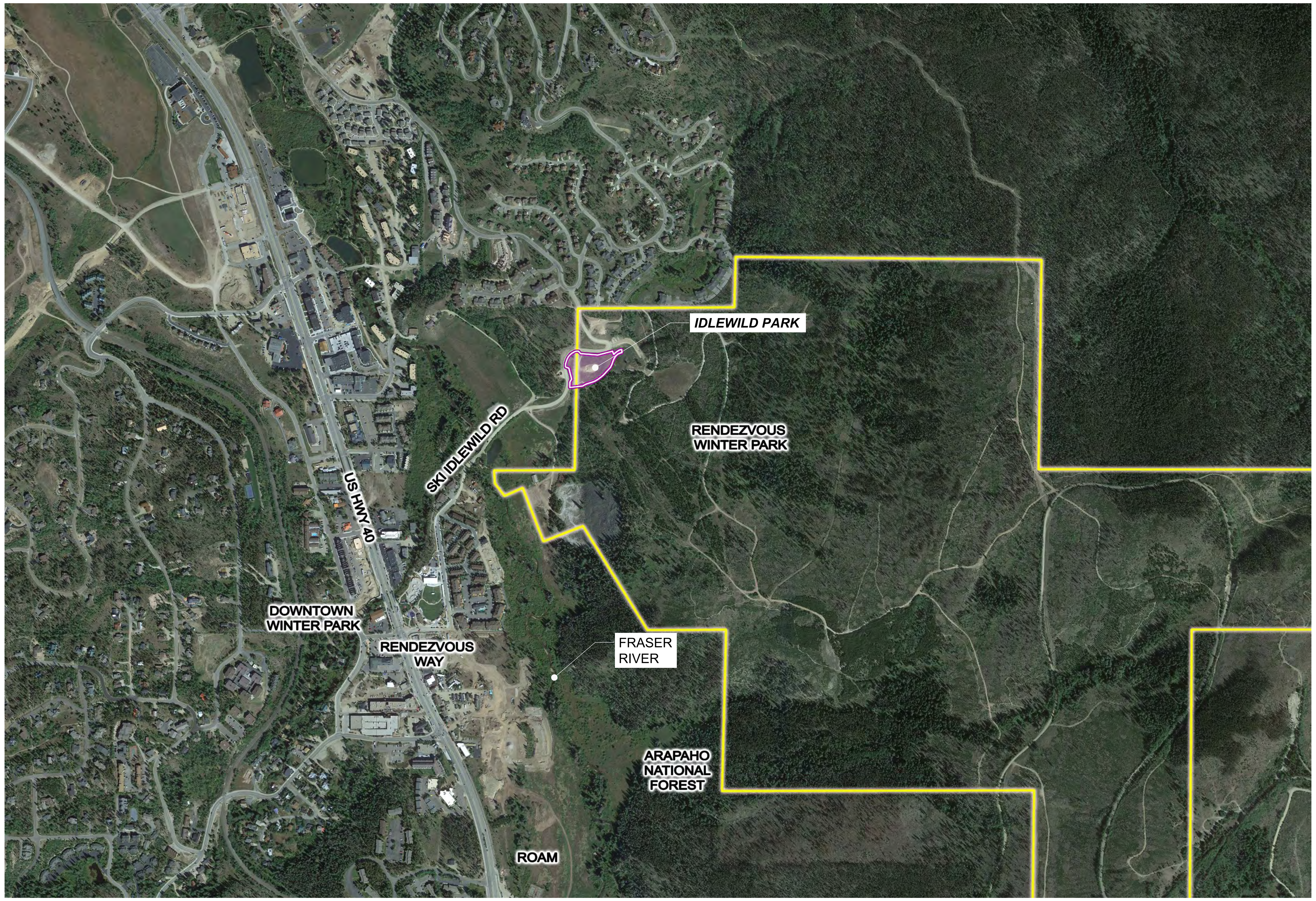
town of winter park

RENDEZVOUS COLORADO

RENDEZVOUS - IDLEWILD PARK

MAJOR SITE PLAN APPLICATION

VICINITY MAP



SCALE: 1:500

LEGAL DESCRIPTION

SUBDIVISION EXEMPTION NO. 2, RENDEZVOUS AT WINTER PARK, FILING NO. 1, TRACT A, BEING A RE-PLAT OF SUBDIVISION EXEMPTION NO. 1, RENDEZVOUS AT WINTER PARK, FILING NO. 1, RECEPTION NO. 2021012863.

ZONING & SETBACKS & NOTES

ZONING - RENDEZVOUS FDP PARK

PLANNING AREA 5

FRONT- 10' SETBACK
SIDE- 5' SETBACK
REAR- 10' SETBACK

SITE DATA CHART

IDLEWILD PARK - SITE AREA

TYPE	*AREA SQ.FT.*	*AREA ACRES*	*% OF TOTAL*
CONCRETE WALK	5,288	0.12	8.1%
CRUSHER FINES TRAIL	3,219	0.07	4.9%
LANDSCAPE AREA	57,098	1.31	87.0%
SUBTOTAL	**65,605**	**1.51**	**100.0%**

*OUTSTANDING AREA INCLUDES PLAY SURFACES AND AREA UNDER THE PROPOSED PAVILION

SHEET INDEX

DEVELOPER

ARROWHEAD WINTER PARK INVESTORS, LLC.
5291 E. YALE AVE
DENVER, CO 80222
PHONE: 970-726-4500

ARCHITECTS

NEO STUDIO
MICHAEL NODA - REGISTERED ARCHITECT
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE: 303-758-3800

PLANNER/ LANDSCAPE ARCHITECT

VOGEL & ASSOCIATES
165 S. UNION BLVD., SUITE 440
LAKEWOOD, CO 80228
CONTACT: JEFF VOGEL
PHONE: 303-893-4288

DHM DESIGN
900 S. BROADWAY., SUITE 300
DENVER, CO 80209
CONTACT: BILL NEUMANN
PHONE: 303-892-5566

CIVIL ENGINEER

TOPKNOT ENGINEERING (TKE)
TONY KREMPIN
998 COUNTY ROAD 553 (POB 2225)
GRANBY, CO 80446
PHONE: 970-281-5280

SURVEYOR

TIM SHENK LAND SURVEYING, INC.
TIMOTHY R. SHENK
BOX 1670. GRANBY, CO 80446
PHONE: 970-887-1046

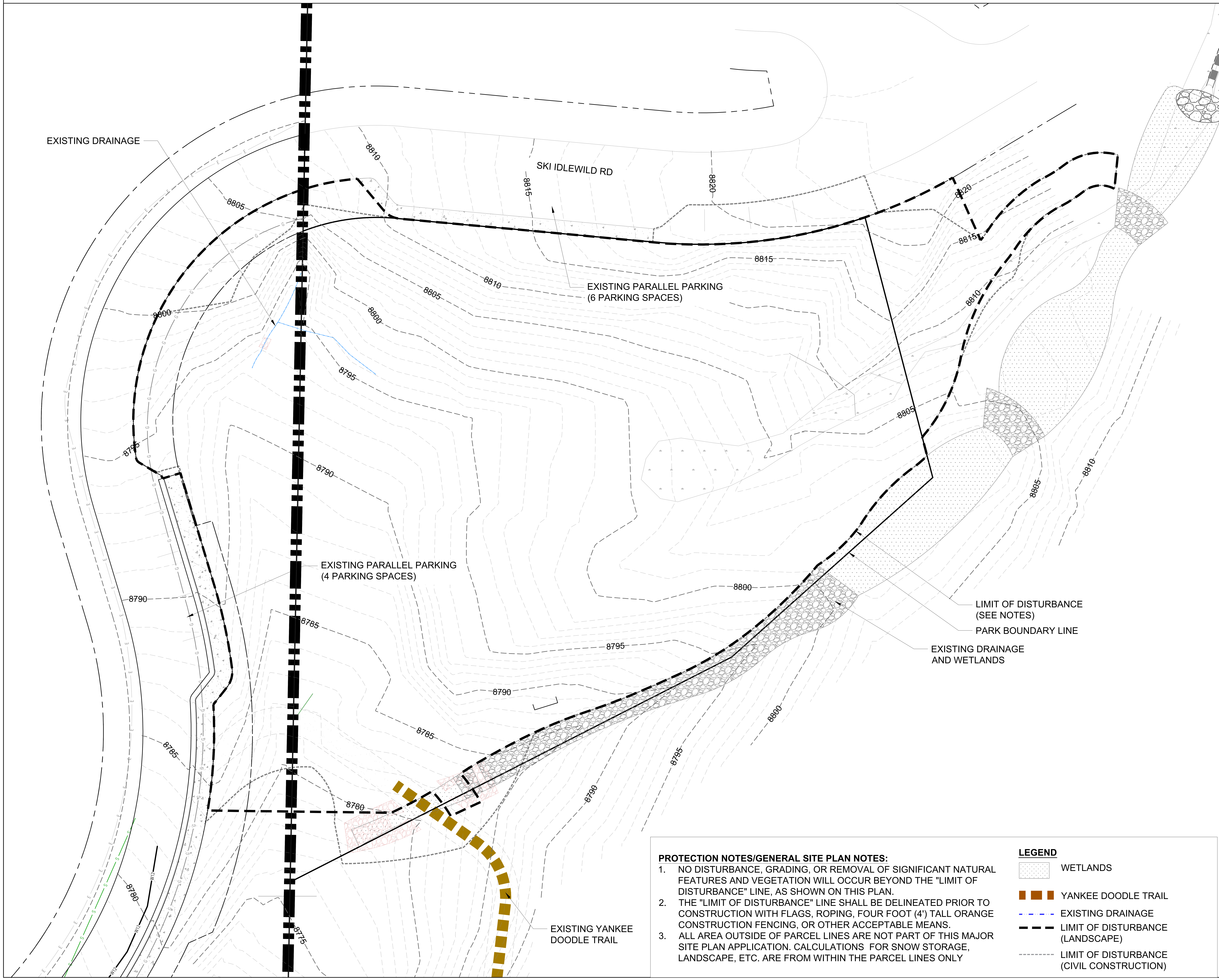
VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 2: 03/14/2024	

COVER SHEET

C



PROTECTION NOTES/GENERAL SITE PLAN NOTES:

1. NO DISTURBANCE, GRADING, OR REMOVAL OF SIGNIFICANT NATURAL FEATURES AND VEGETATION WILL OCCUR BEYOND THE "LIMIT OF DISTURBANCE" LINE, AS SHOWN ON THIS PLAN.
2. THE "LIMIT OF DISTURBANCE" LINE SHALL BE DELINEATED PRIOR TO CONSTRUCTION WITH FLAGS, ROPING, FOUR FOOT (4') TALL ORANGE CONSTRUCTION FENCING, OR OTHER ACCEPTABLE MEANS.
3. ALL AREA OUTSIDE OF PARCEL LINES ARE NOT PART OF THIS MAJOR SITE PLAN APPLICATION. CALCULATIONS FOR SNOW STORAGE, LANDSCAPE, ETC. ARE FROM WITHIN THE PARCEL LINES ONLY

LEGEND

WETLANDS
YANKEE DOODLE TRAIL
EXISTING DRAINAGE
LIMIT OF DISTURBANCE (LANDSCAPE)
LIMIT OF DISTURBANCE (CIVIL CONSTRUCTION)

SCALE: 1"=20'

0 10 20 40

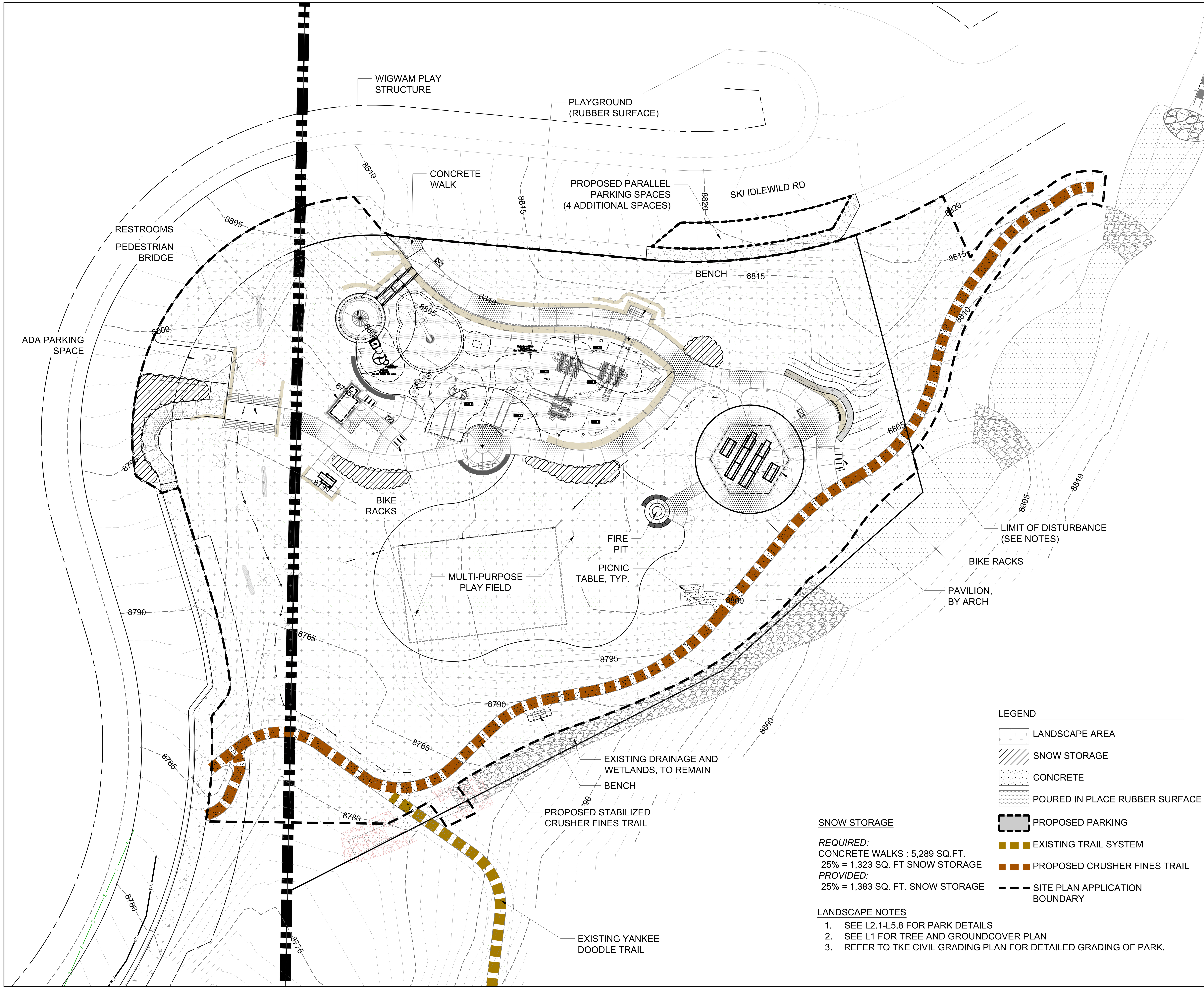
VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 1: 03/14/2024	

SITE PLAN
EXISTING CONDITIONS

S1



SNOW STORAGE

REQUIRED:
CONCRETE WALKS : 5,289 SQ.FT.
25% = 1,323 SQ. FT SNOW STORAGE
PROVIDED:
25% = 1,383 SQ. FT. SNOW STORAGE

LANDSCAPE NOTES

1. SEE L2.1-L5.8 FOR PARK DETAILS
2. SEE L1 FOR TREE AND GROUNDCOVER PLAN
3. REFER TO TKE CIVIL GRADING PLAN FOR DETAILED GRADING OF PARK.

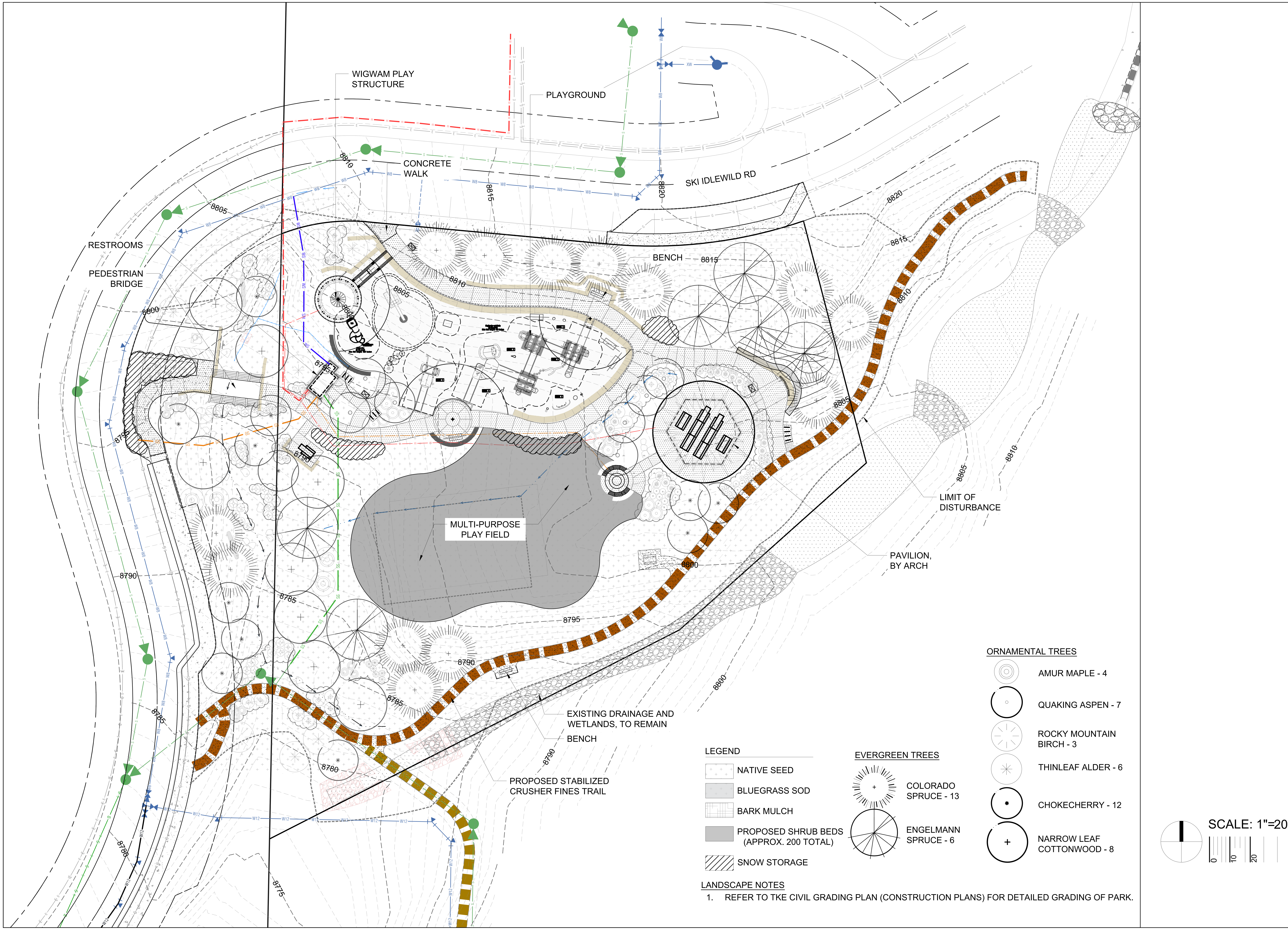
VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 1: 03/14/2024	

SITE PLAN
IDLEWILD PARK

S2



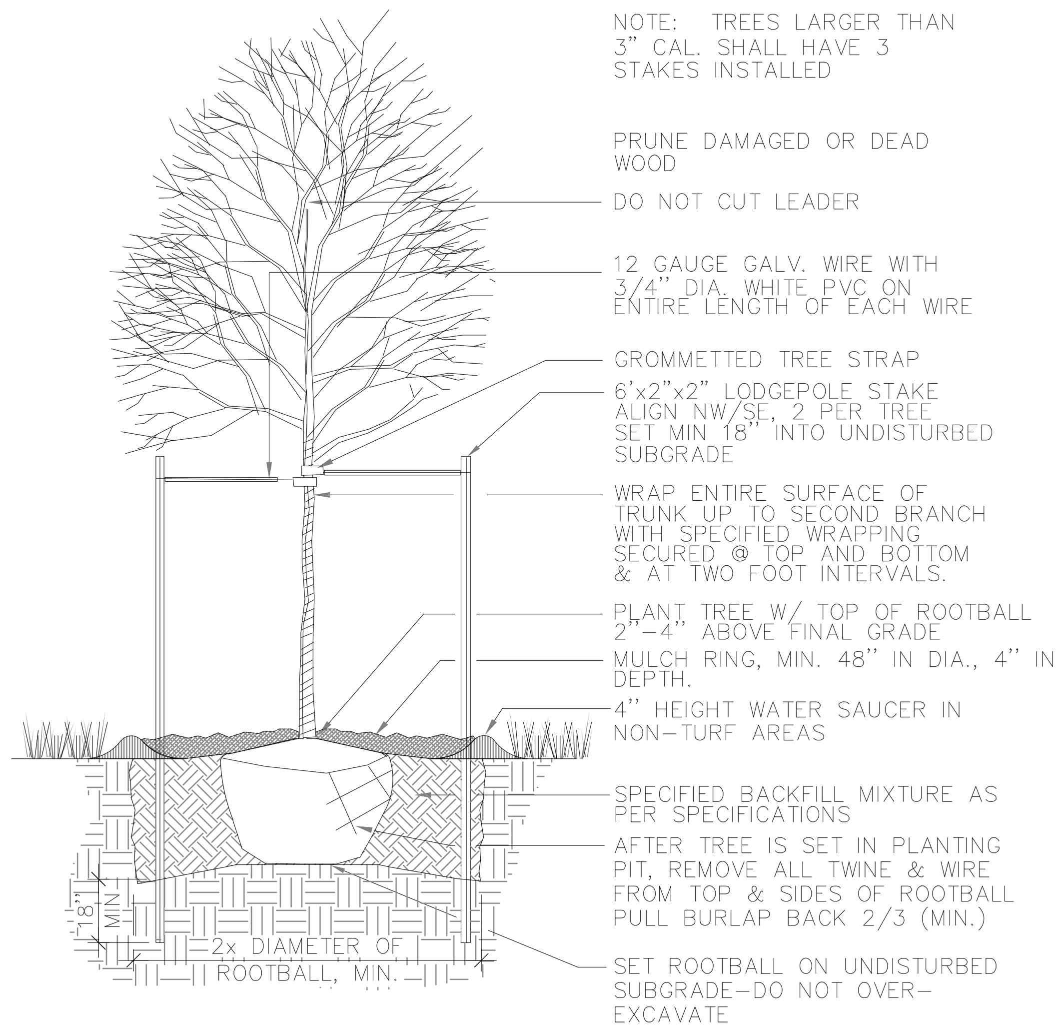
VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

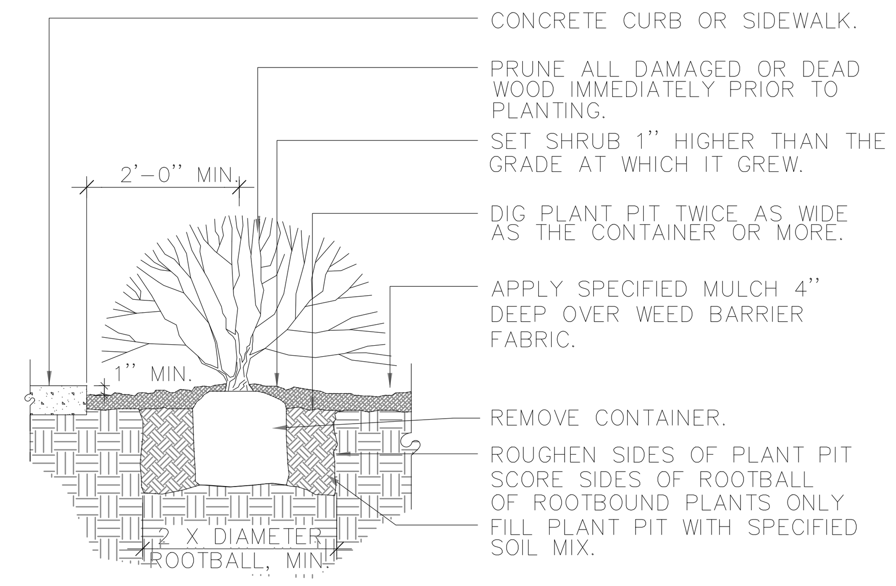
LANDSCAPE PLAN
IDLEWILD PARK

L1



1 / L2 TYPICAL DECIDUOUS TREE PLANTING

SCALE: NTS

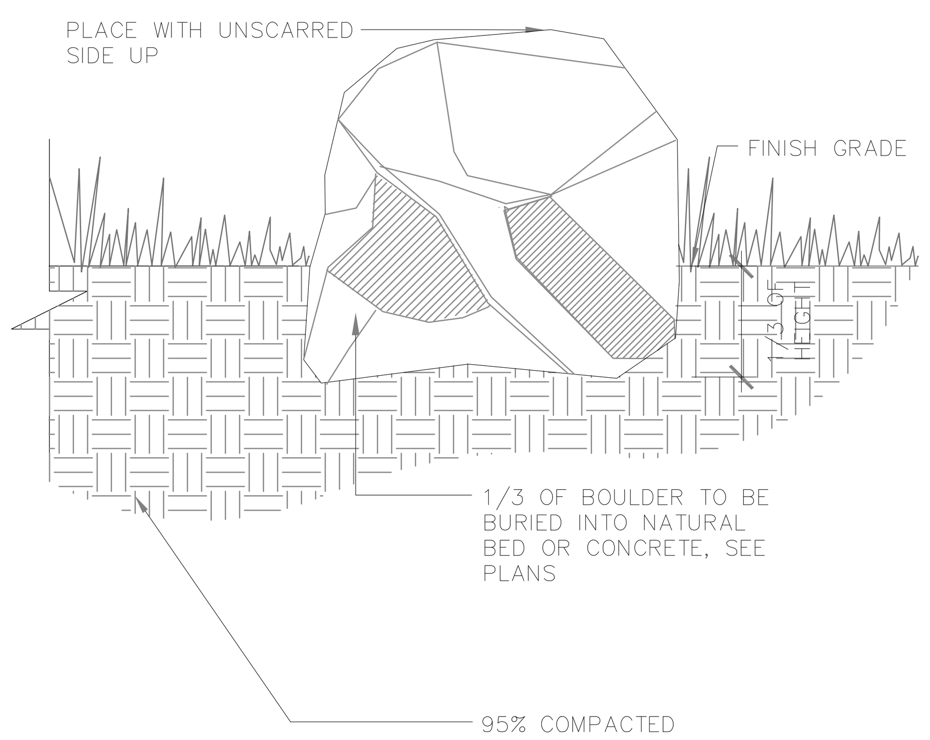


GENERAL NOTES

- HOLD GRADE 1" BELOW EDGE OF WALK OR CURB
- SHRUB PLANTING – REFER TO SHRUB BED LAYOUT FOR PLACEMENT OF SHRUBS.
- FOR GROUPINGS OF SHRUBS, MULCH ENTIRE PLANTING AREA. FOR INDIVIDUAL SHRUBS, MULCH PLANTING PIT AREA ONLY.
- GRADE EDGE OF PLANTING AREAS TO RETAIN MULCH.
- ANY BROKEN OR CRUMBLING ROOTBALL WILL BE REJECTED. REMOVING THE CONTAINERS WILL NOT BE AN EXCUSE FOR DAMAGED ROOTBALLS.

2 / L2 TYPICAL SHRUB PLANTING

SCALE: NTS



NOTE:

1. ALL BOULDERS TO BE BUFF SANDSTONE
2. DO NOT FRACTURE BOULDER DURING PLACEMENT, SUCH ACTION WILL BE CAUSE FOR REJECTION, LANDSCAPE ARCHITECT TO MAKE THAT DETERMINATION
3. SELECT AND PLACE BOULDERS SO THAT MINIMAL EXCAVATION SCARES ARE VISIBLE
4. PLACE BOULDERS TO CONFIGURATIONS AND LOCATIONS AS SHOWN ON PLAN
5. WASH OFF BOULDER AFTER PLACEMENT
6. CONTRACTOR TO REFER TO PLANS FOR THE EXACT SIZES AND LOCATIONS OF EACH LANDSCAPE BOULDER ON SITE.
7. ALL BOULDERS TO BE BURIED A MINIMUM OF 6"
8. ALL BOULDERS TO BE APPROVED BY THE LANDSCAPE ARCHITECT OR OWNERS REPRESENTATIVE PRIOR TO PLACEMENT
9. BOULDER SIZES SHOWN BELOW ARE THE STANDARD SIZES UNLESS OTHERWISE NOTED ON PLAN

LANDSCAPE BOULDERS TO BE COLORADO BUFF SANDSTONE, SIZES ARE APPROXIMATE.
- 1/3 OF BOULDERS SHALL BE SMALL SIZE: 2'HTx2.5'Wx3'L
- 1/3 OF BOULDERS SHALL BE MEDIUM SIZE: 2'HTx3'Wx4'L
- 1/3 OF BOULDERS SHALL BE LARGE SIZE: 30"HTx3'Wx5'L

3 / L2 LANDSCAPE BOULDER

SCALE: NTS

LANDSCAPE NOTES

1. ALL PLANT MATERIAL IS TO BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
2. ALL SHRUB BED AND TREE LOCATIONS ARE TO BE STAKED OUT ON THE SITE FOR APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. PROVIDE SHRUB BED LAYOUT BASED UPON THIS LANDSCAPE PLAN AND NOT THE IRRIGATION PLAN.
3. TREE LOCATION TO BE NO CLOSER THAN 6' FROM ALL CURBS AND WALKWAYS.
4. THE CONTRACTOR SHALL FINE GRADE ALL AREAS TO BE PLANTED. THE CONTRACTOR SHALL REMOVE REQUIRED DEPTH OF SOIL ALONG CURBS AND WALKWAYS TO ACCOMMODATE SEED, SOD OR MULCH DEPTH.
5. ALL AREAS TO BE PLANTED, SEEDED OR SODDED WILL HAVE THE TOPSOIL INSTALLED. THESE AREAS WILL THEN BE TILLED TO A MINIMUM 6" DEPTH INCORPORATING A-1 ORGANICS BIOCOMP CLASS 1 COMPOST AT A MINIMUM RATE OF 4 C.Y. PER 1000 S.F. THE DISTURBED AREAS OF THE SITE WILL THEN BE FINE GRADED IN PREPARATION FOR SEEDING, SODDING OR PLANTING AS SPECIFIED IN THE PLANS AND SPECIFICATIONS.
6. ALL BED AREAS AND TREE PLANTINGS WILL RECEIVE A MINIMUM OF 4" OF FIR FIBER MULCH OR APPROVED EQUAL. THE CONTRACTOR IS RESPONSIBLE FOR WEED CONTROL ON BEDS AND SEEDED AREAS UNTIL FINAL PROJECT ACCEPTANCE. TREE PLANTINGS AND PLANTING BEDS WILL BE TREATED WITH DIEHARD TRANSPLANT (TREES) AND DIEHARD BED PREP (PLANTING BEDS) MICORRHIZA INOCULANTS INSTALLED AND AT THE RATE RECOMMENDED BY THE MANUFACTURER.
7. ALL PLANT MATERIAL WILL CONFORM TO THE AMERICAN ASSOCIATION OF NURSEREYMAN AND STATE OF COLORADO INDUSTRY STANDARDS.
8. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL PLANT QUANTITIES. SYMBOLS ON ALL SHRUBS AND TREES SHALL TAKE PRECEDENCE OVER WRITTEN QUANTITIES.
9. CONTRACTOR TO INSTALL TEMPORARY ORANGE CONSTRUCTION FENCING AROUND ALL SEEDED AREAS.
10. THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES AND WALKWAYS. HAVE ALL FINE GRADING APPROVED PRIOR TO SEEDING.
11. CONTRACTOR SHALL INSTALL SLEEVING FOR IRRIGATION IMPROVEMENTS PRIOR TO INSTALLING CONCRETE FLATWORK.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGE TO EXISTING UTILITIES, CURB AND GUTTER, WALKWAYS, IRRIGATION SYSTEM AND OTHER EXISTING STRUCTURES THAT IS A RESULT OF HIS WORK. THE REPAIR OF SUCH DAMAGE WILL BE AT NO ADDITIONAL COST TO THE OWNER.
13. ALL FINE GRADING TO BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO SODDING AND SEEDING.

VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

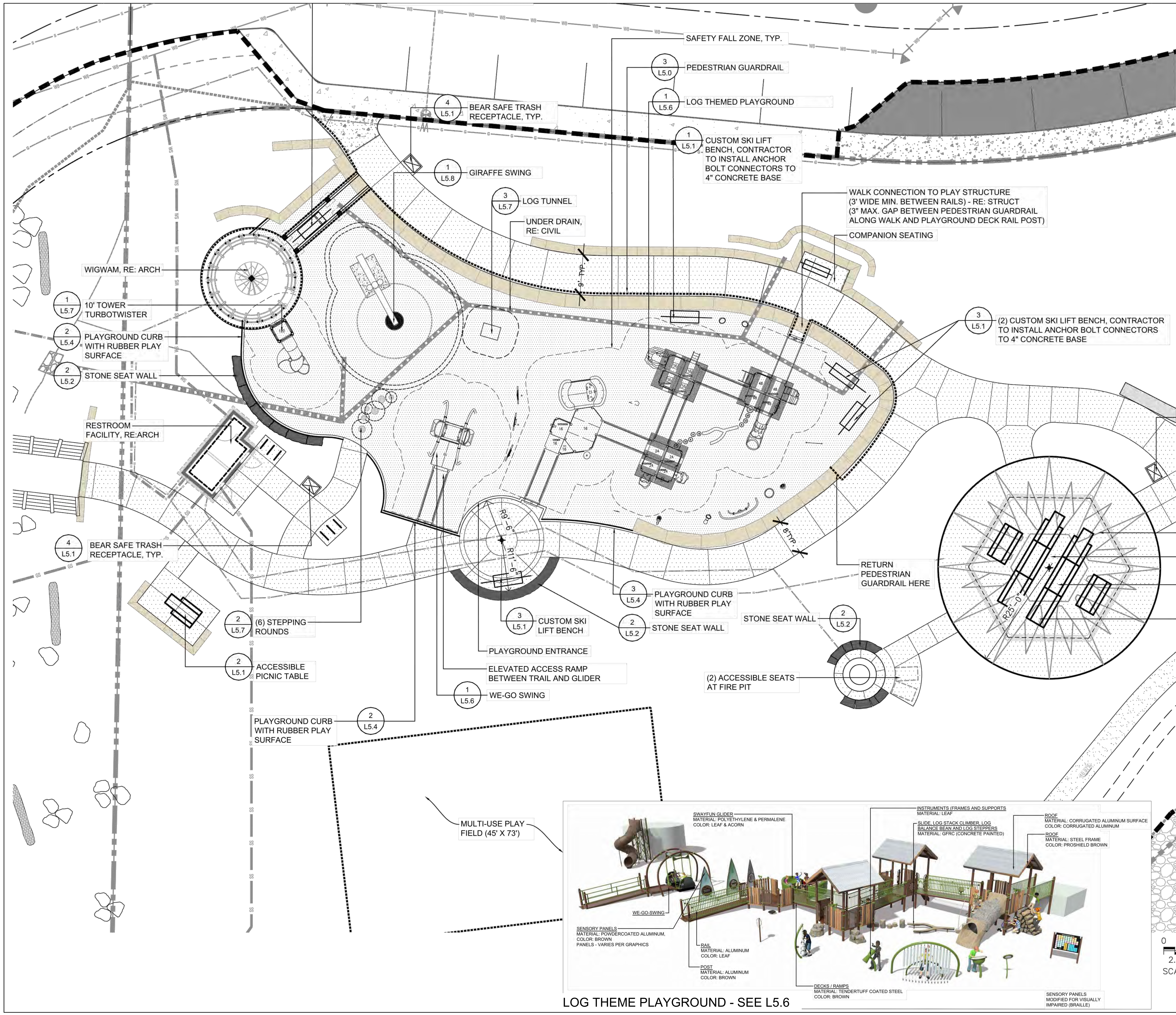
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

LANDSCAPE PLAN
IDLEWILD PARK

L2



LIMIT OF CONSTRUCTION
PROPERTY BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
RIGHT OF WAY
EXISTING DRAINAGE
EXISTING ELECTRICAL LINE
EXISTING GAS LINE
EXISTING WATER LINE
EXISTING SEWER LINE
POURED IN PLACE RUBBER SURFACE
CONCRETE
STABILIZED CRUSHER FINES
PEDESTRIAN GUARDRAIL
HANDRAIL
FALL ZONE
SWALE LINE
PICNIC TABLE
SKI LIFT BENCH
STONE WALL
STONE SEAT WALL
BIKE RACK
SIGNAGE
BEAR SAFE TRASH RECEPTACLE

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

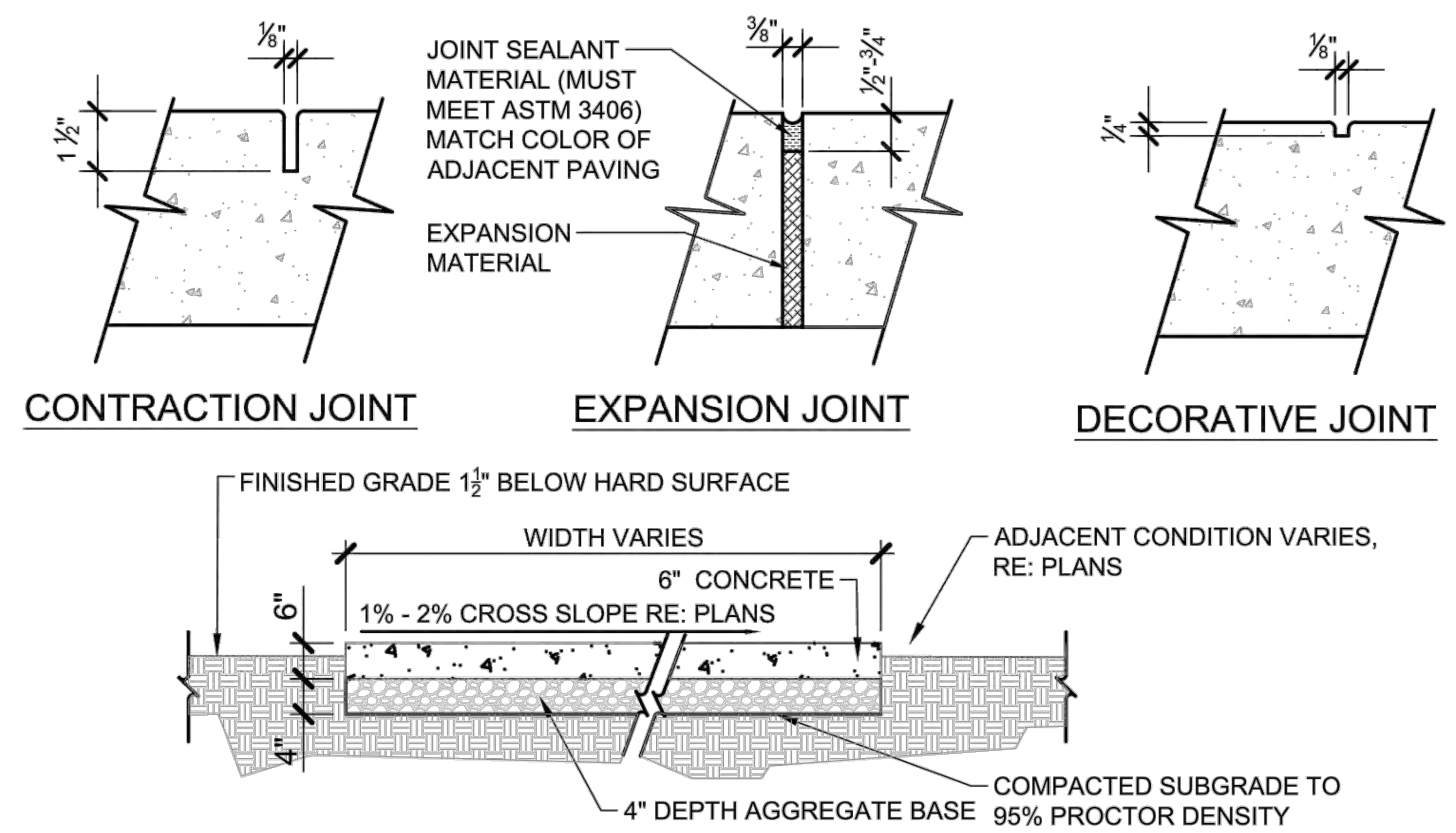
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

LAYOUT AND MATERIALS -PLAYGROUND ENLARGEMENT

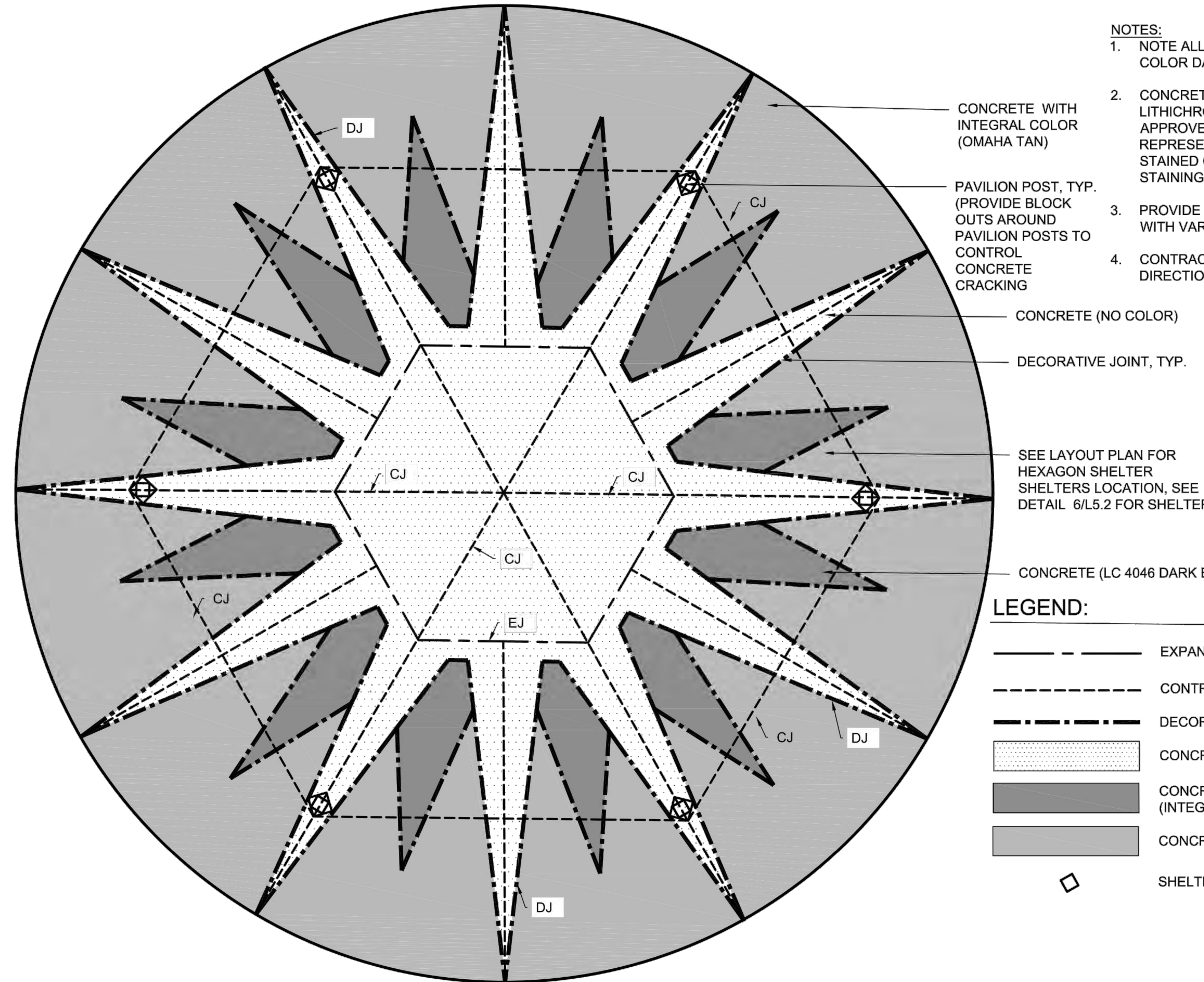
L2.1



NOTES:
1. CONCRETE TO BE 6" DEPTH
2. SAWCUT JOINTS EVERY 10' (10' WIDE WALKS) OR EVERY 8' (8' WIDE WALKS)
3. SAWCUT EXPANSION JOINTS EVERY 100'
4. FIBER MESH REINFORCEMENT - SEE SPECS
5. 4000 PSI AT 28 DAYS - SEE SPECS
6. 2% MAX CROSS SLOPE TO FOLLOW NATURAL SLOPE OF SURROUNDING GRADE FOR POSITIVE DRAINAGE
7. SEE PLANS FOR LAYOUT
8. ALL CONCRETE WALKS TO HAVE MEDIUM BROOM FINISH
9. LONGITUDINAL SLOPE TO BE 5% MAX.
10. REFER TO PLAN FOR INTEGRAL COLOR, STAIN, AND FINISH.

1 / L5.0 CONCRETE PAVING

SCALE: NTS

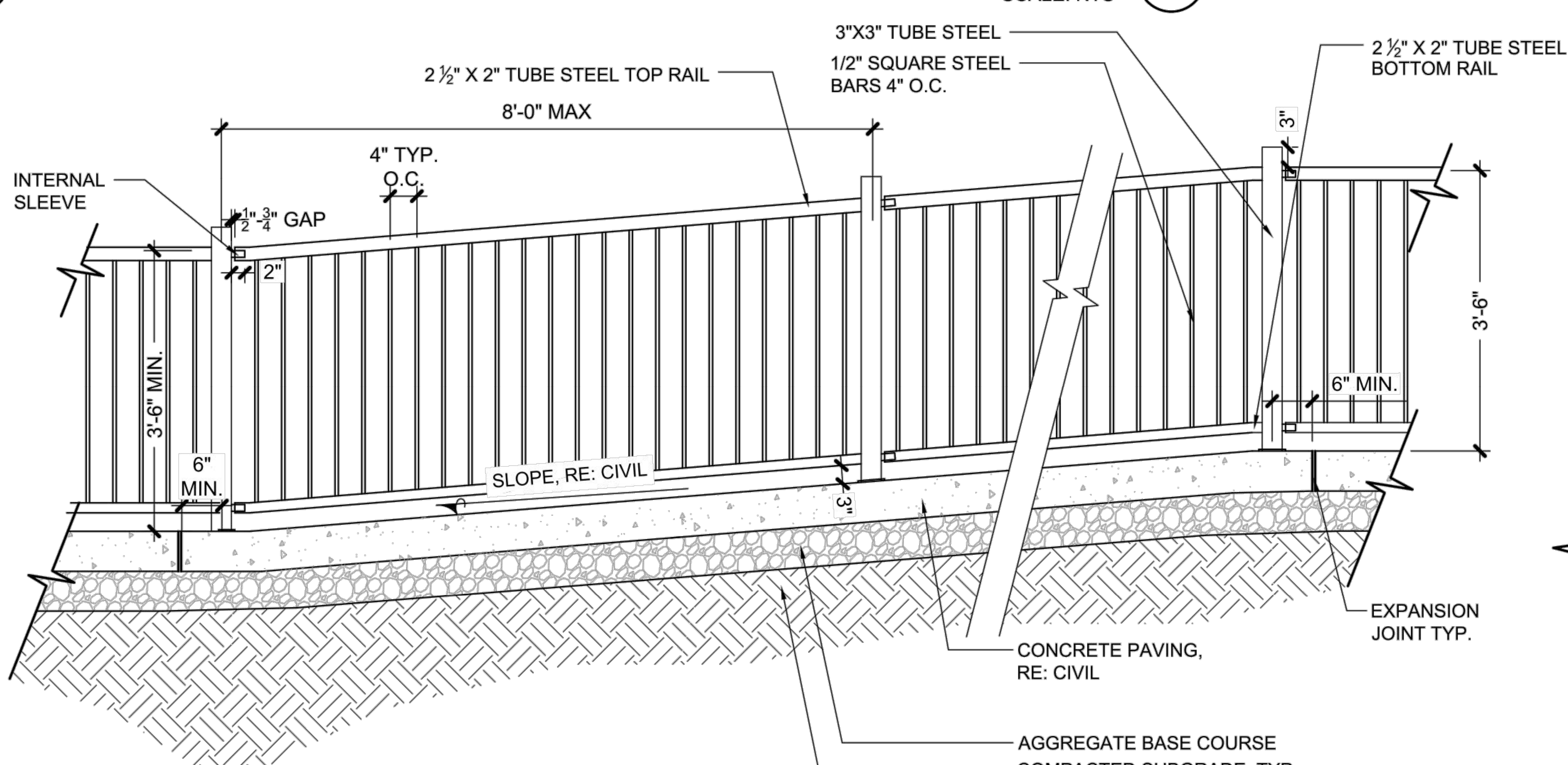


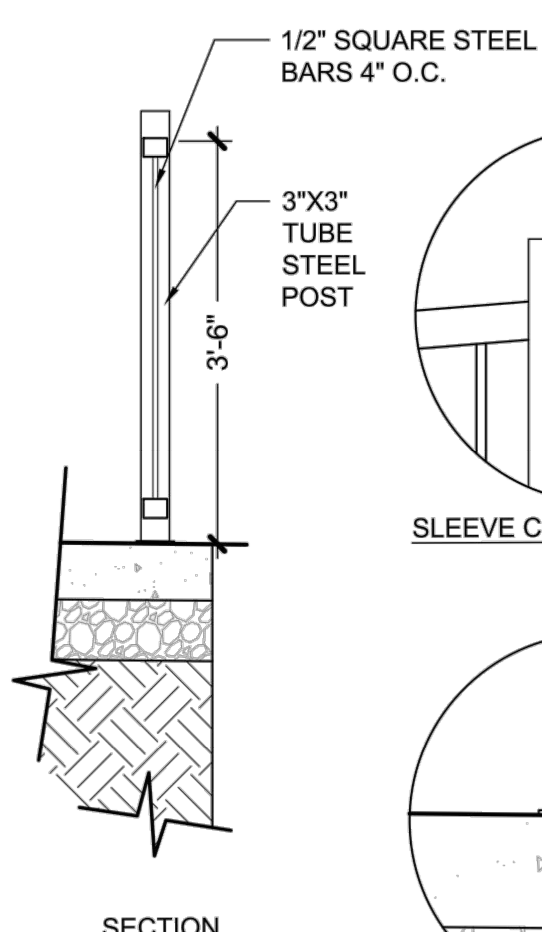
NOTES:
1. NOTE ALL CONCRETE IN PAVILLION PLAZA TO BE INTEGRAL COLOR DAVIS COLOR - OMAHA TAN.
2. CONCRETE TO BE STAINED AS INDICATED ABOVE WITH LITHICHROME AS PROVIDED BY CONTRACTOR OR APPROVED EQUAL. SUBMIT COLOR CHART TO OWNER'S REPRESENTATIVE FOR APPROVAL. PROVIDE 24"X24" STAINED CONCRETE MOCKUPS FOR APPROVAL PRIOR TO STAINING CONCRETE UNDER SHELTER.
3. PROVIDE 3 24"X24" SAMPLE OF SANDBLASTED CONCRETE WITH VARIATIONS FOR APPROVAL.
4. CONTRACTOR TO PROVIDE #4 REBAR 18"O.C. BOTH DIRECTIONS IN PLAZA ONLY.

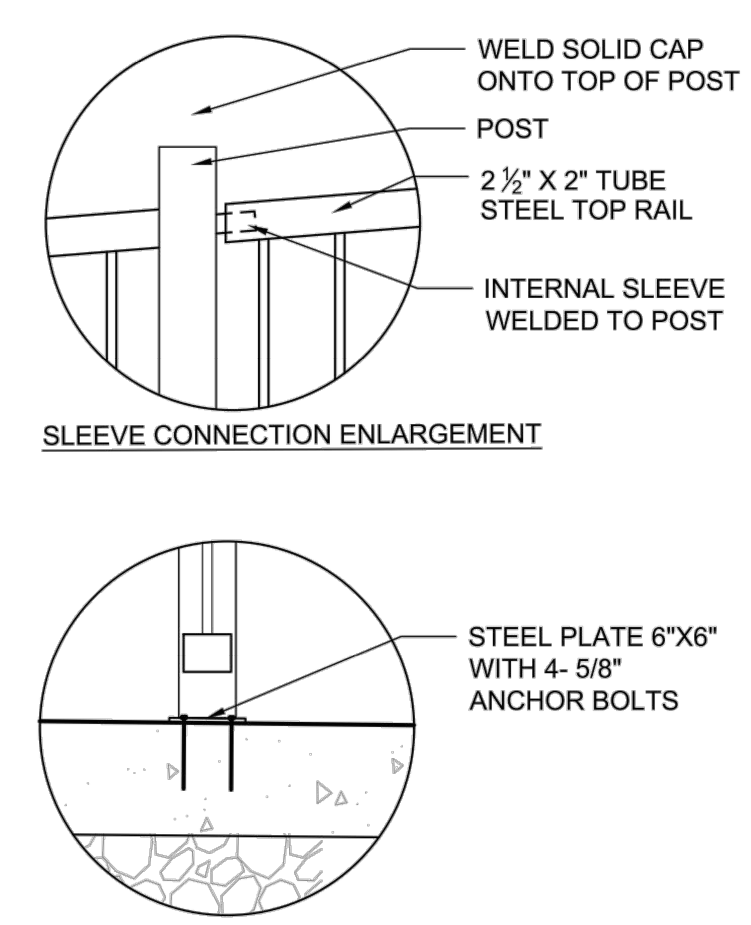
LEGEND:
- EXPANSION JOINT (EJ)
- CONTROL JOINT (CJ)
- DECORATIVE JOINT (DJ)
- CONCRETE (INTEGRAL COLOR WITH SANDBLAST FINISH)
- CONCRETE (INTEGRAL COLOR WITH LC 4047 LIGHT BROWN)
- CONCRETE (INTEGRAL COLOR ONLY)
- SHELTER COLUMN

2 / L5.0 DECORATIVE CONCRETE (UNDER SHELTER)

SCALE: 1/4" = 1'0"



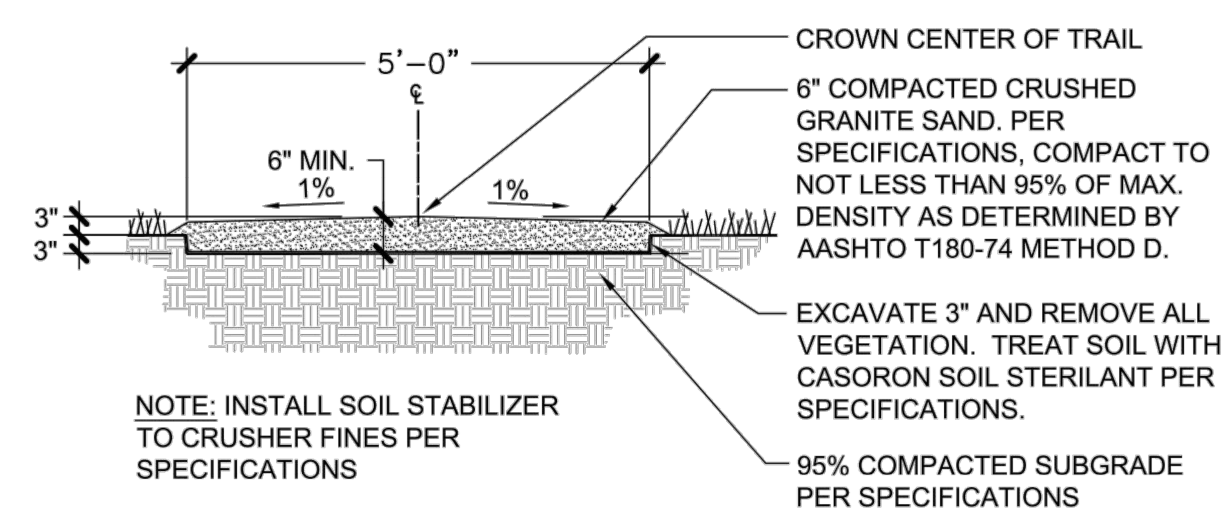




NOTES:
1. COLOR TO BE POWDER COATED BLACK.
2. CONTRACTOR TO FIELD MEASURE PRIOR TO FABRICATION.
3. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.

3 / L5.0 PEDESTRIAN GUARDRAIL

SCALE: NTS



NOTE: INSTALL SOIL STABILIZER TO CRUSHER FINES PER SPECIFICATIONS

4 / L5.0 STABILIZED CRUSHER FINES

SCALE: NTS

811
Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

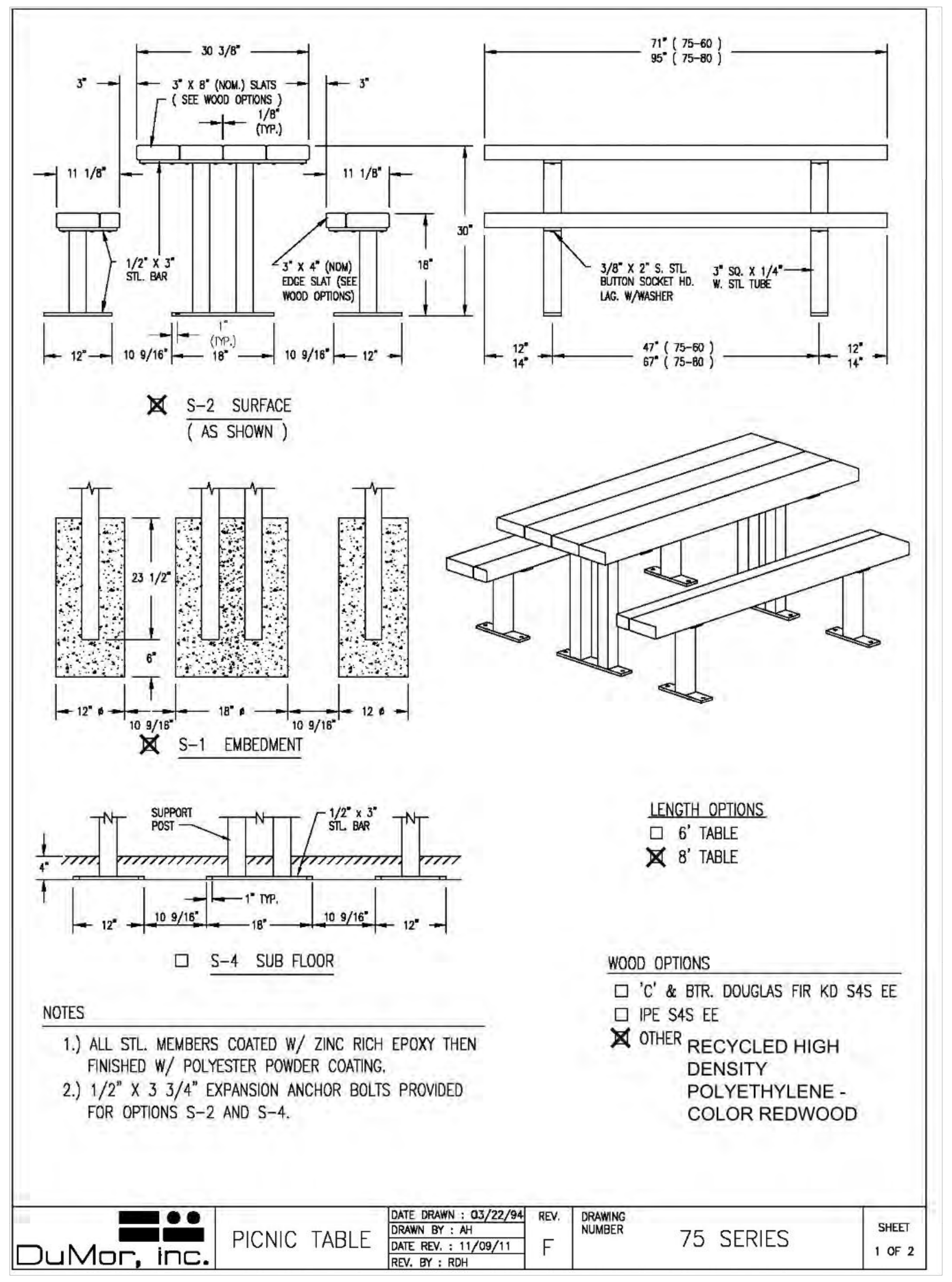
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

L5.0



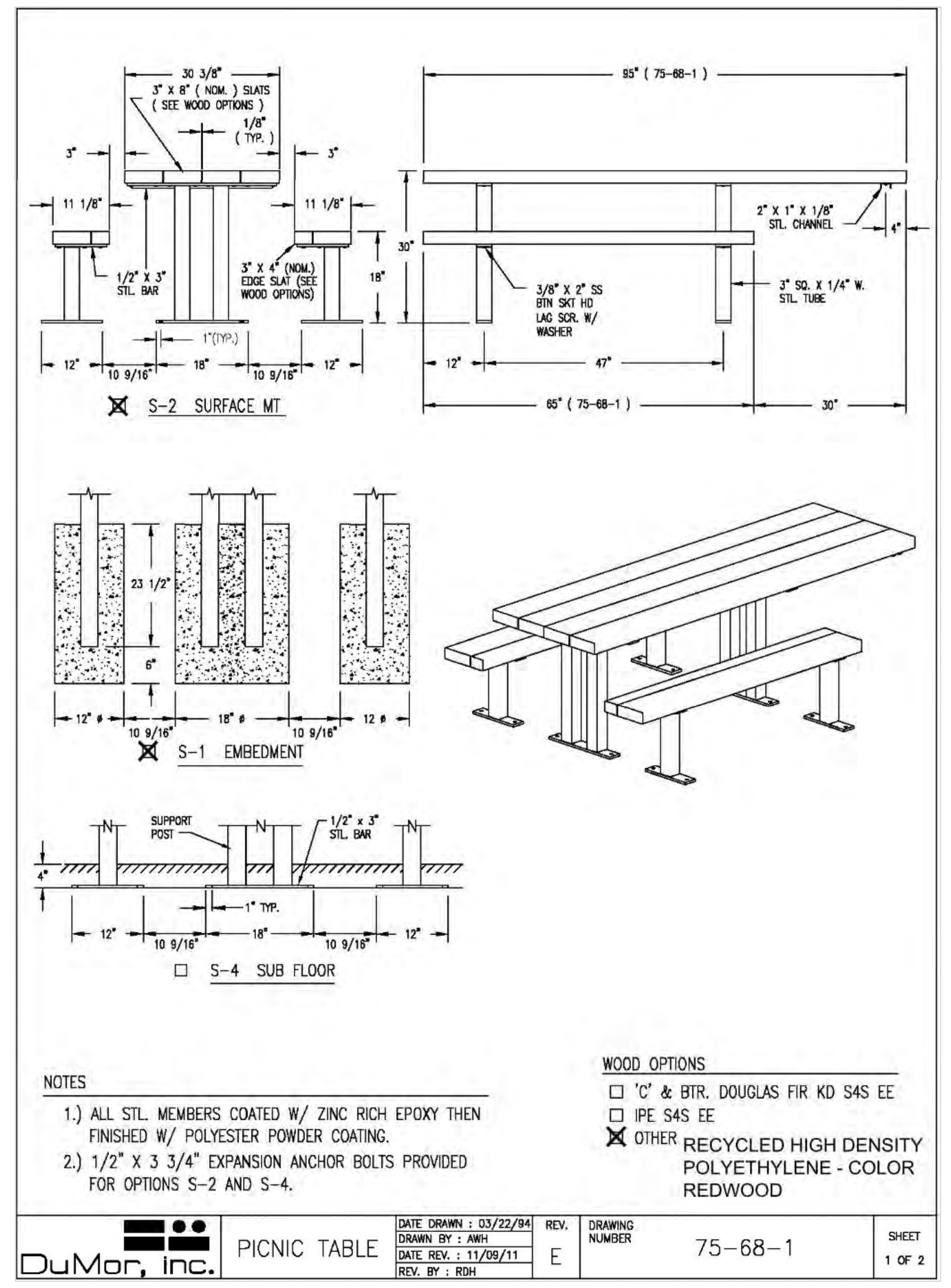
1 L5.1

PICNIC TABLE

SCALE: NTS

75 SERIES
MANUFACTURER: DUMOR INC.
DISTRIBUTOR: ROCKY MOUNTAIN RECREATION
CONTRACT: EVAN BAER
PHONE: 303-783-1452
EMAIL: EVAN@RMREC.COM

NOTE: 1 TABLE TO BE EMBEDDED
6 TABLES TO BE SURFACE MOUNTED



2 L5.1

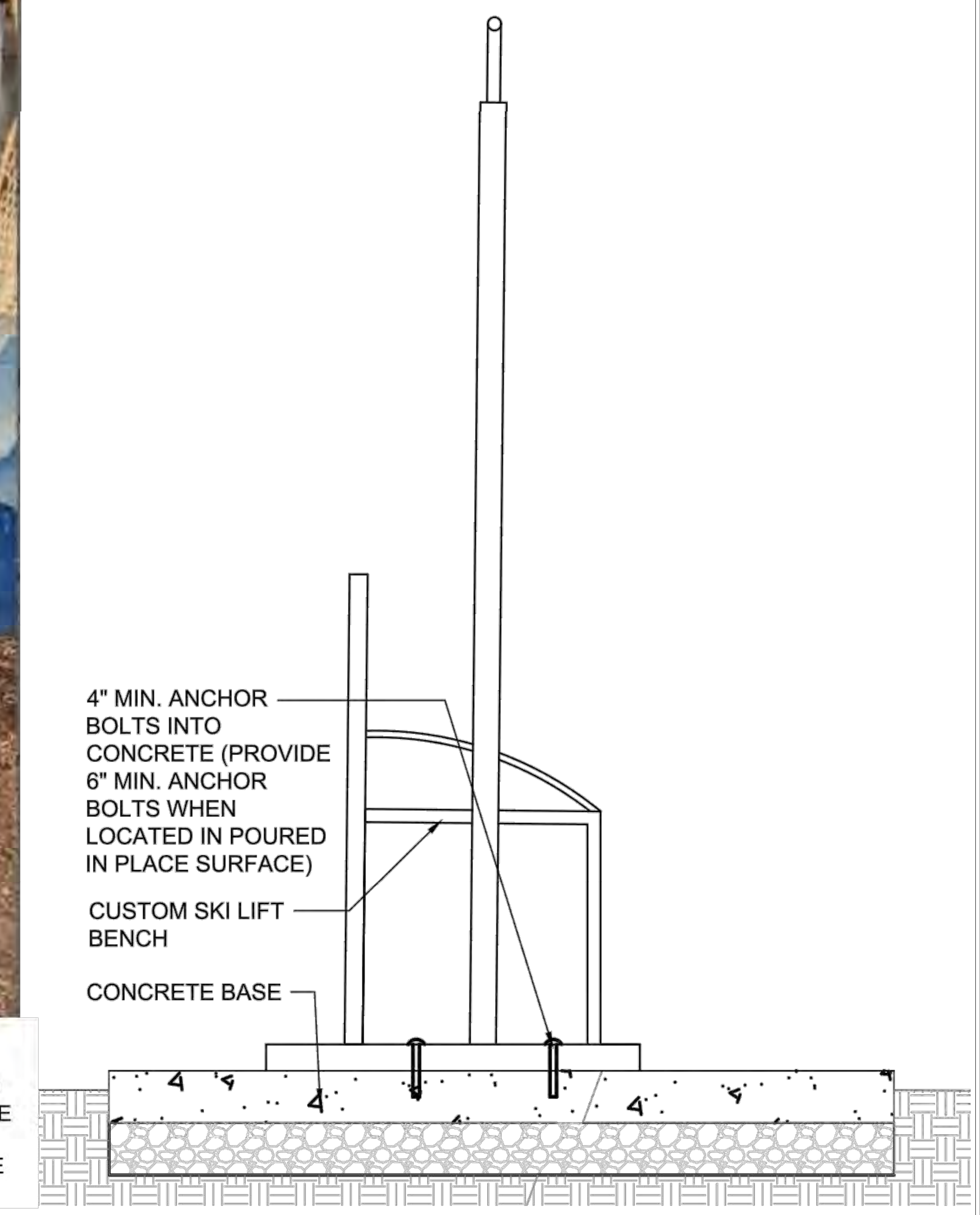
ACCESSIBLE PICNIC TABLE

SCALE: NTS

75-58-1
MANUFACTURER: DUMOR INC.
DISTRIBUTOR: ROCKY MOUNTAIN RECREATION
CONTRACT: EVAN BAER
PHONE: 303-783-1452
EMAIL: EVAN@RMREC.COM

NOTE: 1 TABLE TO BE EMBEDDED
2 TABLES TO BE SURFACE MOUNTED

NOTES:
1. POWDER COAT BLACK ALL STEEL FRAME COMPONENTS.
2. REPLACE ALL WOOD SEATING WITH REDWOOD OR APPROVED EQUAL. MATCH SIZE OF EXISTING WOOD PLANKS AND PROVIDE NEW HARDWARE.
3. REPLACE ALL FASTENERS WITH STAINLESS STEEL HARDWARE TO MATCH SIZE AND TYPE OF EXISTING.

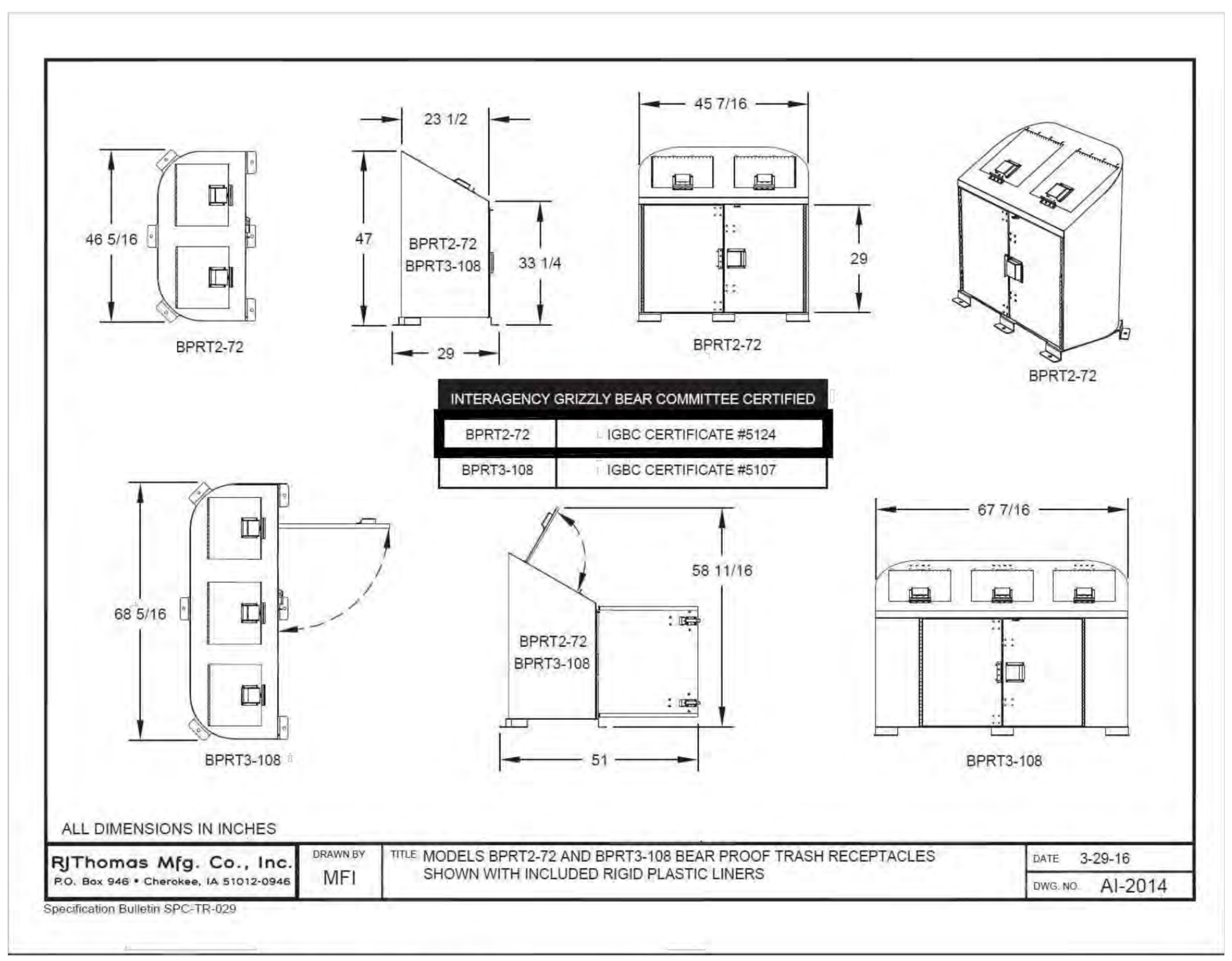


3 L5.1

CUSTOM SKI LIFT BENCH

SCALE: NTS

UTILIZE EXISTING SKI LIFTS, CHAIRS PROVIDED BY OWNER - RE-PAINT (POWDER COAT) AND REPLACE WOOD SEAT

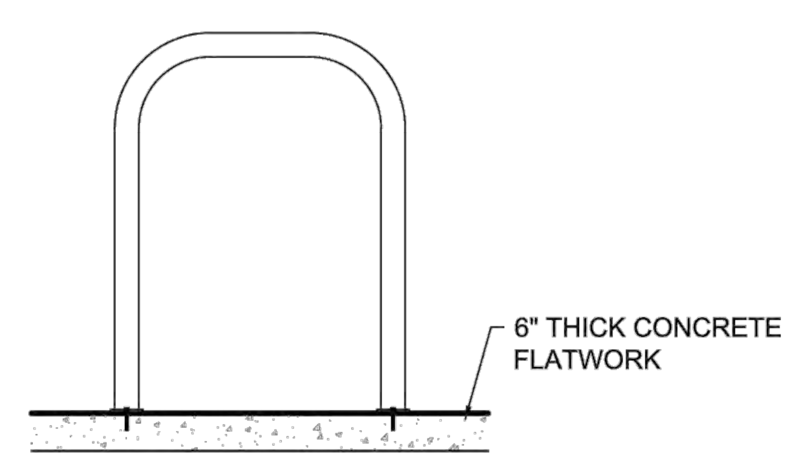


4 L5.1

BEAR SAFE TRASH RECEPTACLE

SCALE: NTS

BPRT3/CUT-108
MANUFACTURER: PILOT ROCK
DISTRIBUTOR: PILOT ROCK
PHONE: 800-762-5002



ELEVATION

NOTES:
1. BIKE RACK (MADRAX #UX238-P), SURFACE MOUNTED, SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
2. COORDINATE WITH OWNER ON EXACT LOCATION.
3. COLOR: BLACK

5 L5.1

BIKE RACK

SCALE: NTS

811 Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆ Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

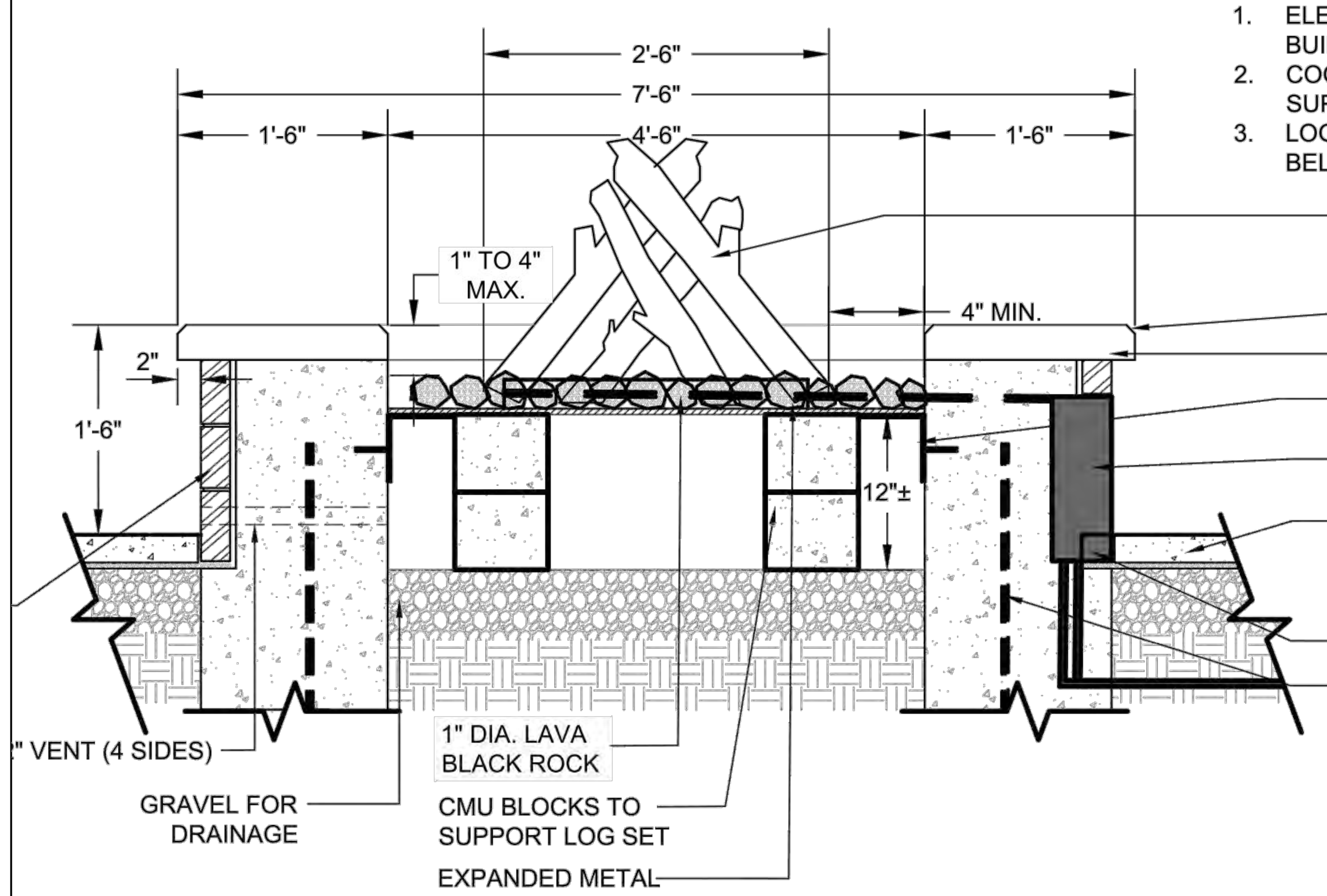
DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

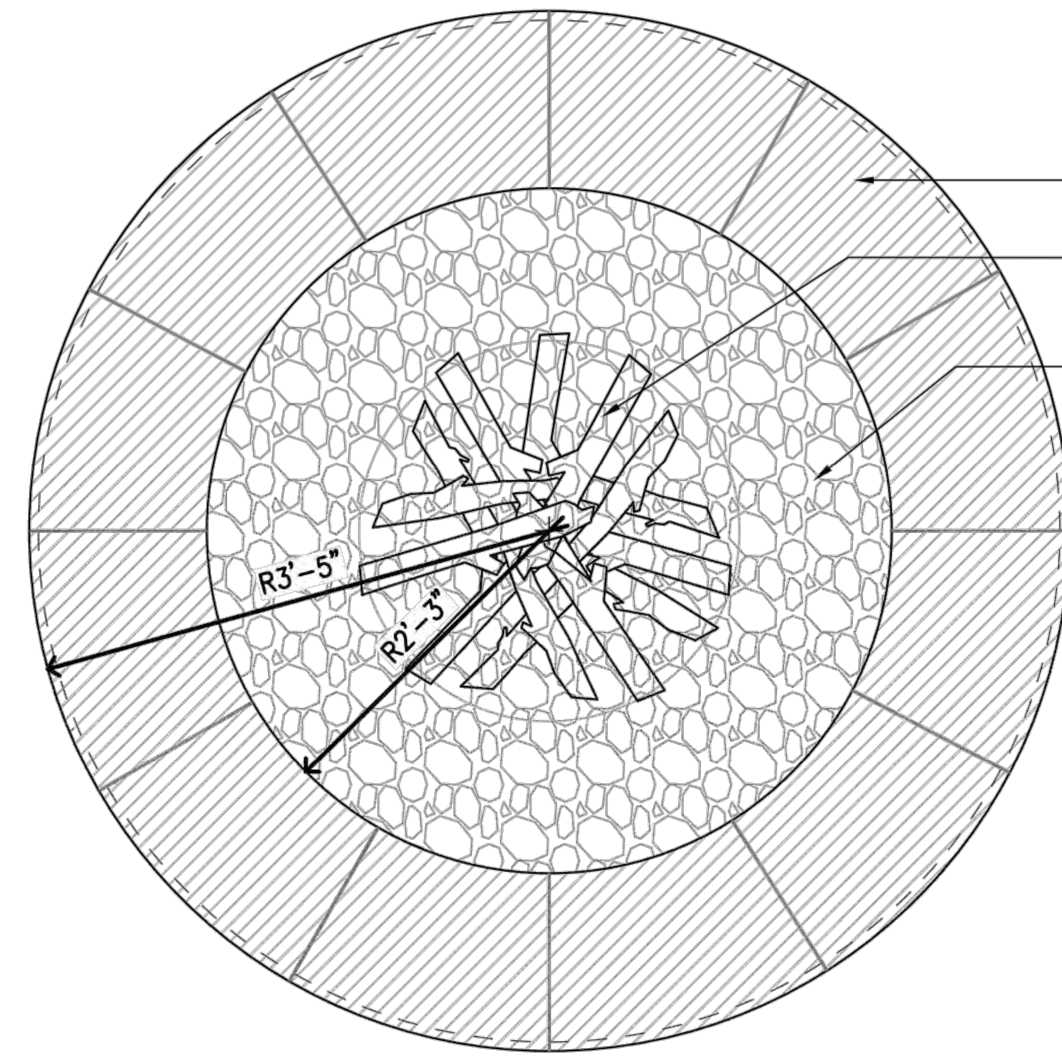
SITE DETAILS

L5.1

PLAN

NOTE:
1. ELECTRICAL TO PROVIDE TIMER IN RESTROOM BUILDING TO CONTROL ON/OFF OF FIRE PIT.
2. COORDINATE IGNITION SYSTEM WITH LOG SUPPLIER.
3. LOGS TO BE WELDED/ SECURED TO METAL PAN BELOW TO PREVENT REMOVAL.



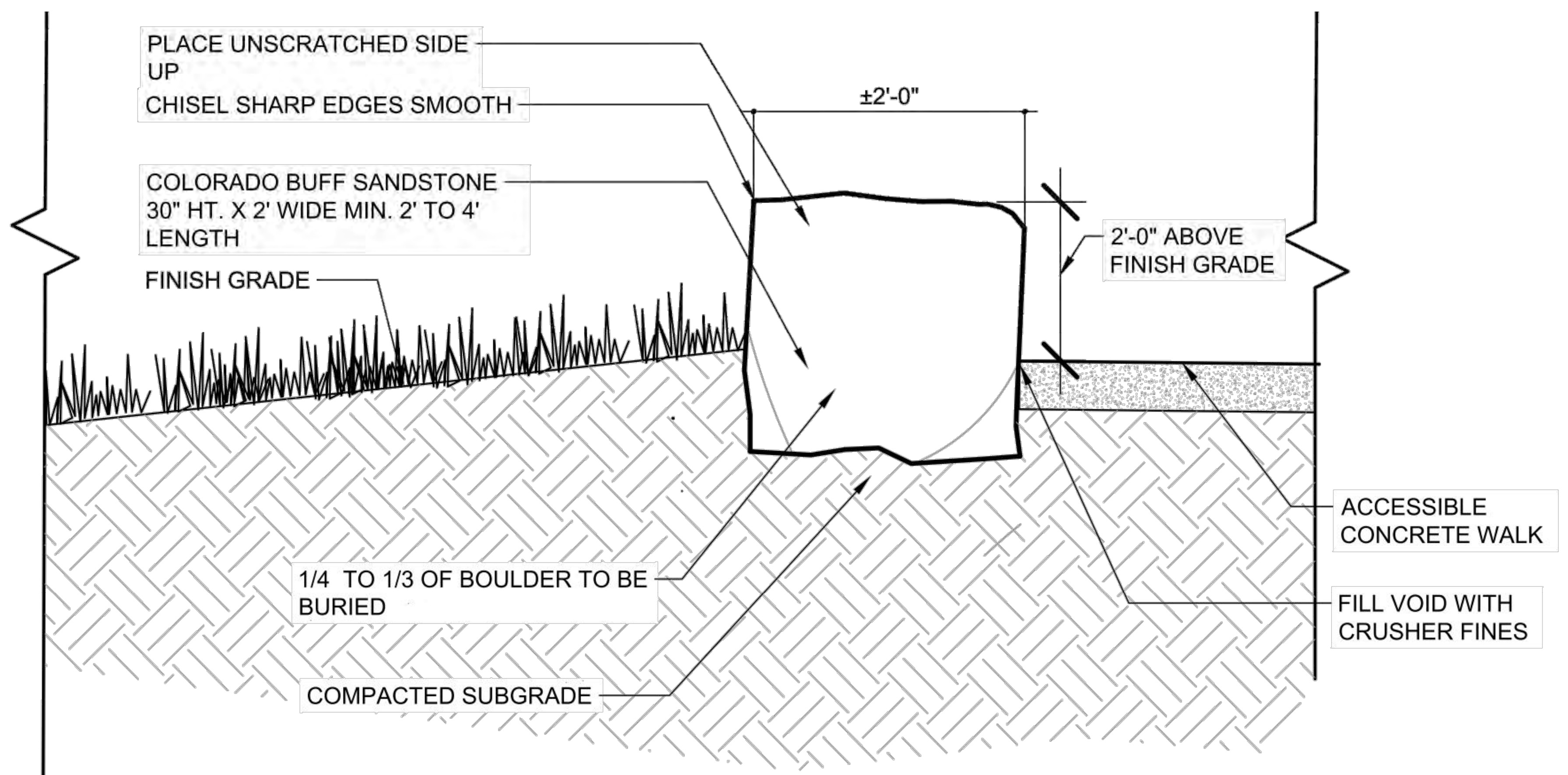


PLAN

STEEL LOG - CAMPFIRE SERIES C-3600 PINE
WEBSITE: https://www.steelog.com/pine-series
NOTE:

1 L5.2 FIRE PIT

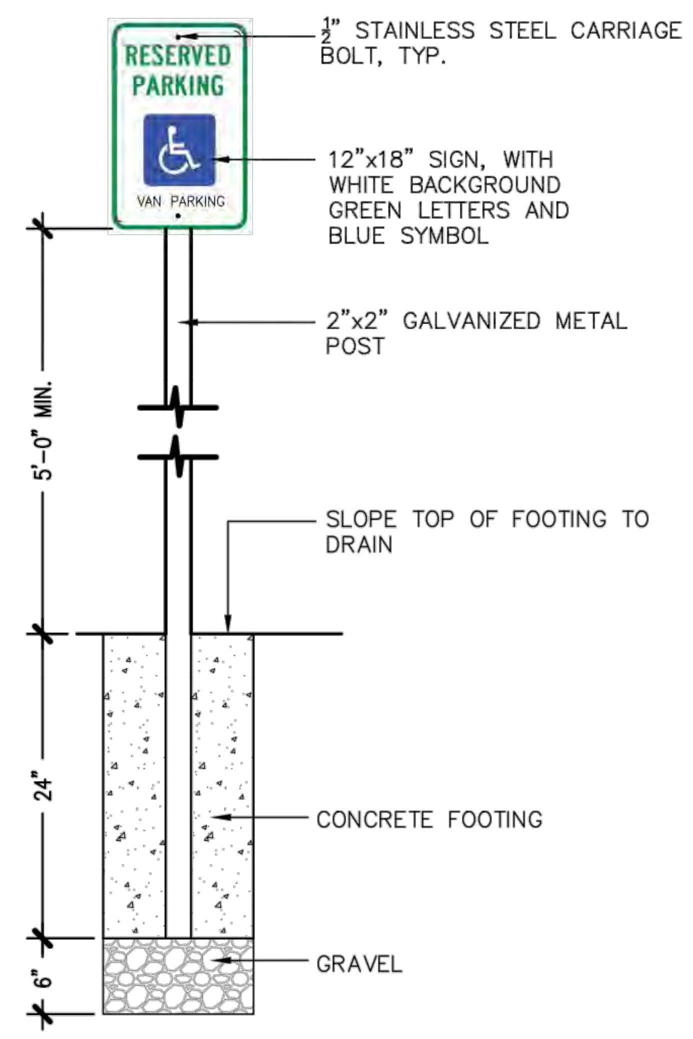
SCALE: NTS



NOTE: CONTRACTOR TO CUT AND CHISEL EDGES OF STONE TO FORM RADIUS OF WALL AS SHOWN ON PLANS. FORM TIGHT FIT BETWEEN STONES 1" MAX. GAP.

2 L5.2 STONES SEAT WALL

SCALE: NTS



3 L5.2 ACCESSIBLE PARKING SIGN

SCALE: NTS

811
Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

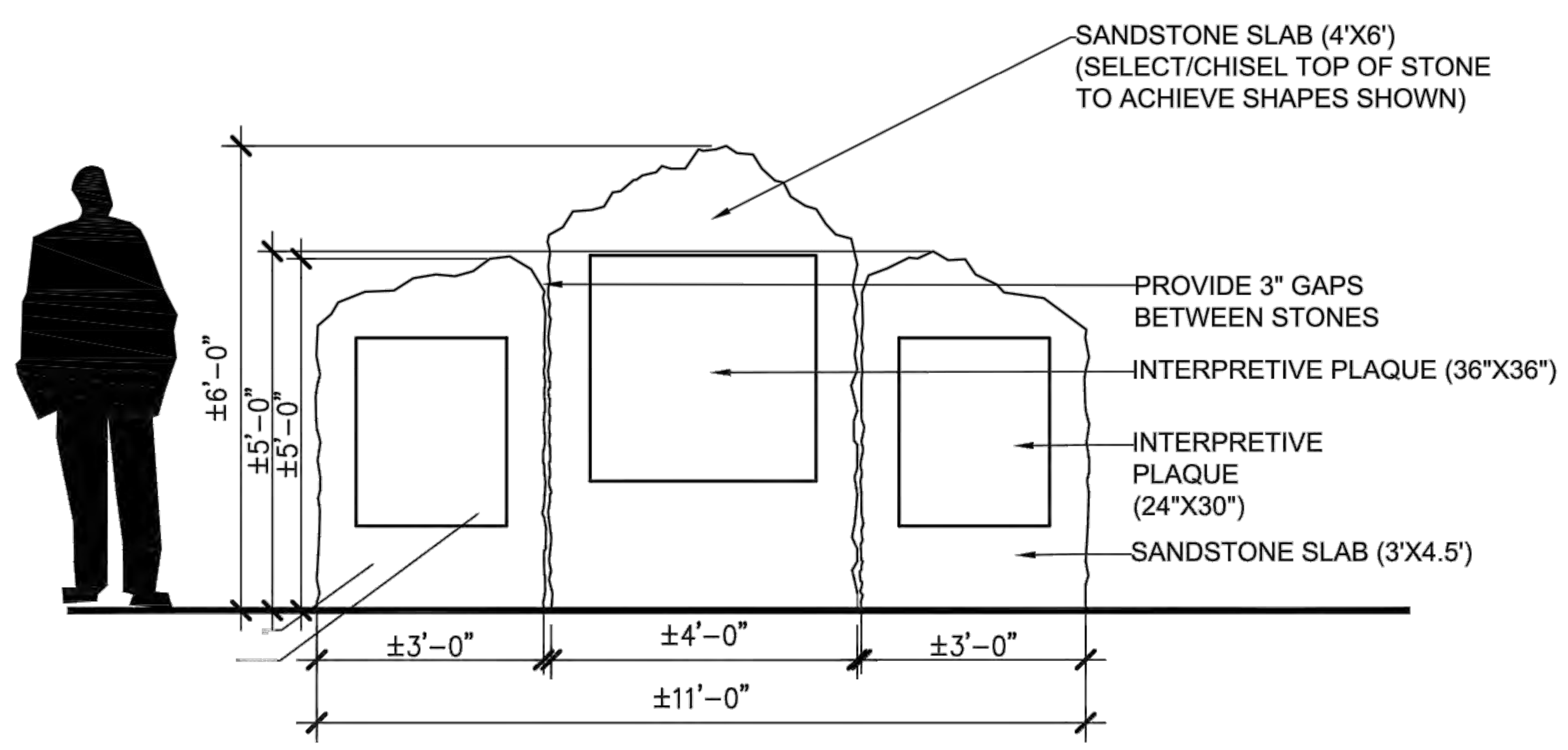
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

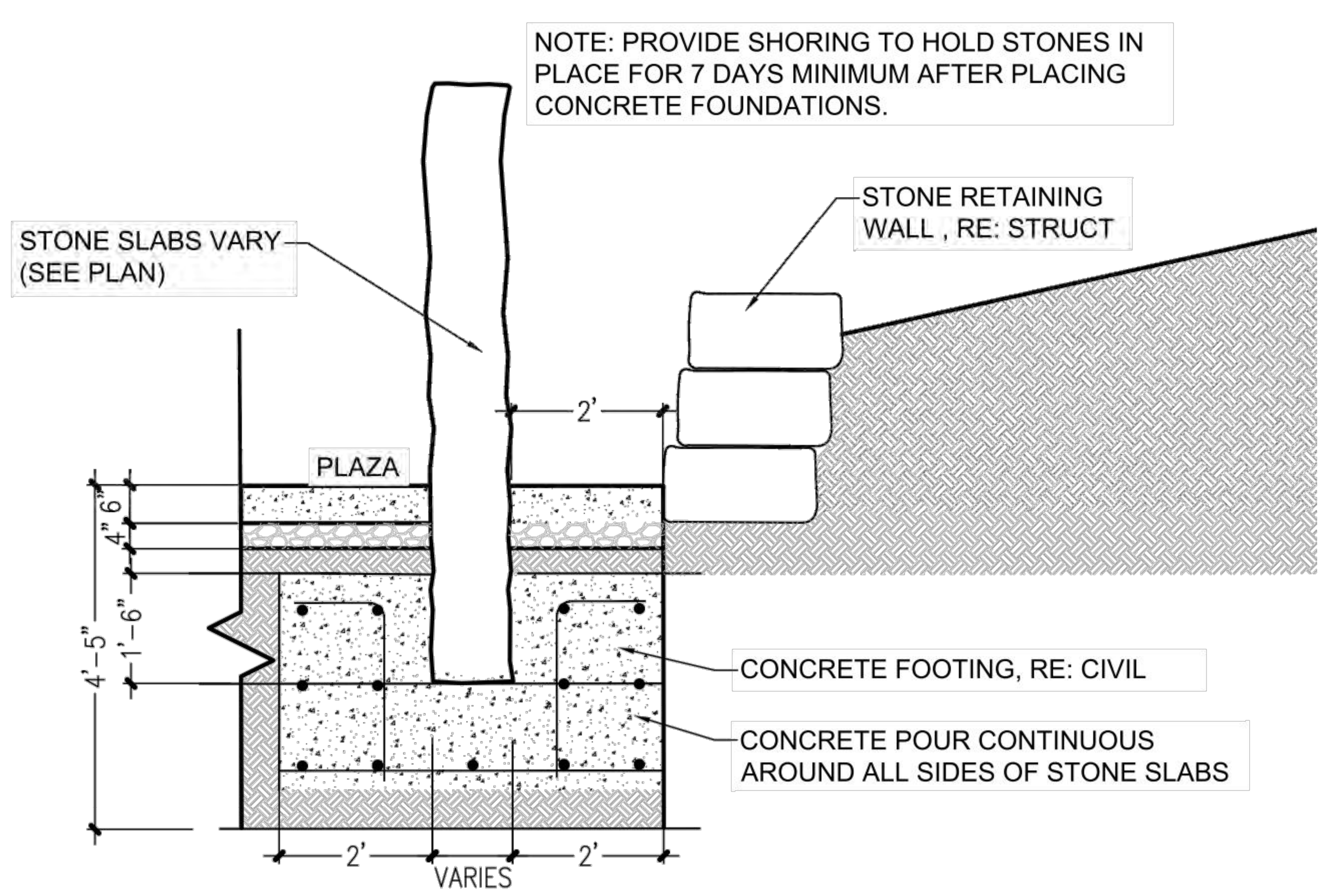
DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

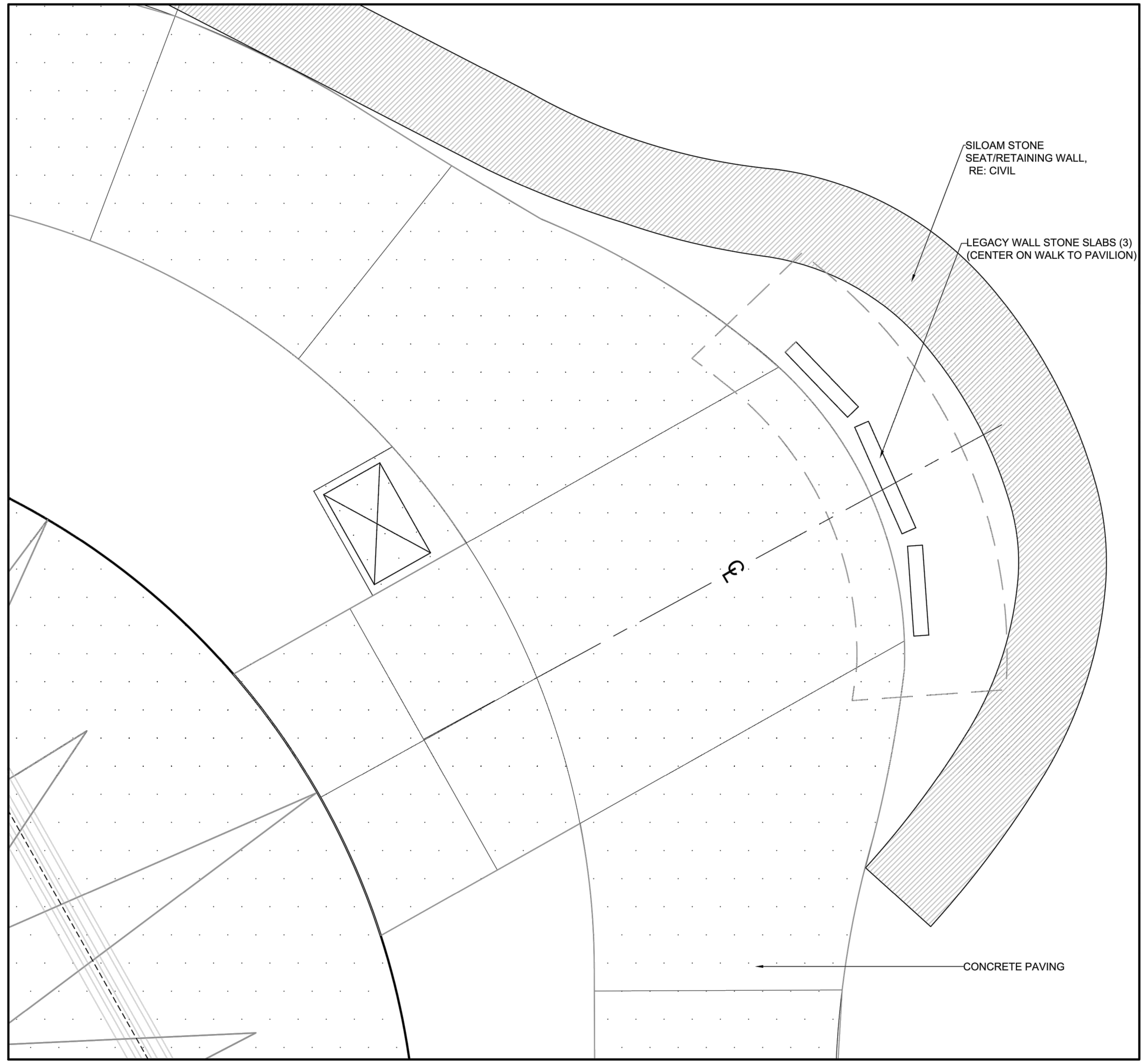
L5.2



ELEVATION



SECTION



PLAN

1 L5.3 LEGACY WALL

SCALE: 1" = 2'-0"

VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

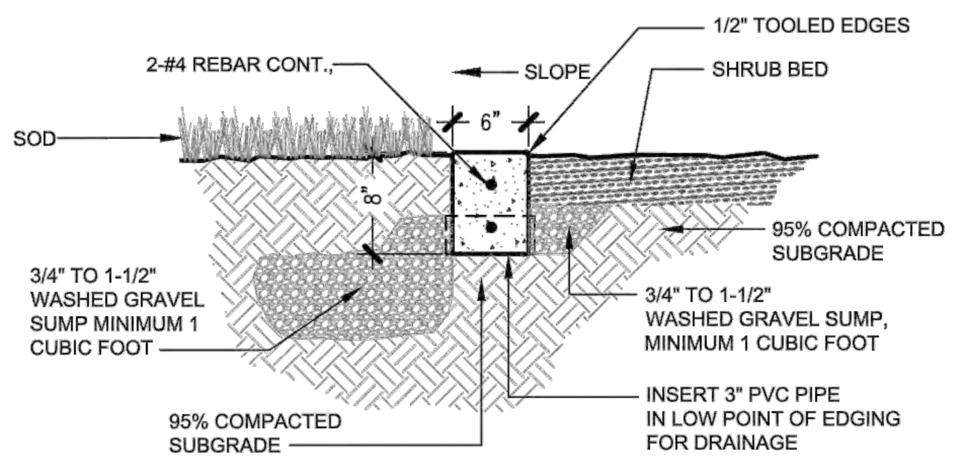
SITE
DETAILS

L5.3

811
Know what's below.
Call before you dig.
or www.UNCC2.org

CONCRETE EDGE:

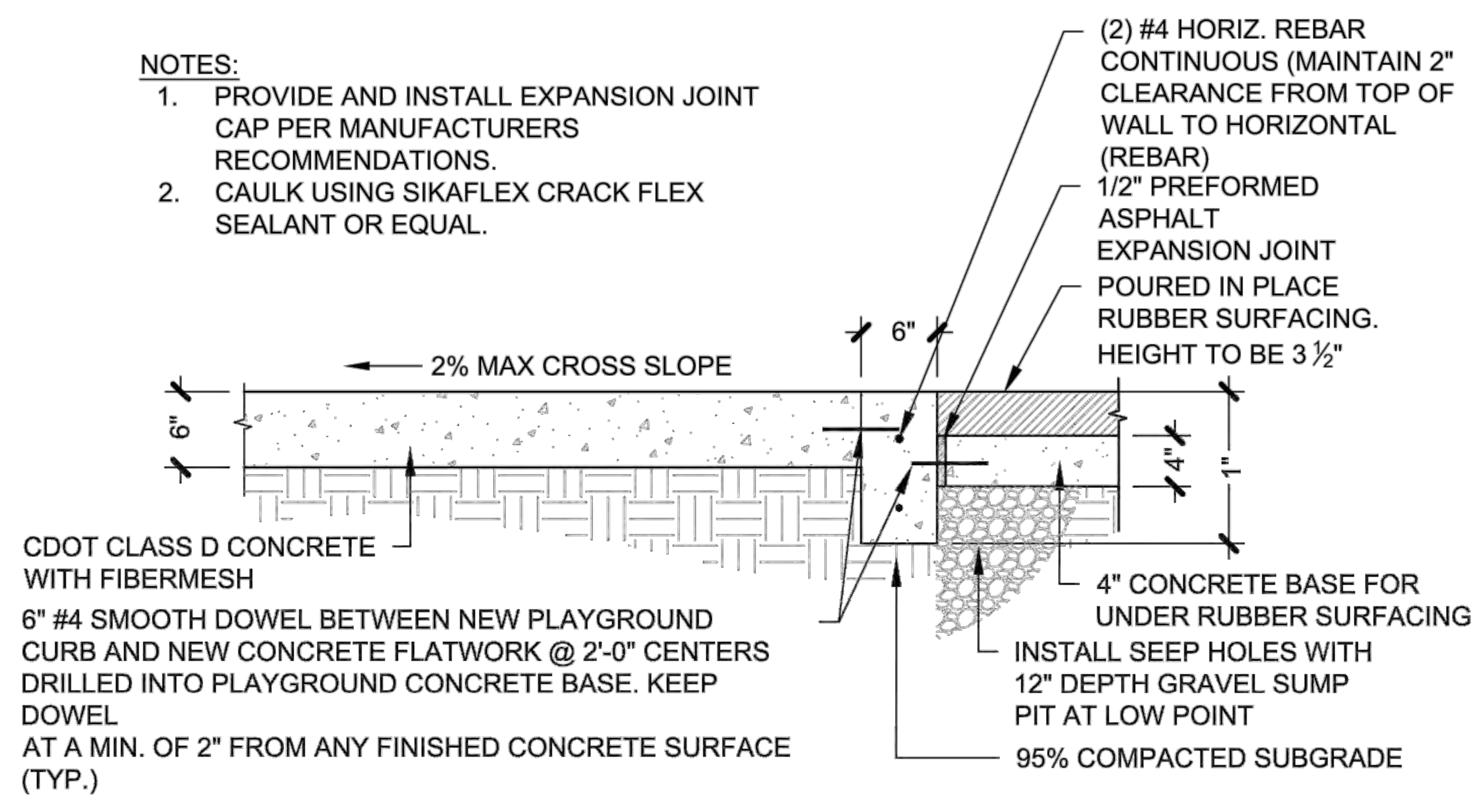
1. 4000 PSI CONCRETE BAND WITH FIBERMESH.
2. PROVIDE CONTROL JOINTS AT 3'-0" O.C.
3. ALL REBAR TO BE EPOXY COATED
4. ALL CONCRETE EDGER (LANDSCAPE) COLOR TO BE GRAY
5. CONCRETE EDGER IS TO BE CONSTRUCTED ONLY WHERE NOTED ON PLANS



1 L5.4 CONCRETE EDGER

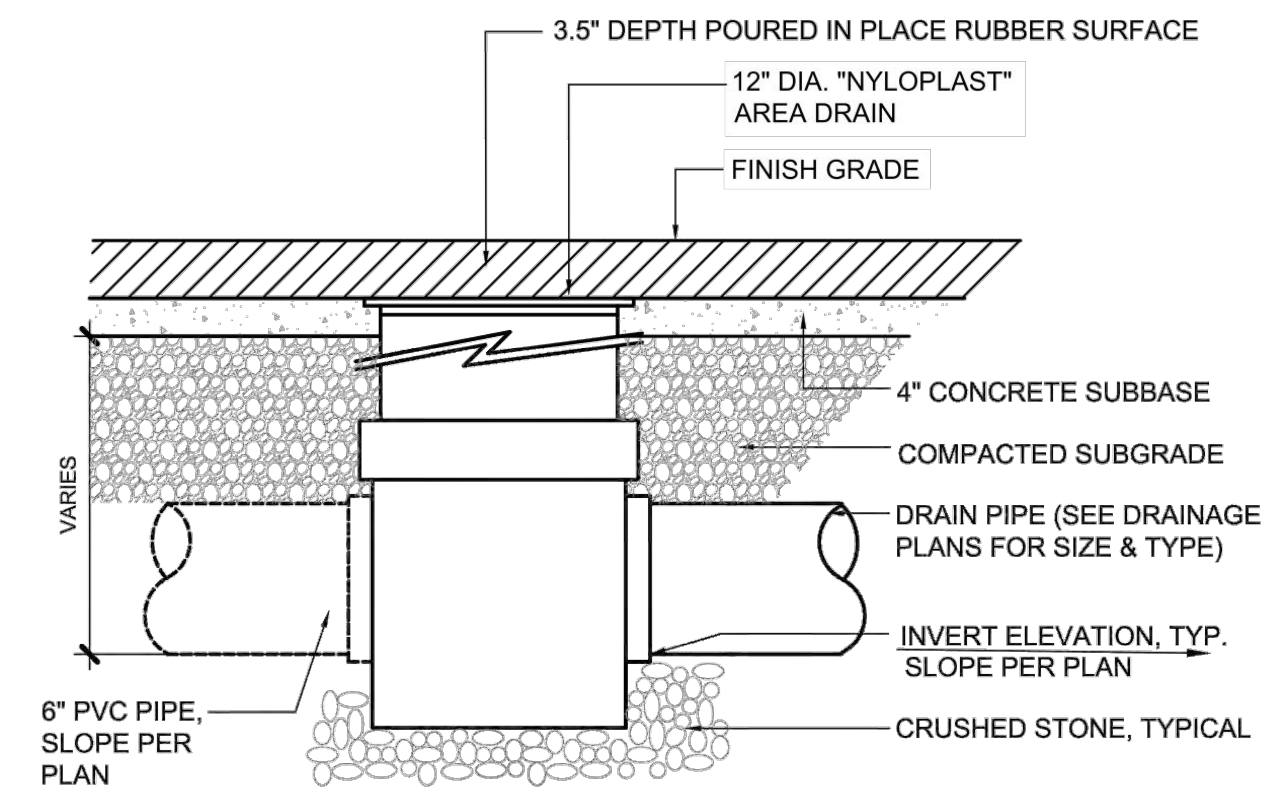
SCALE: NTS

NOTES:
1. PROVIDE AND INSTALL EXPANSION JOINT CAP PER MANUFACTURERS RECOMMENDATIONS.
2. CAULK USING SIKAFLEX CRACK FLEX SEALANT OR EQUAL.



2 L5.4 PLAYGROUND CURB WITH RUBBER PLAY SURFACE

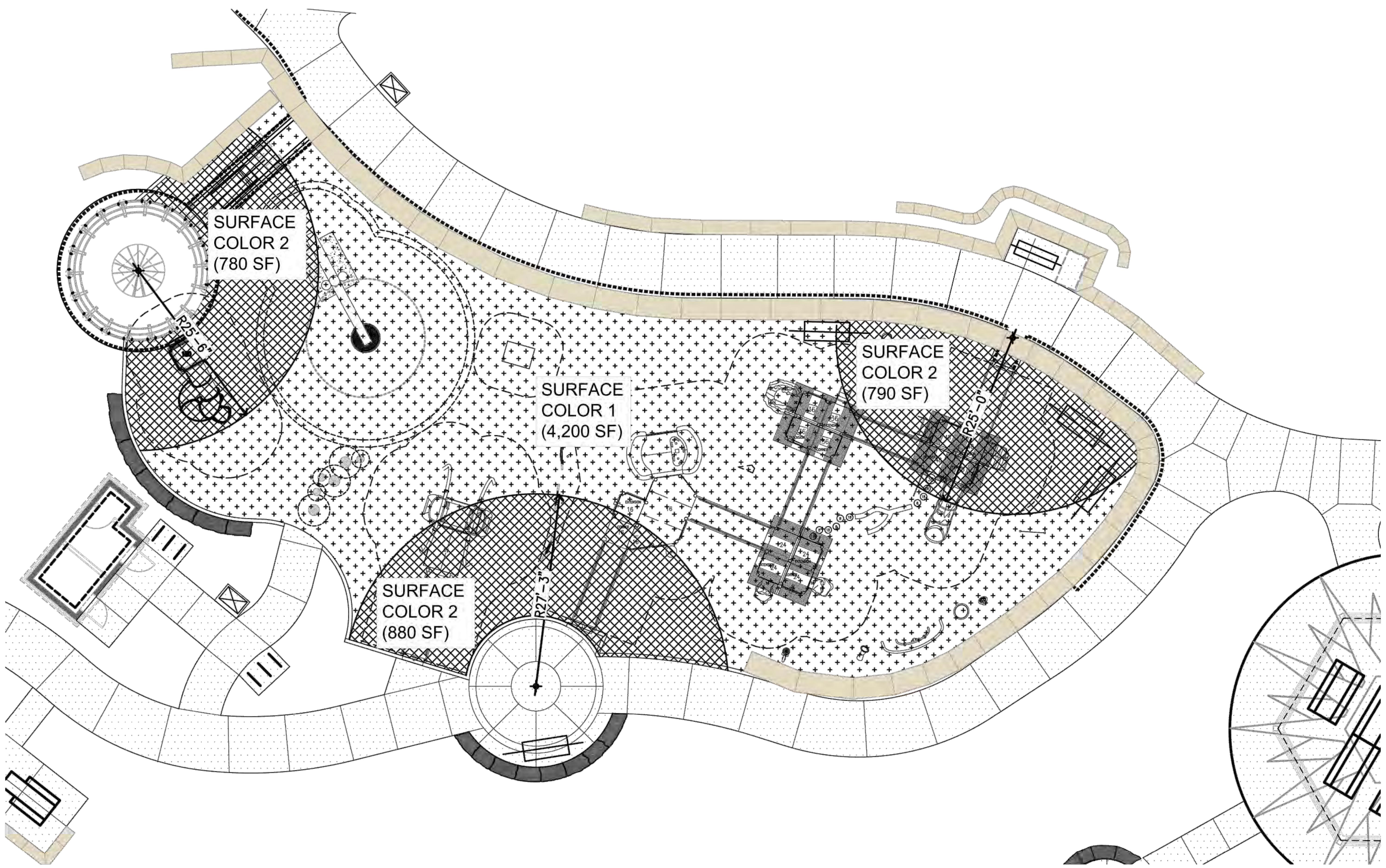
SCALE: NTS



3 L5.4 AREA DRAIN AT PLAYGROUND

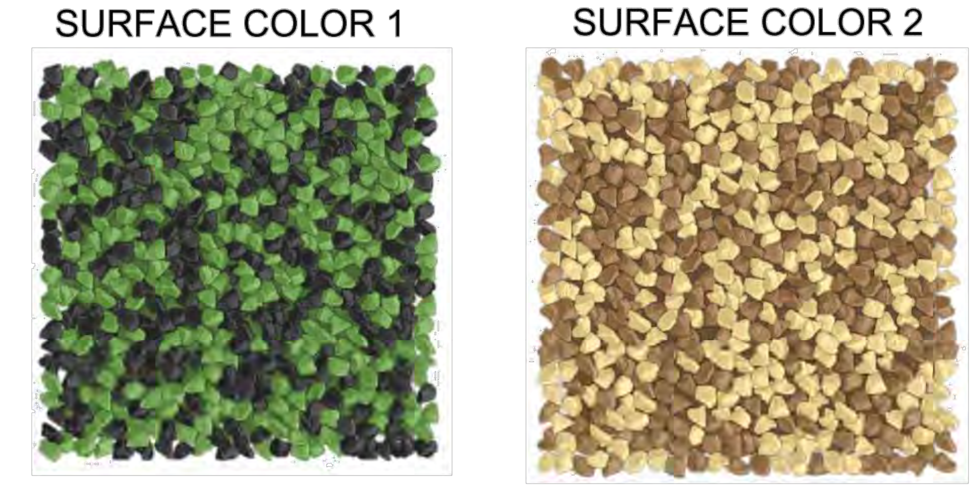
(COORDINATE WITH CIVIL UNDERDRAIN LAYOUT)

SCALE: NTS



SURFACE COLOR 1

SURFACE COLOR 2



LEGEND

	SURFACE COLOR 1 (50% BLACK & 50% BRIGHT GREEN)
	SURFACE COLOR 2 (50% BROWN & 50% EGGSHELL)

4 L5.4 POURED IN PLACE PLAYGROUND SURFACE COLOR

SCALE: 1" = 10'-0"

811. Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

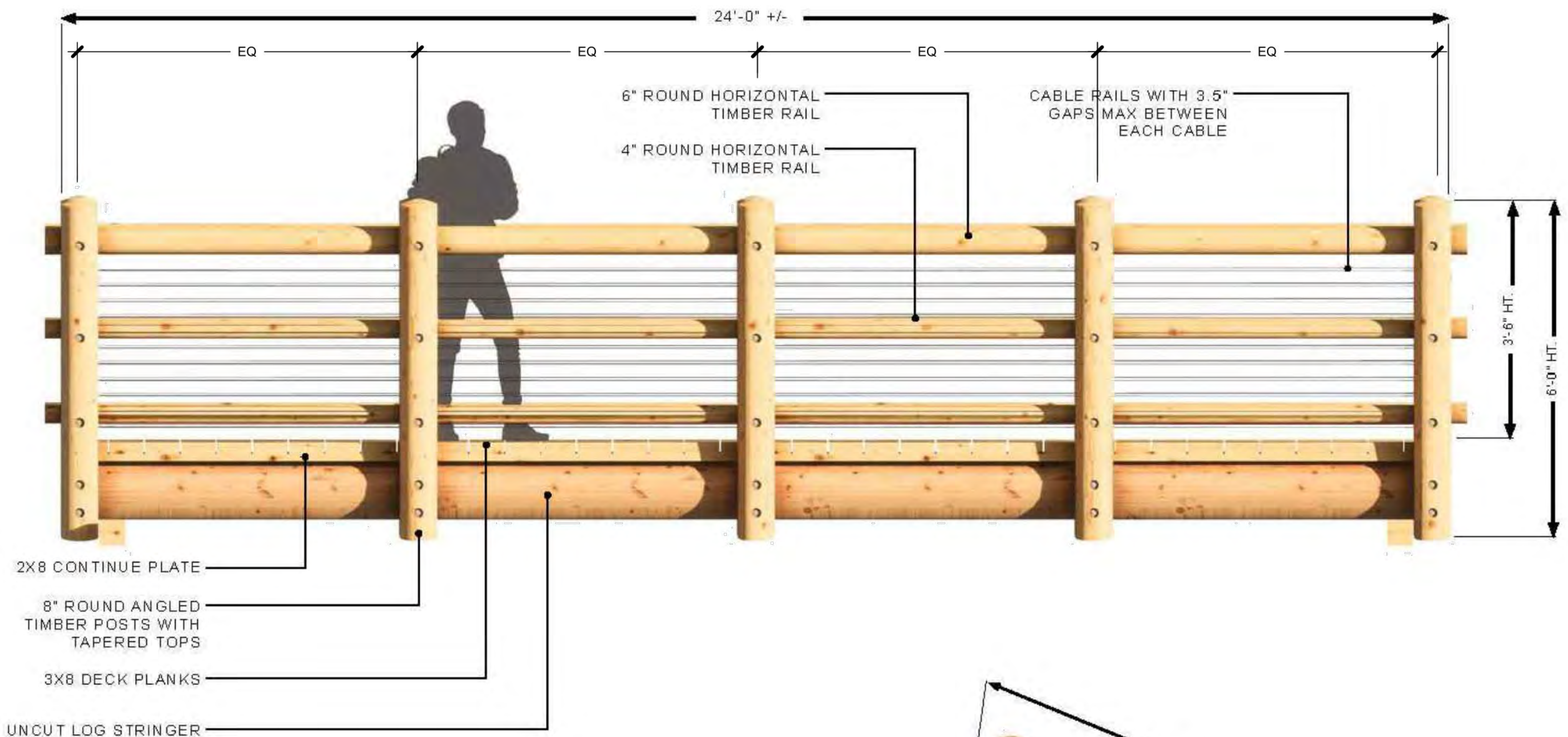
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

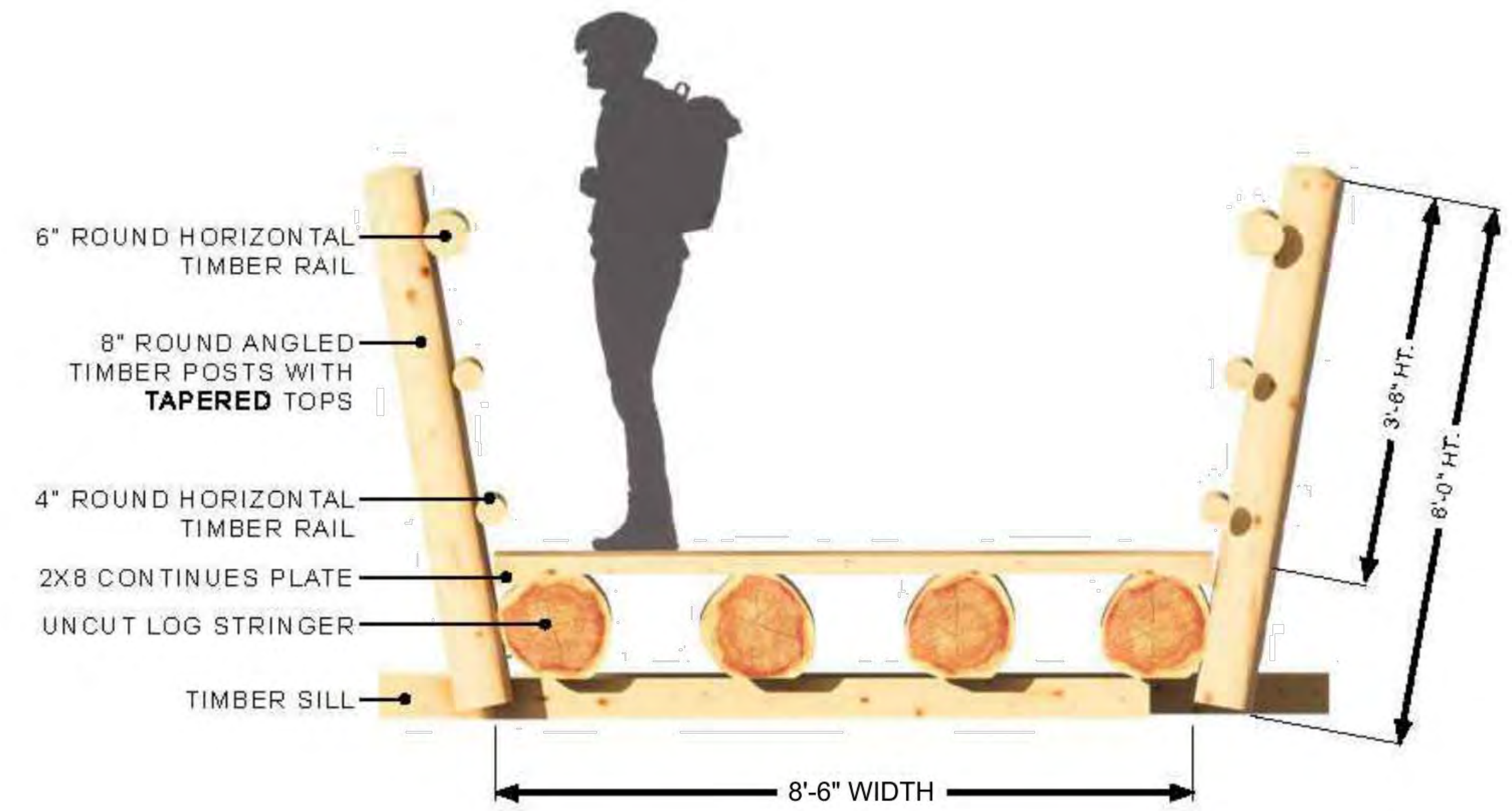
RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

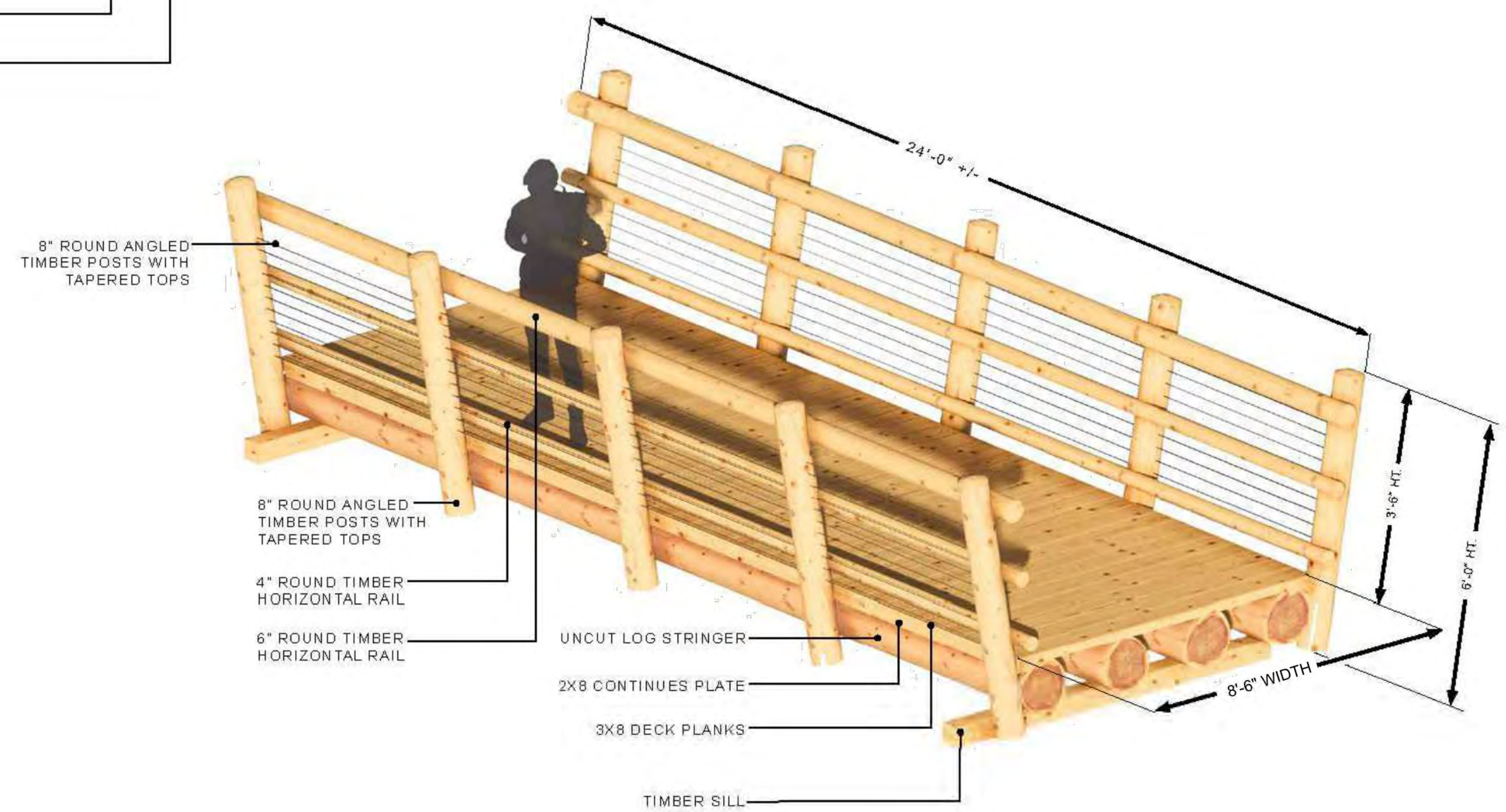
SITE DETAILS

L5.4





NOTE: REFER TO STRUCTURAL FOR BRIDGE DECK AND ABUTMENT WALL DETAILS.



DHM DESIGN

1
L5.5

BRIDGE

SCALE: NTS

811
Know what's below.
Call before you dig.
or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

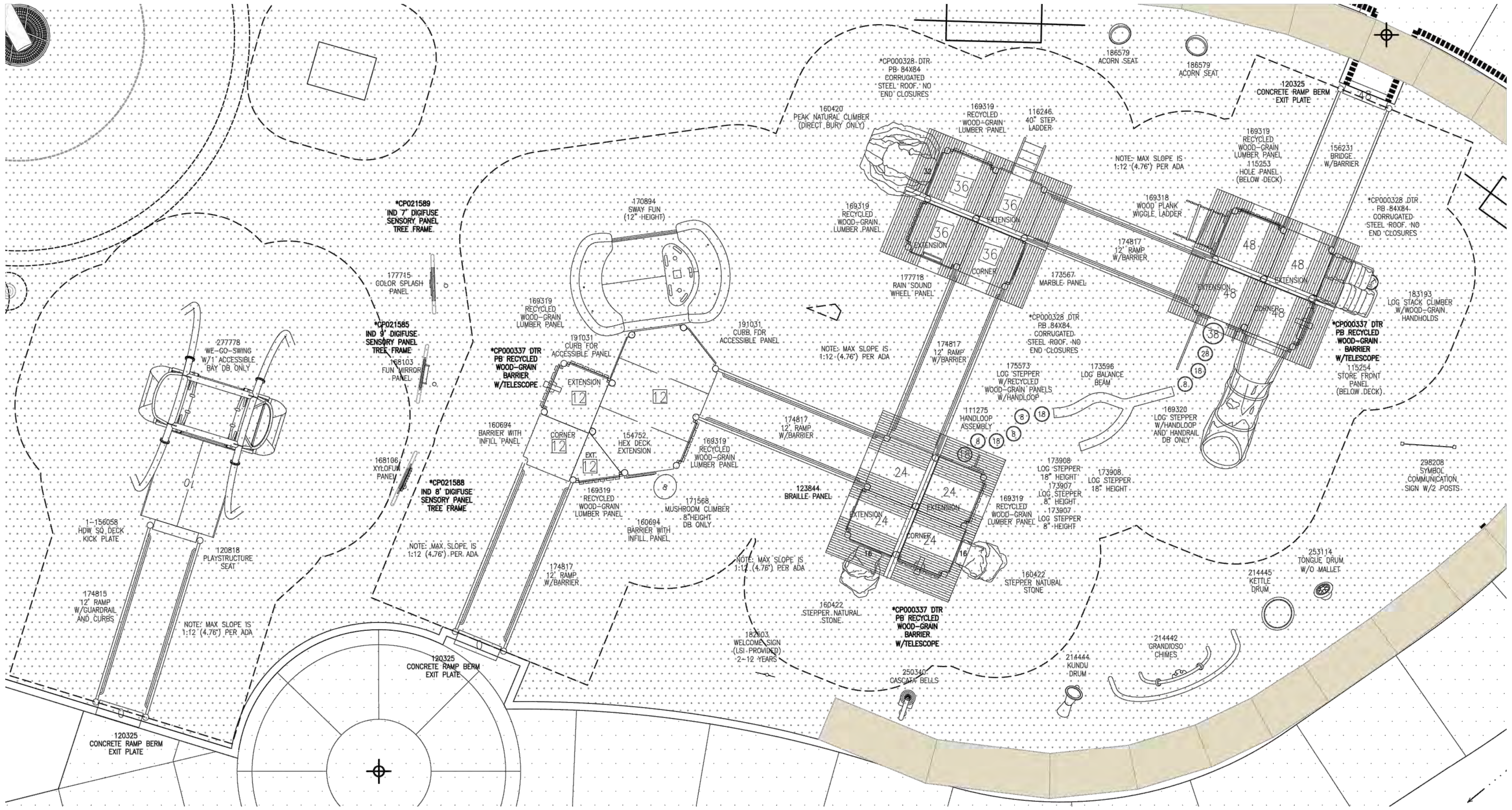
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

L5.5



CASCATA BELLS

GRANDIOSO CHIMES

1
L5.6

LOG THEME PLAYGROUND

ALL INCLUSIVE PLAYGROUND BY LANDSCAPE STRUCTURES INC.

SCALE: NTS

811 Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

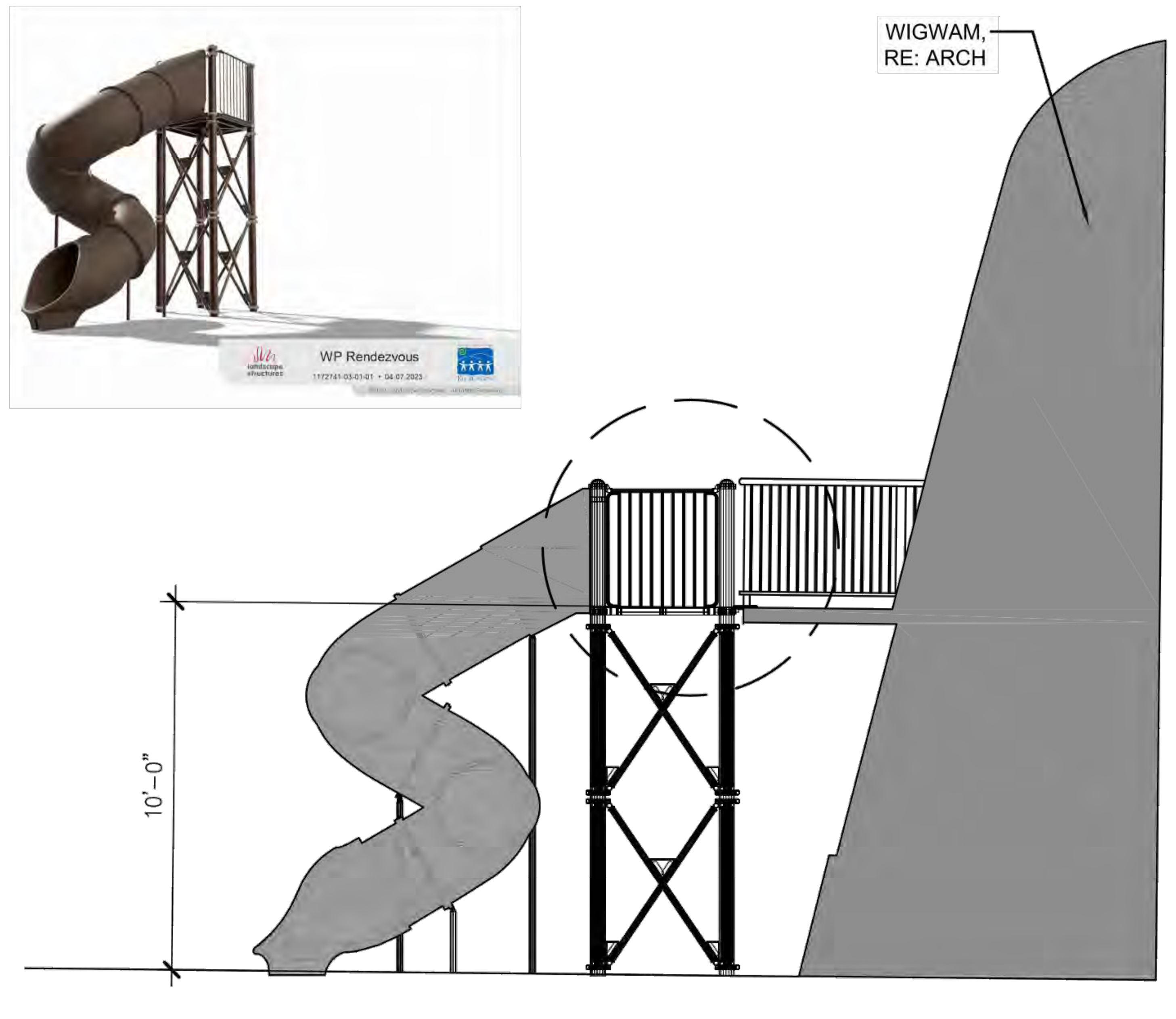
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

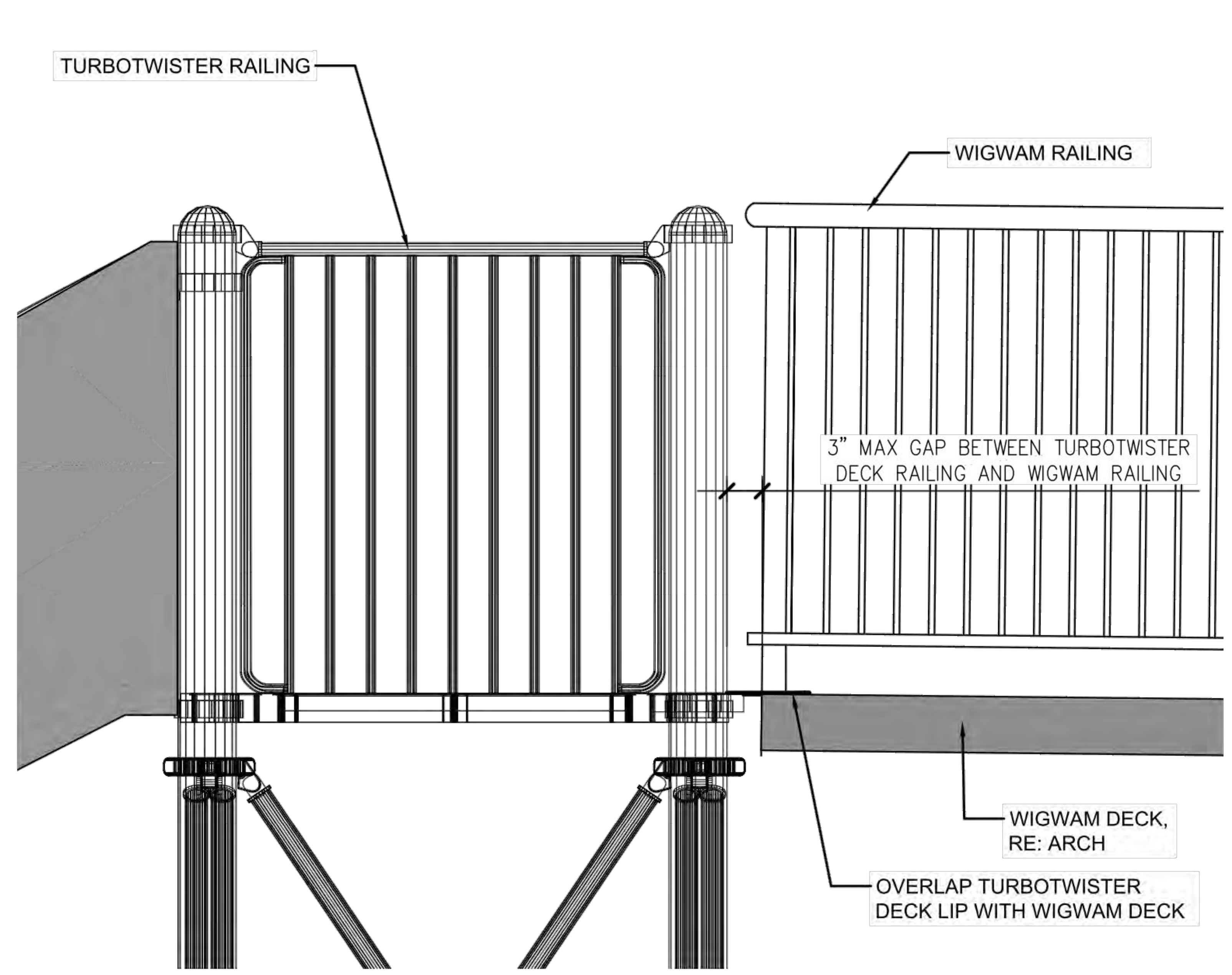
DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

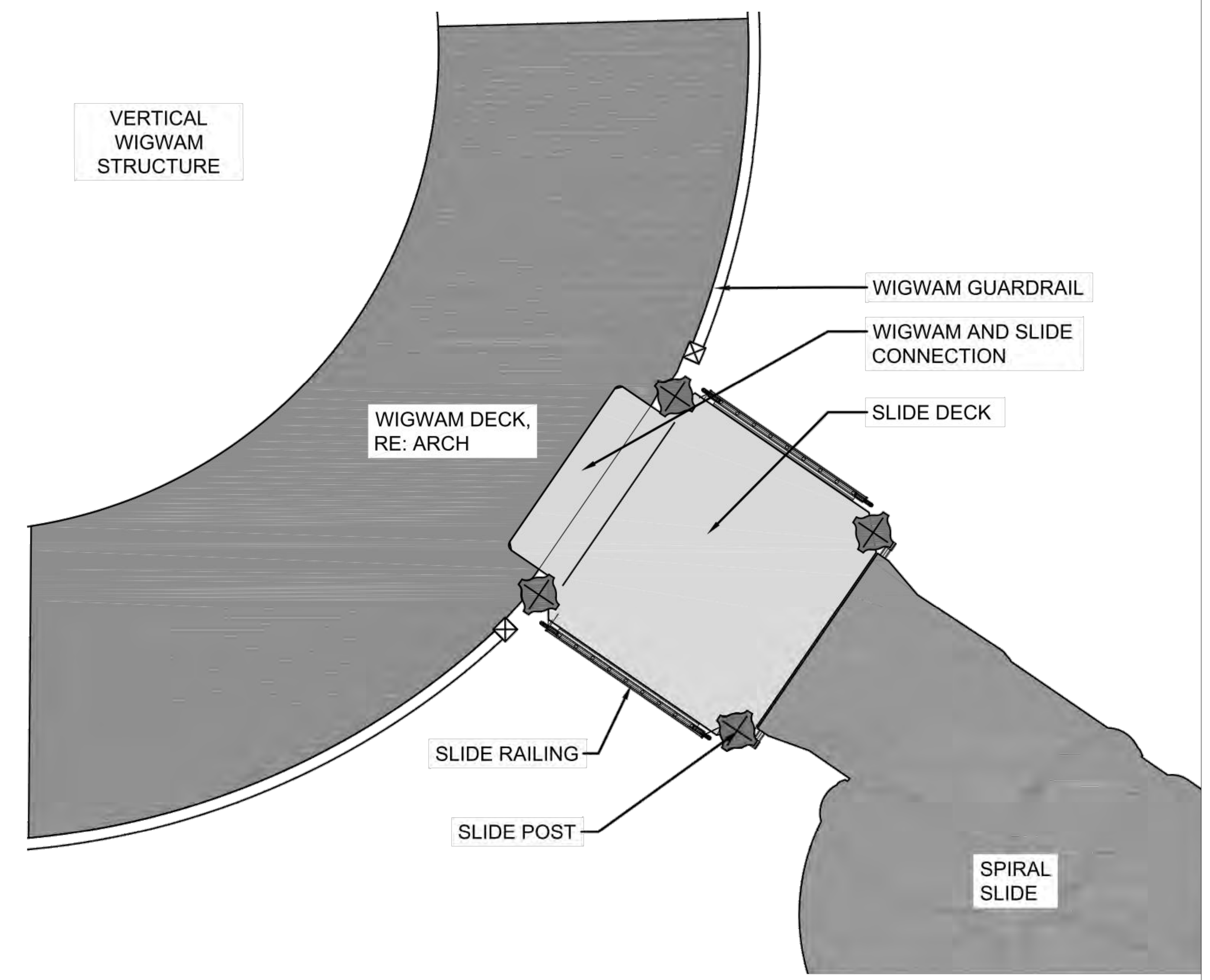
L5.6



SECTION



SECTION ENLARGEMENT

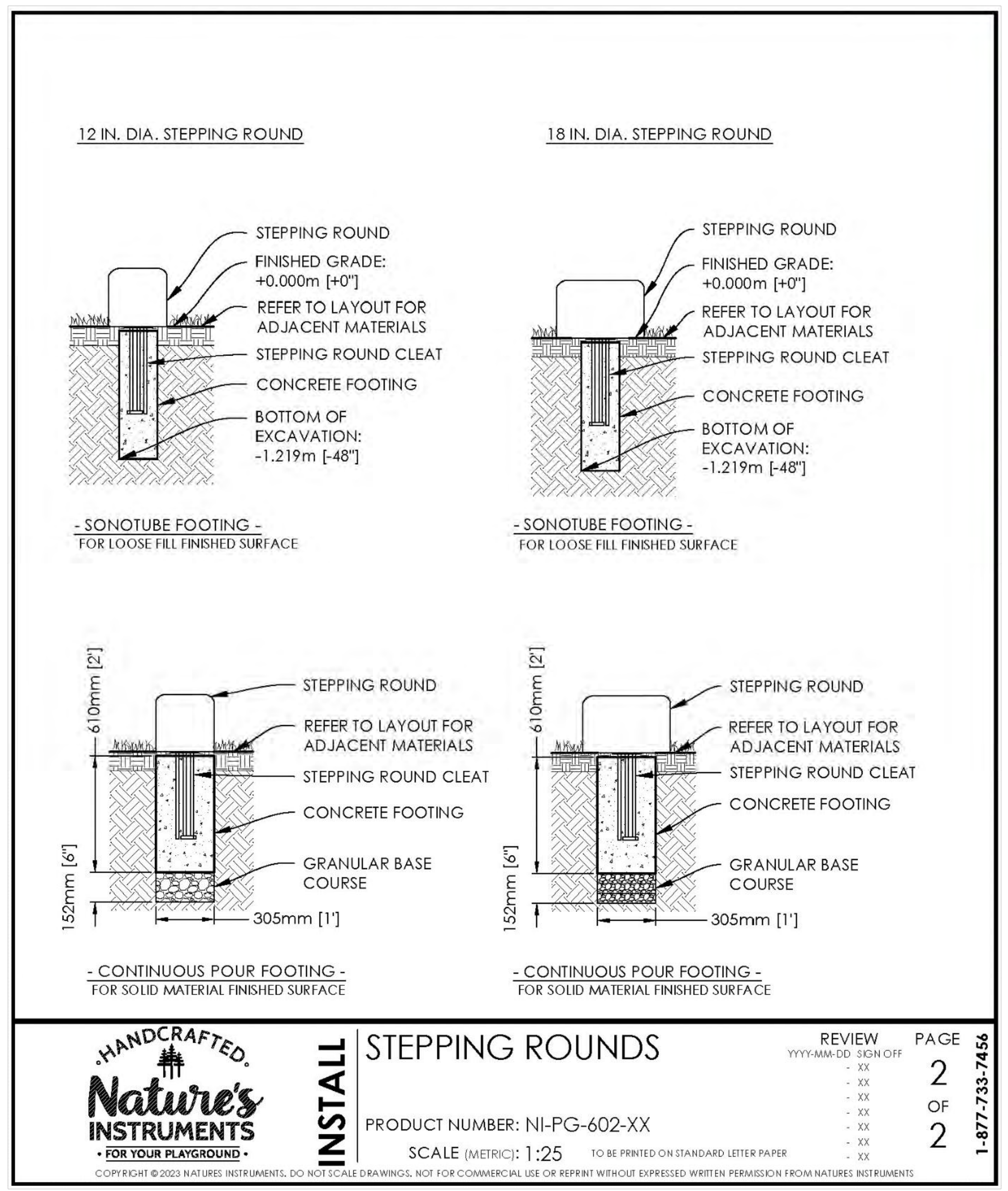


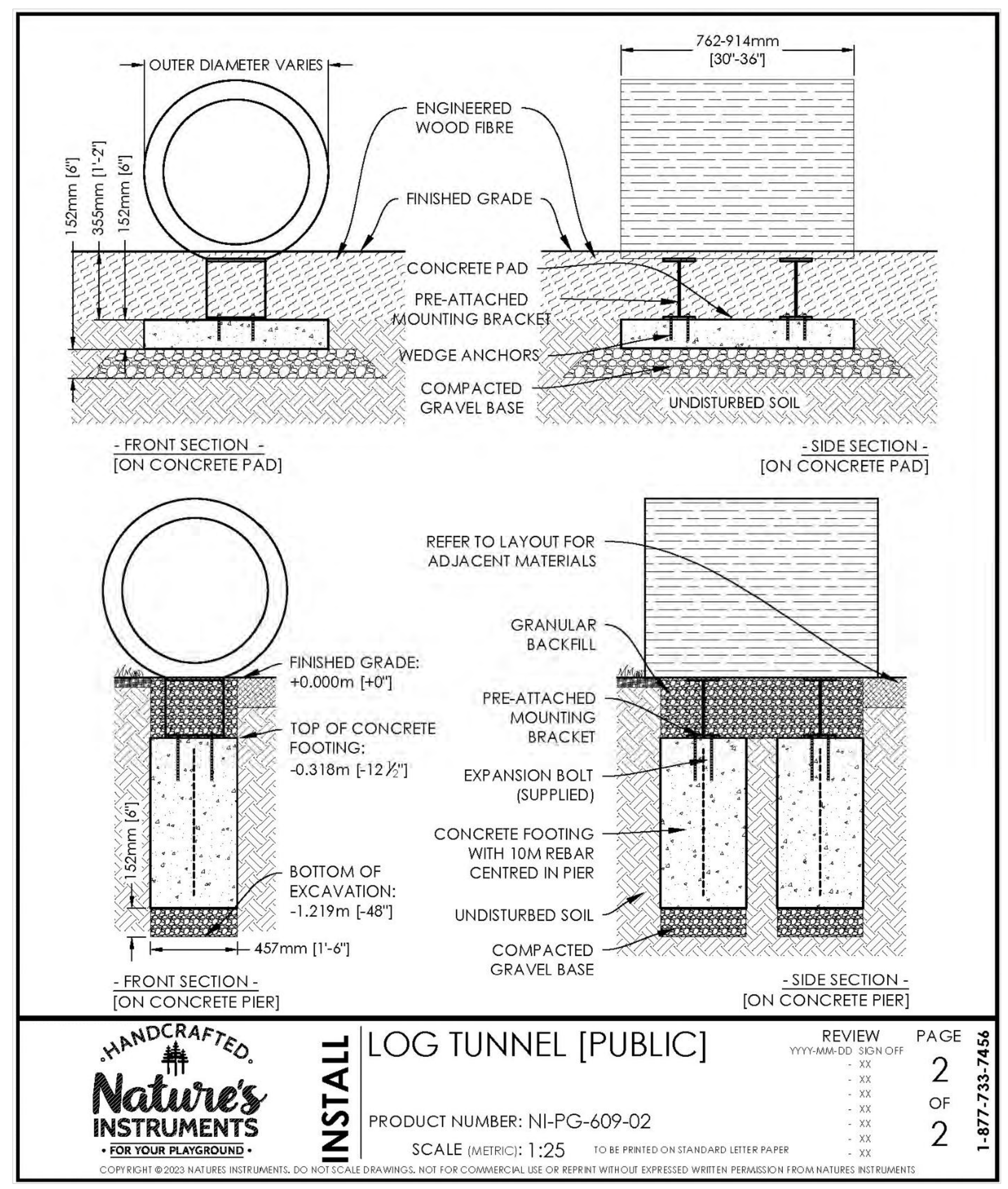
PLAN VIEW

1 L5.7 10' TOWER TURBOTWISTER

MANUFACTURER: LANDSCAPE STRUCTURES
CONTACT: EVAN BAER PHONE: 303.909.7471

SCALE: NTS





2 L5.7 STEPPING ROUNDS

MANUFACTURER: NATURE'S INSTRUMENTS
CONTACT: SALES@NATURESINSTRUMENTS.COM
PHONE: 1.877.733.7456
MATERIAL: SOLID HARDWOOD

SCALE: NTS

3 L5.7 LOG TUNNEL

MANUFACTURER: NATURE'S INSTRUMENTS
CONTACT: SALES@NATURESINSTRUMENTS.COM
PHONE: 1.877.733.7456
MATERIAL: SOLID HARDWOOD LOG

SCALE: NTS

811 Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 • (303) 893-4288

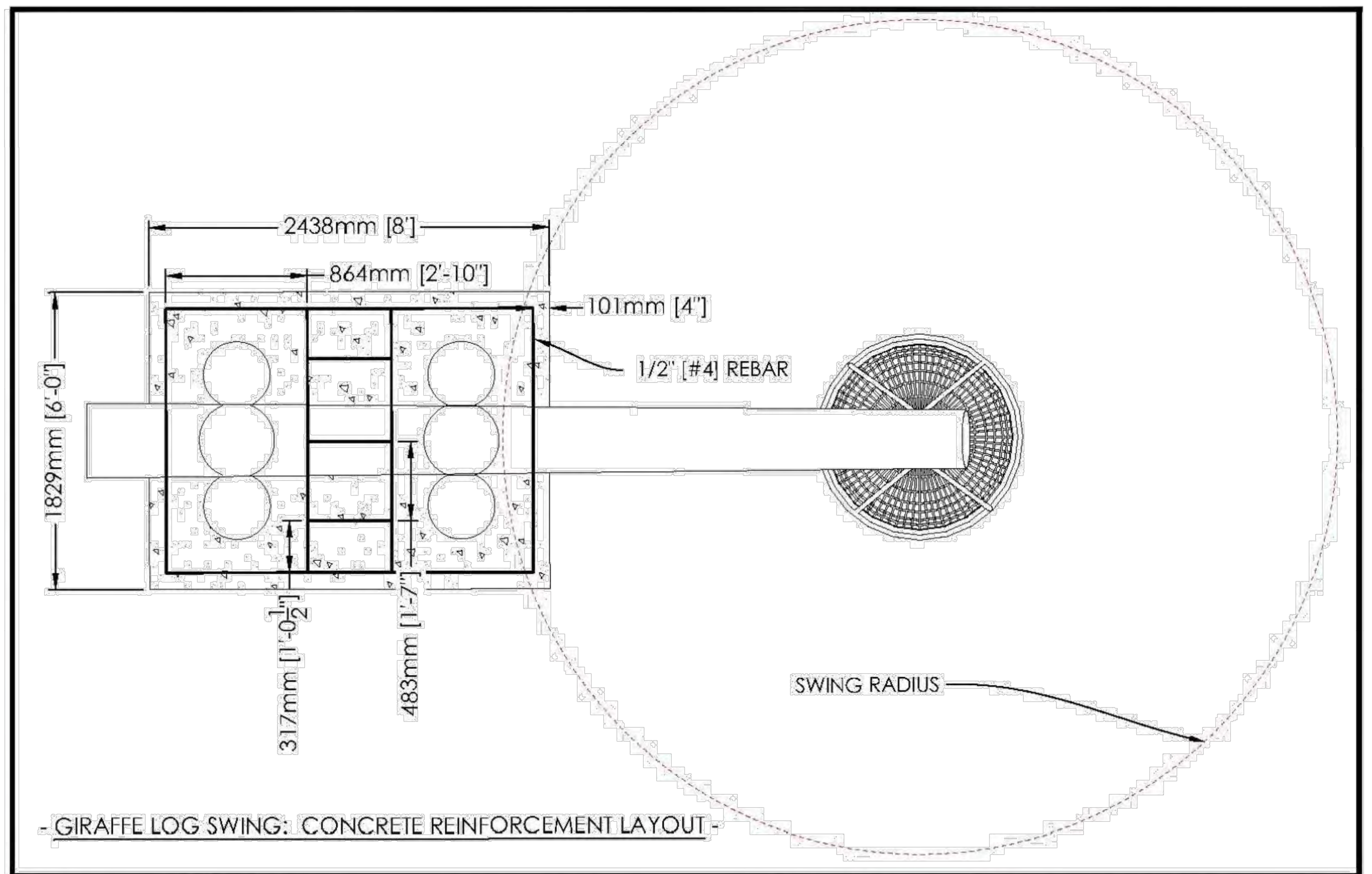
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

L5.7



- GIRAFFE LOG SWING: CONCRETE REINFORCEMENT LAYOUT -

HANDCRAFTED Nature's INSTRUMENTS • FOR YOUR PLAYGROUND • | INSTALL | LOG FRAME OMNI BASKET SWING: GIRAFFE BASKET | PRODUCT NUMBER: NI-PG-809-04 | SCALE (METRIC): 1:40 | TO BE PRINTED ON STANDARD LETTER PAPER | REVIEW YYYY-MM-DD SIGN OFF | PAGE 7 OF 8 | 1-877-733-7456

COMPONENTS

NATURE'S INSTRUMENTS NI-PG-809-04 GIRAFFE LOG SWING PACKAGE INCLUDES THE FOLLOWING:

1 @ 5379mm [17'-7 ¾"] HORIZONTAL SWING BEAM
2 @ LOG COLUMNS (2 SETS OF 3 LOGS) WITH PRE-ATTACHED CLEATS
1 @ NEST SWING WITH HARDWARE
4 @ STEEL ANGLE IRONS
2 @ THREADED ROD (1 ½" x 36") HOT DIP GALVANIZED
2 @ 38mm [1-1/2"] S.S NUT AND WASHER
~ @ TWO-PART EPOXY
2 @ HARDWOOD PLUGS

REQUIRED MATERIALS NOT INCLUDED:

- ALL FOOTING MATERIALS
- GRANULAR BASE COURSE
- CLEAR GRAVEL
- BACKFILL
- PROTECTIVE SAFETY SURFACING
- REBAR
- ADHESIVE

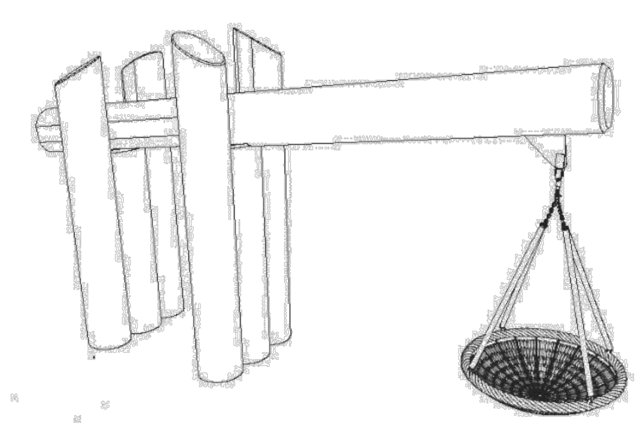
NOTES

1. THE SWING MUST HAVE A REQUIRED PROTECTIVE SAFETY ZONE IN ACCORDANCE WITH THE MOST CURRENT LOCAL PLAYGROUND STANDARD.
2. REVIEW CONSTRUCTION DOCUMENTS FOR ACTUAL SURFACE TYPE AND DEPTH. IF SAFETY SURFACE OTHER THAN EWF (ENGINEERED WOOD FIBRE) IS PROPOSED, PLEASE CONSULT WITH MANUFACTURER.

EXCAVATION

3. EXCAVATE PIT MIN. 2438mm [8'] x 1829mm [6'-0"] x 1676mm [5'-6"] DEEP. PIT DEPTHS MEASURED FROM SUBGRADE.
4. INSTALL COMPACTED GRANULAR BASE COURSE TO BE 305mm [12"] DEPTH CRUSHED GRAVEL (OR 19mm [3/4"] CLEAR GRAVEL). GRANULAR BASE TO FILL THE ENTIRE BOTTOM OF EXCAVATED HOLE.

IF DIMENSIONS ARE OFF CONTACT NATURE'S INSTRUMENTS WITH IMAGES OF THE INSTALLATION STEPS PRIOR TO MAKING ANY ADJUSTMENTS TO THE LOGS



- GIRAFFE LOG SWING: ISO VIEW -

HANDCRAFTED Nature's INSTRUMENTS • FOR YOUR PLAYGROUND • | INSTALL | LOG FRAME OMNI BASKET SWING: GIRAFFE BASKET | PRODUCT NUMBER: NI-PG-809-04 | SCALE (METRIC): 1:25 | TO BE PRINTED ON STANDARD LETTER PAPER | REVIEW YYYY-MM-DD SIGN OFF | PAGE 1 OF 8 | 1-877-733-7456

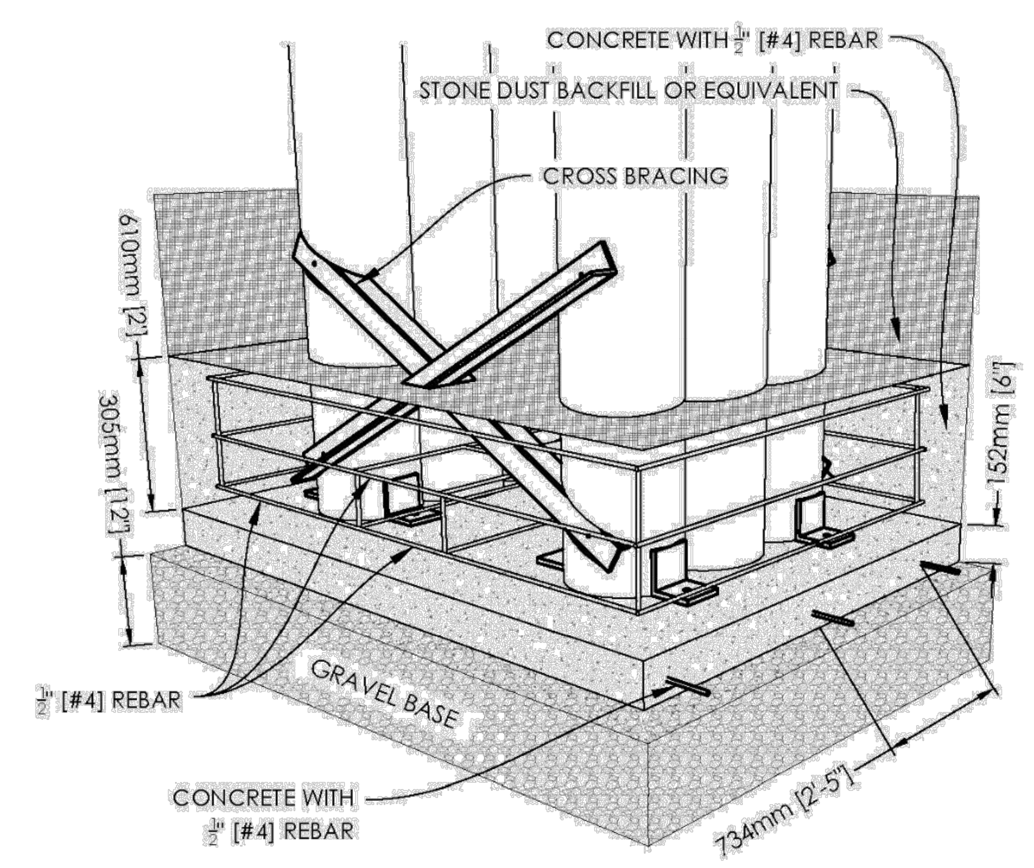
NOTES - CONTINUED

REBAR

5. ENSURE REBAR IS MIN. 100mm [4"] FROM ALL EDGES AND LOGS.
6. CREATE A GRID OF HORIZONTAL AND VERTICAL REBAR (AS SHOWN BELOW).
7. ENSURE REBAR IS TIED AND LIFTS ARE MIN. 152mm [6"] SPACED.

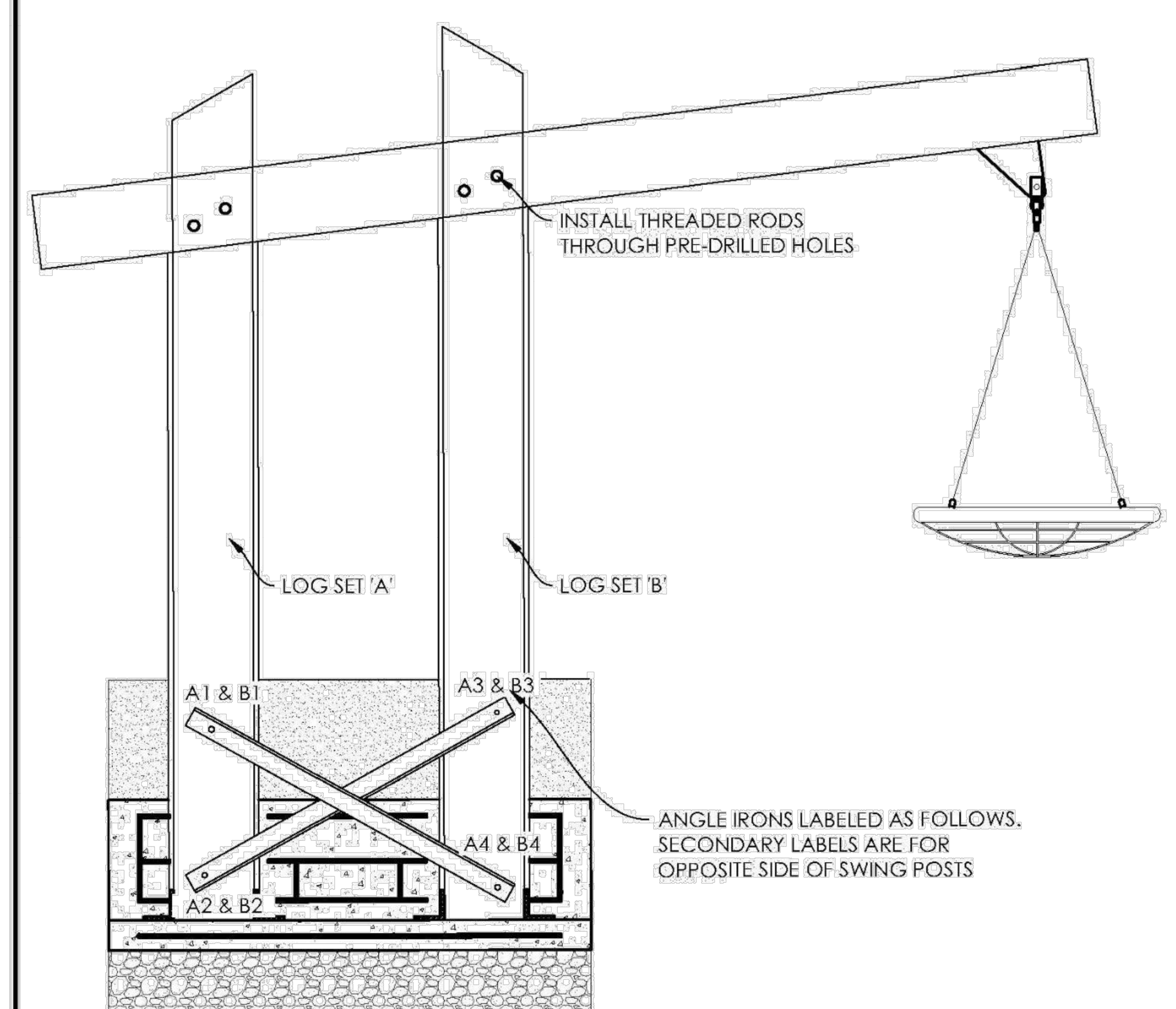
CONCRETE (TO BE INSTALLED IN 2 SEPARATE POURS)

8. FIRST CONCRETE POUR:
   - 8.1. INSTALL CONCRETE PAD TO ACHIEVE SPECIFIED ELEVATIONS.
   - 8.2. MANUFACTURER RECOMMENDS CONCRETE SHOULD BE MINIMUM 30MPa (4500 PSI). FOLLOW LOCAL REGULATIONS FOR A LOAD BEARING FOOTING.
   - 8.3. ALLOW MINIMUM 12 HOURS FOR CONCRETE TO CURE.
   - 8.4. REMOVE FORMS AND BACKFILL AS NEEDED. MATERIAL ON TOP OF CONCRETE TO BE STONE DUST OR EQUIVALENT.



- GIRAFFE LOG SWING: FOOTING ISO SECTION -

HANDCRAFTED Nature's INSTRUMENTS • FOR YOUR PLAYGROUND • | INSTALL | LOG FRAME OMNI BASKET SWING: GIRAFFE BASKET | PRODUCT NUMBER: NI-PG-809-04 | SCALE (METRIC): 1:25 | TO BE PRINTED ON STANDARD LETTER PAPER | REVIEW YYYY-MM-DD SIGN OFF | PAGE 2 OF 8 | 1-877-733-7456



- LABELING PLAN -

HANDCRAFTED Nature's INSTRUMENTS • FOR YOUR PLAYGROUND • | INSTALL | LOG FRAME OMNI BASKET SWING: GIRAFFE BASKET | PRODUCT NUMBER: NI-PG-809-04 | SCALE (METRIC): 1:30 | TO BE PRINTED ON STANDARD LETTER PAPER | REVIEW YYYY-MM-DD SIGN OFF | PAGE 5 OF 8 | 1-877-733-7456

1 / L5.8 GIRAFFE SWING

MANUFACTURER: NATURE'S INSTRUMENTS
CONTACT: SALES@NATURESINSTRUMENTS.COM
PHONE: 1.877.733.7456
MATERIAL: HARDWOOD, STAINLESS STEEL RING FRAME, CHAIN/PLASTIC BASKET SEAT, SYNTHETIC ROPE, STEEL CORE ROPE ATTCHMENTS

SCALE: NTS

811 Know what's below. Call before you dig. or www.UNCC2.org

VOGEL & ASSOCIATES
Land Planning • Landscape Architecture • Development Consulting •
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

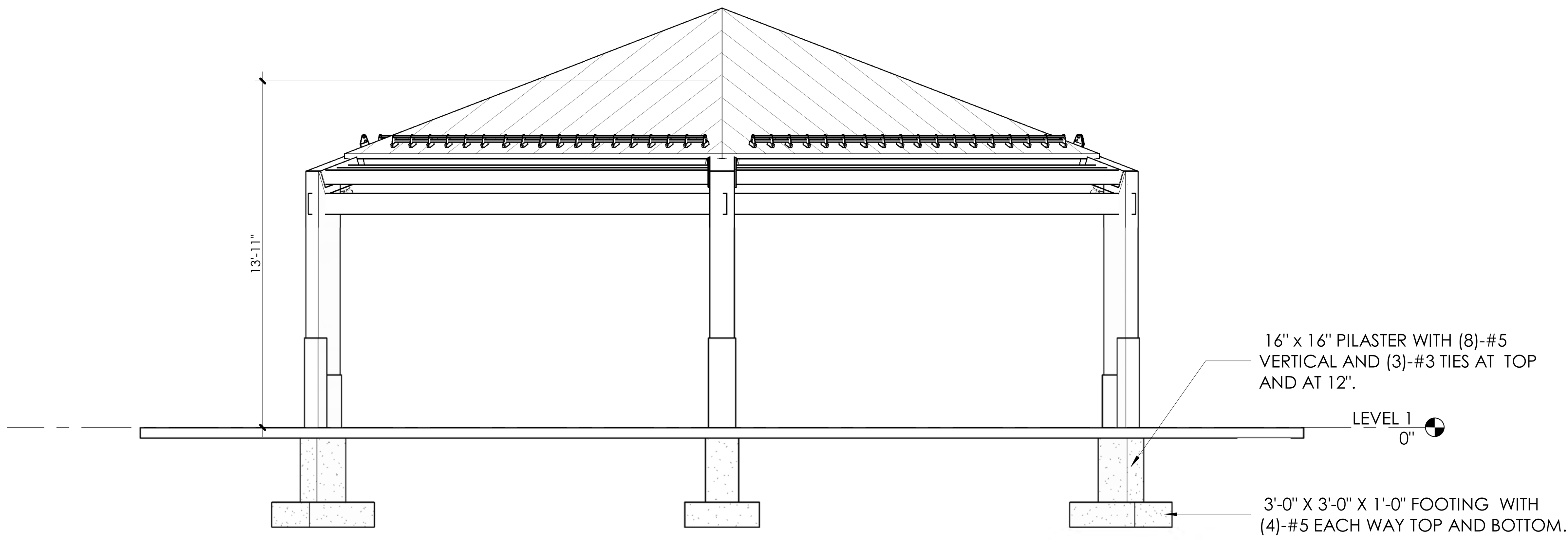
DHM DESIGN
900 S. Broadway
Suite 300
Denver, CO 80209
303.892.5566
www.dhmdesign.com

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1 : 02/14/2024	
REV 2 : 03/14/2024	

SITE DETAILS

L5.8



2 PAVILION - ELEVATION_DRB
1/4" = 1'-0"

OUTDOOR LIGHTING TABULATION

FIXTURE NAME	PROPOSED # OF FIXTURES	PROPOSED # LUMENS	PROPOSED CCT (IN KELVIN)
JETT WALL SCONCE	6	975	2700 K

MATERIAL LEGEND

MATERIAL NAME: STANDING SEAM METAL ROOF - ZEE - LOCK PANEL MFR: BERRIDGE COLOR: CHARCOAL GREY
HORIZONTAL CEDAR SIDING EXPOSURE: 6" TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
HEAVY TIMBER COLUMNS AND RAFTERS TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
FASCIA AND RAKE MATERIAL: COMPOSITE BOARD TEXTURE: SMOOTH COLOR: SW 3022 BLACK ALDER
TUB STEEL MATERIAL: STAINLESS STEEL TEXTURE: SMOOTH COLOR: SW 3022 BLACK ALDER
INTERIOR LIGHT ZONE OUTDOOR WALL SCONCE ACCESS LIGHTING COLOR: BLACK

neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: 05.23.2023
REVISIONS

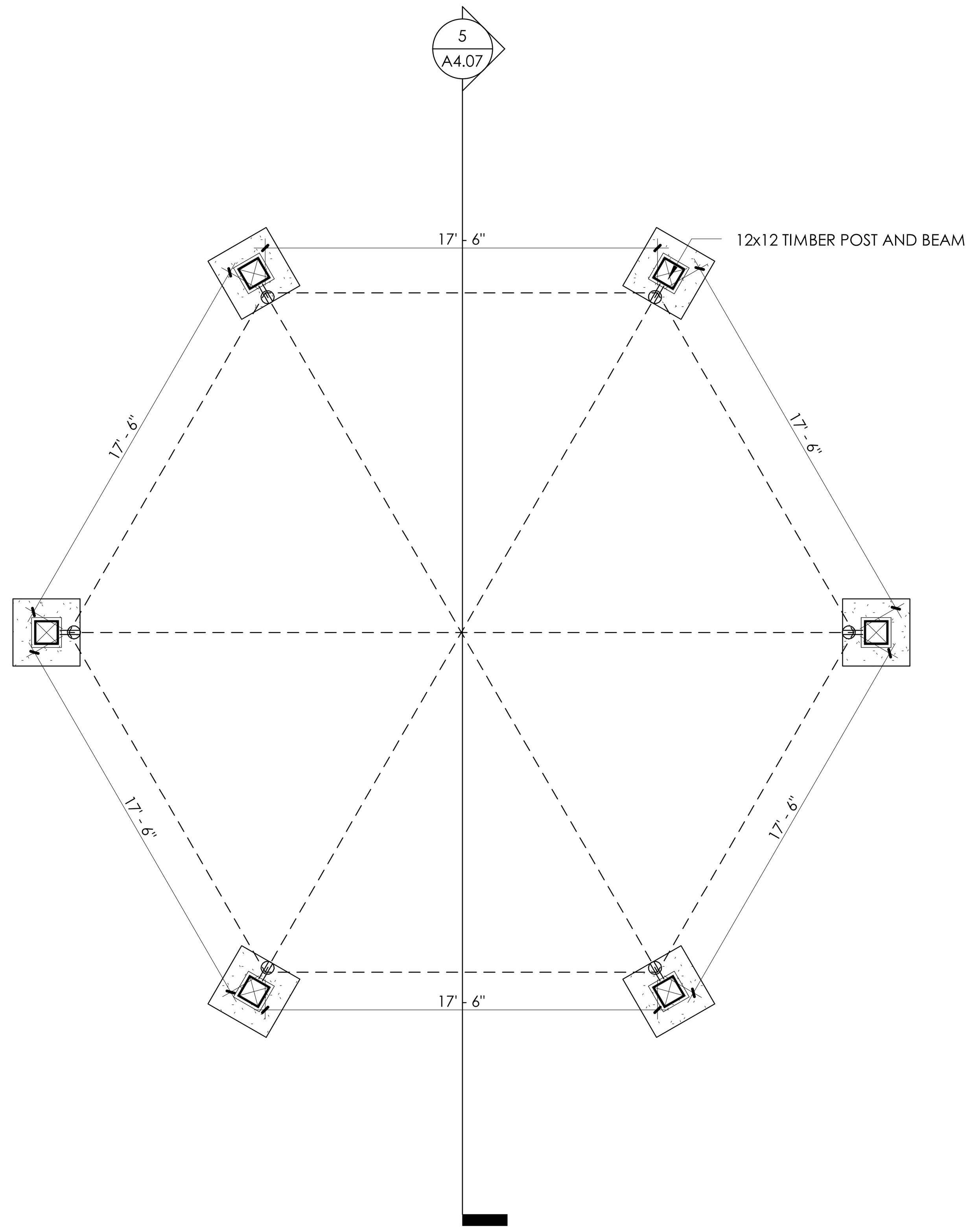
ISSUED FOR: NOT FOR CONSTRUCTION

SCALE: As indicated

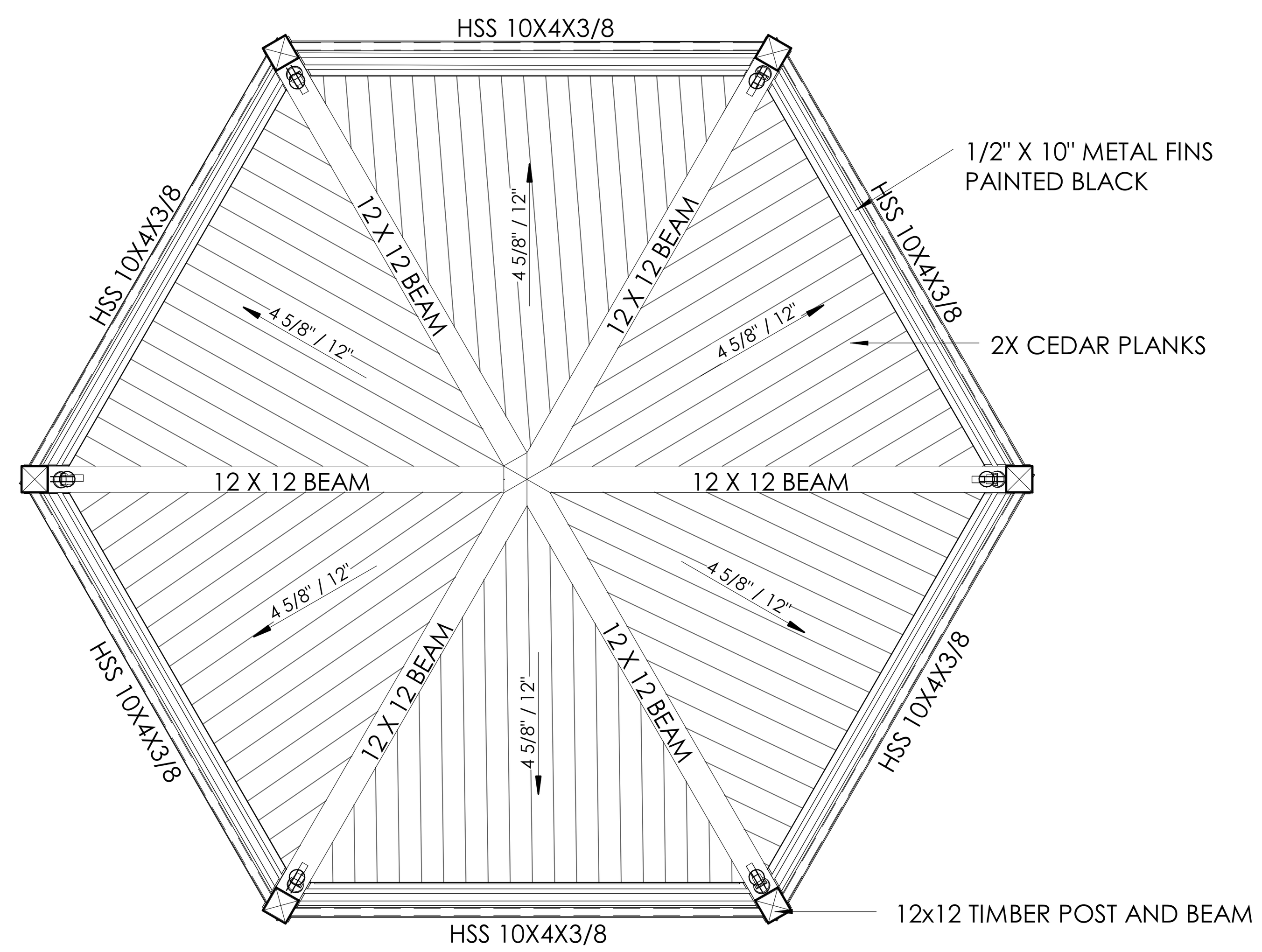
SHEET TITLE:
PAVILON DRB

DRB 1.2

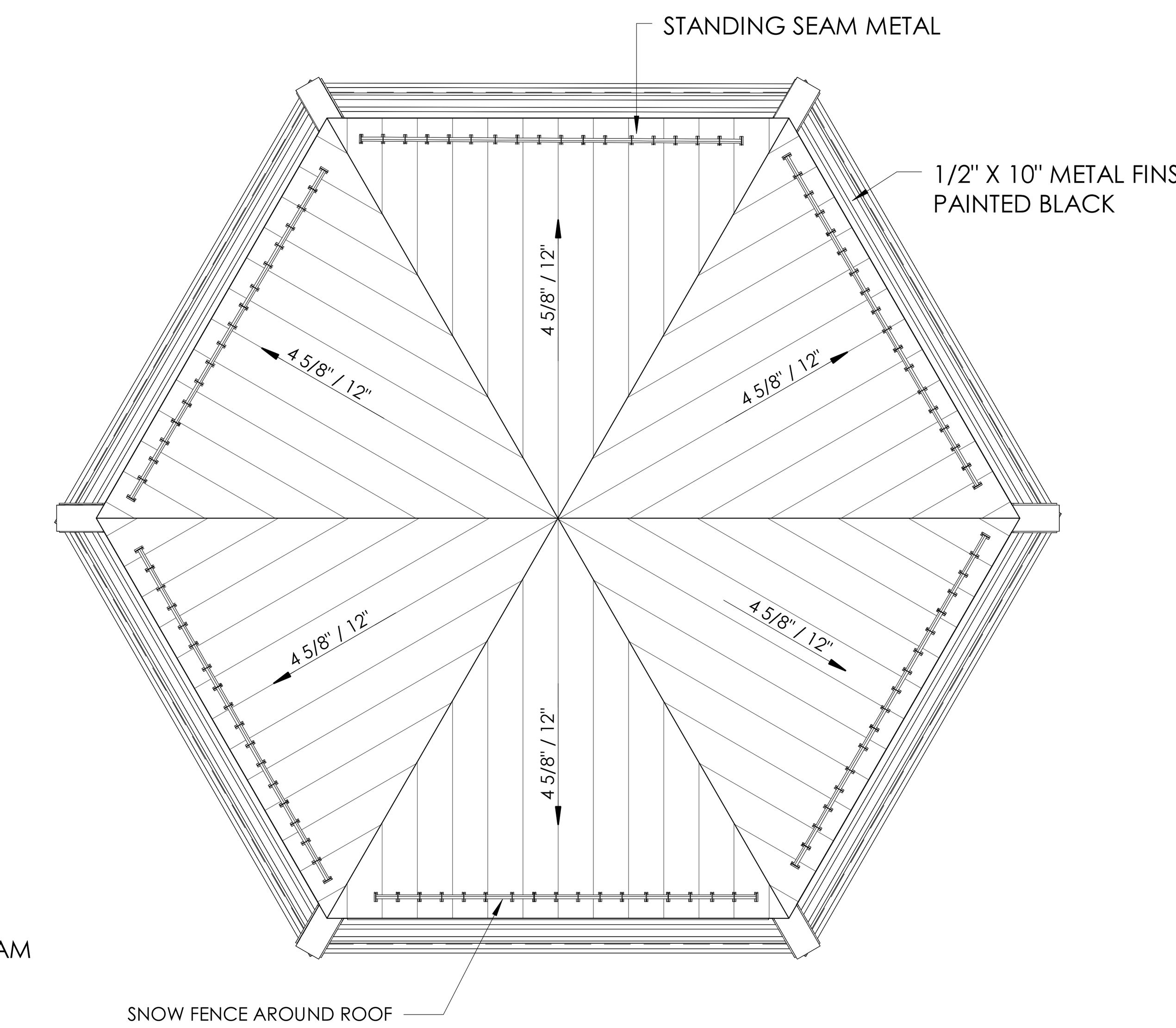
1/24/2024 2:45:13 PM



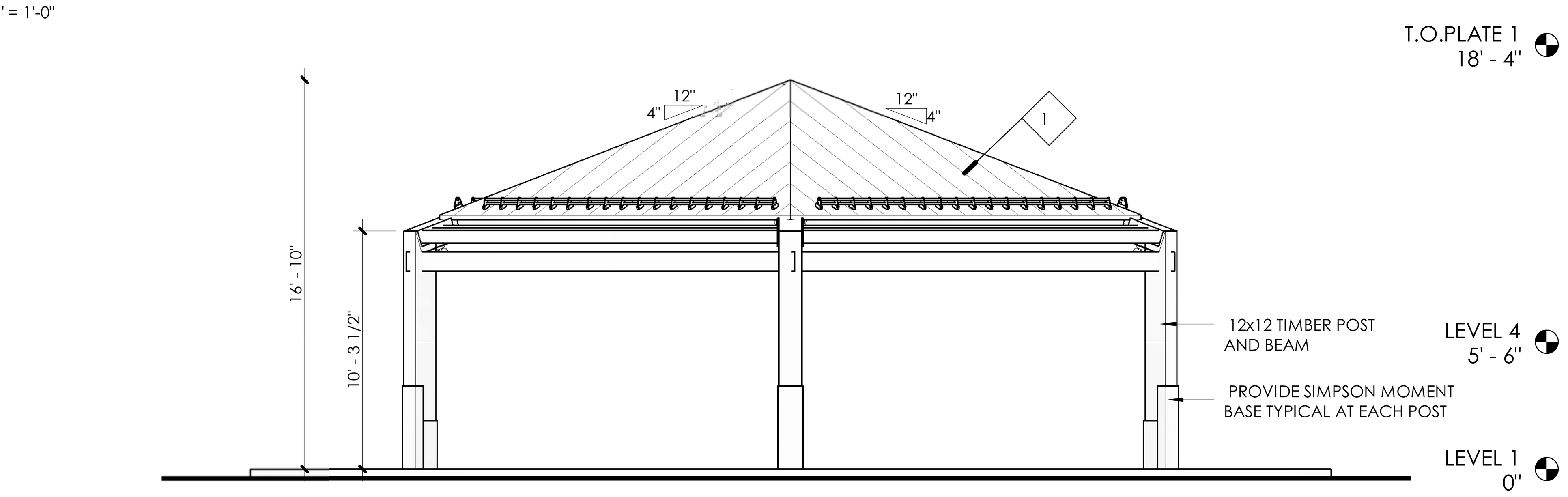
2 PAVILION STRUCTURE FLOOR PLAN
3/16" = 1'-0"



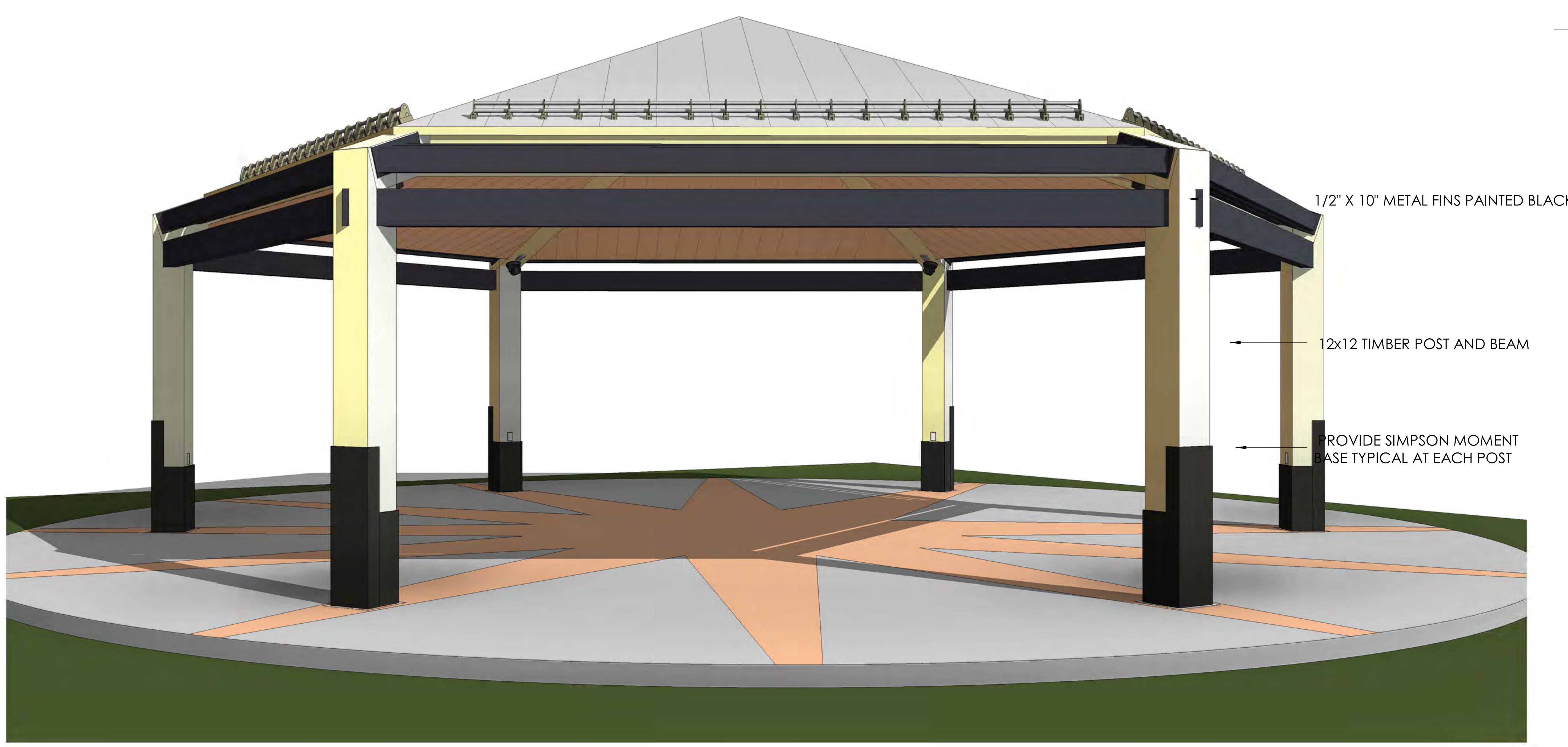
4 PAVILION STRUCTURE RCP
3/16" = 1'-0"

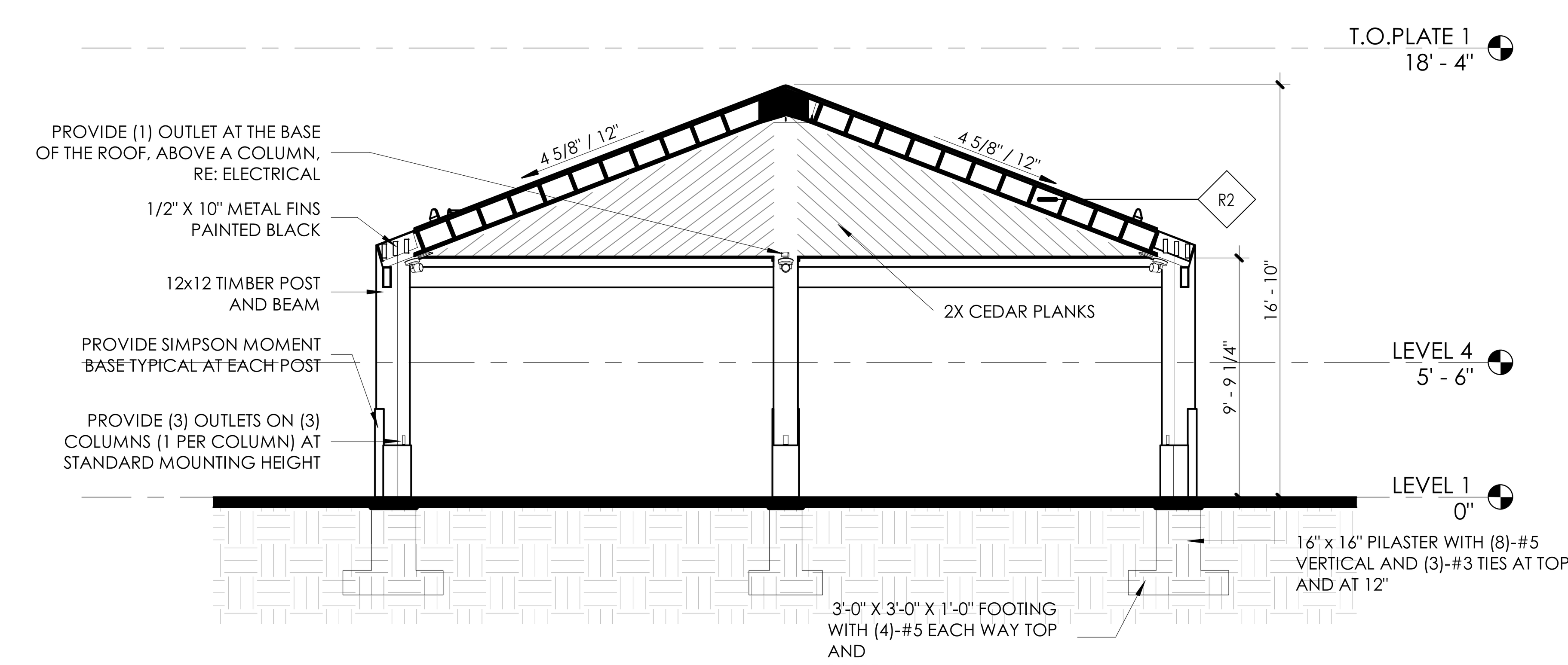


6 PAVILION STRUCTURE - ROOF PLAN
3/16" = 1'-0"



3 PAVILION STRUCTURE - ELEVATION
3/16" = 1'-0"





5 PAVILION STRUCTURE - SECTION
3/16" = 1'-0"

MATERIAL LEGEND

1	MATERIAL NAME: STANDING SEAM METAL ROOF - ZEE - LOCK PANEL MFR: BERRIDGE COLOR: CHARCOAL GREY
2	HORIZONTAL CEDAR LAP SIDING EXPOSURE: 6" TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
3	HEAVY TIMBER COLUMNS AND RAFTERS TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
4	ALUMINUM STOREFRONT COLOR: BLACK GLASS COLOR: CLEAR
5	MATERIAL NAME: STONE VENEER MFR: LOCAL STONE COLOR:
6	FASCIA AND RAKE MATERIAL: COMPOSITE BOARD TEXTURE: SMOOTH COLOR: SW 3022 BLACK ALDER
7	METAL ACCENT TEXTURE: METAL PANEL COLOR: BLACK

ROOF TYPES

R1 — METAL ROOF:
STANDING SEAM METAL, ICE AND WATERSHIELD, 3/4" OSB SHEATHING, 2X10'S AT 1'-4" O.C. (RE: STRUCTURAL), 2X CEDAR PLANKS, STAINED.

neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

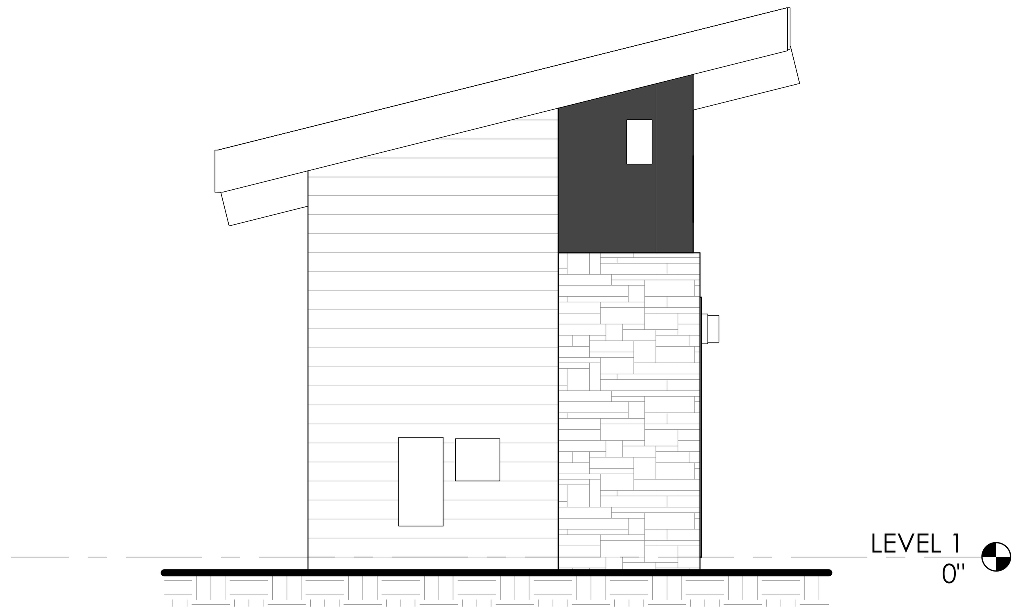
PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: 05.23.2023
REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION

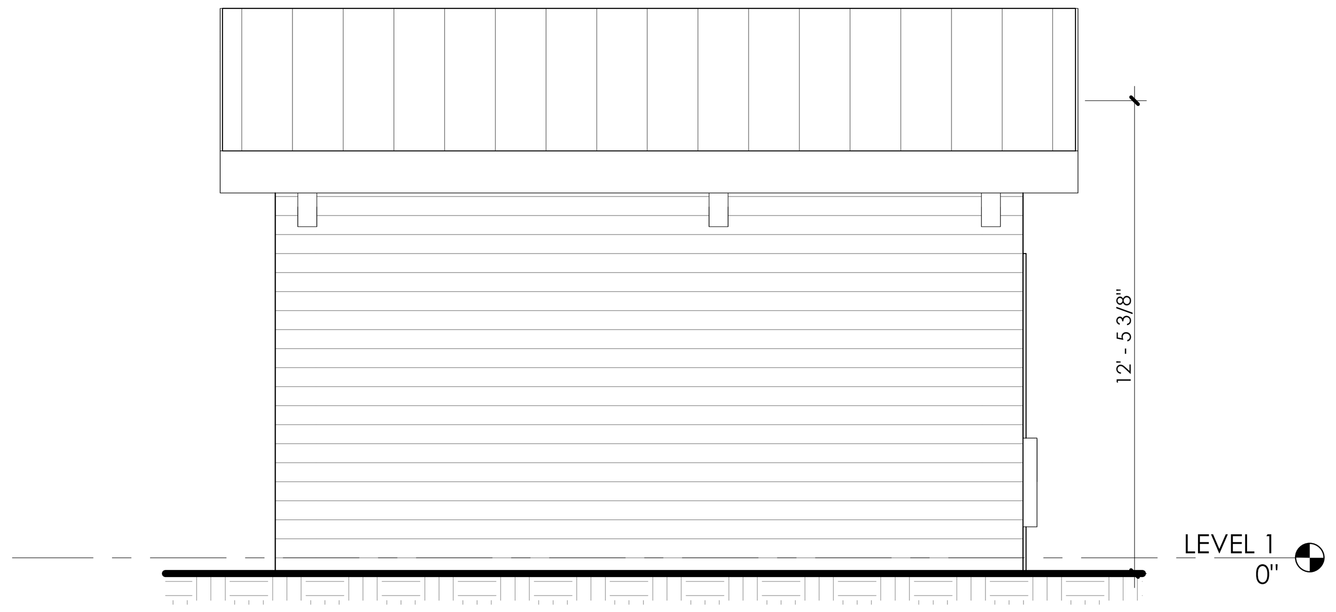
SCALE: As indicated

SHEET TITLE: PAVILION STRUCTURE

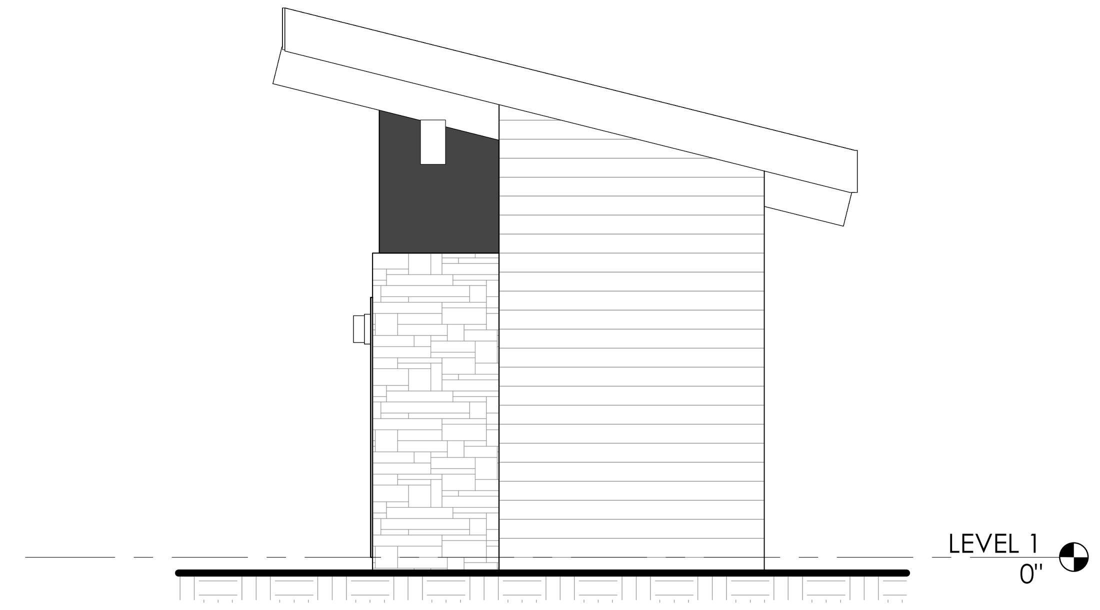
A4.07



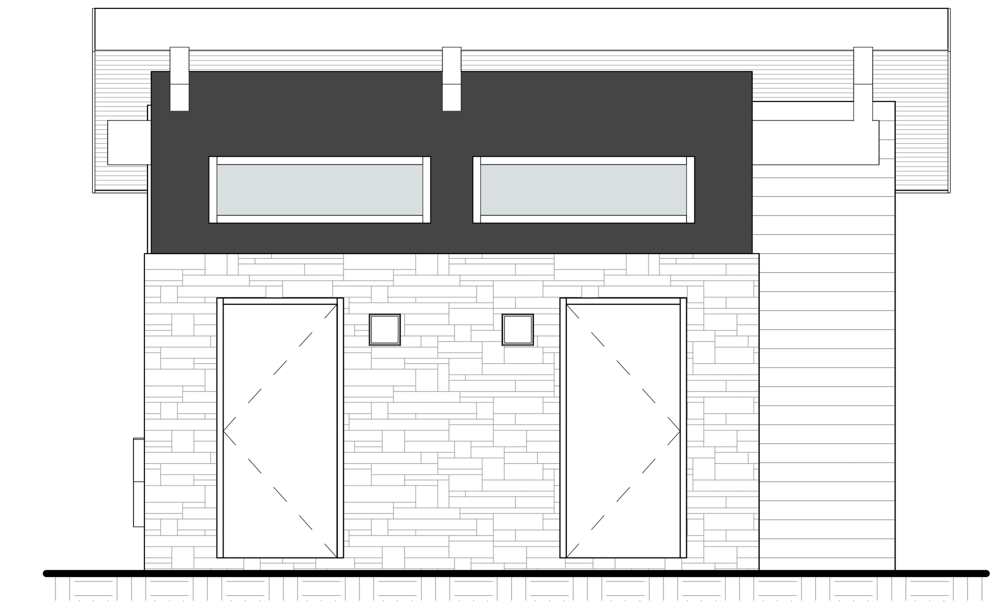
5 RESTROOM-ELEV.4 DRB
1/4" = 1'-0"



4 RESTROOM-ELEV.3 DRB
1/4" = 1'-0"



3 RESTROOM-ELEV.2 DRB
1/4" = 1'-0"



2 RESTROOM-ELEV.1 DRB
1/4" = 1'-0"

OUTDOOR LIGHTING TABULATION

FIXTURE NAME	PROPOSED # OF FIXTURES	PROPOSED # LUMENS	PROPOSED CCT (IN KELVIN)
JETT WALL SCONCE	2	975	2700K

MATERIAL LEGEND

ASPHALT SHINGLES GAF TIMBERLINE HDZ LIFETIME SHINGLES COLOR: PEWTER GRAY
HORIZONTAL HARD-I-PLANK EXPOSURE: 6" TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
HEAVY TIMBER COLUMNS AND RAFTERS TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
WINDOW: COMPOSITE BLACK WINDOW W/ LOW-E CLEAR INSULATED GLASS TRIM: PAINTED COMPOSITE
MATERIAL NAME: STONE VENEER MFR: LOCAL SCREE STONE COLOR:
FASCIA AND RAKE MATERIAL: COMPOSITE BOARD TEXTURE: SMOOTH COLOR: SW 3022 BLACK ALDER
HARD-I-BOARD T&G SOFFIT COLOR: CHARCOAL GRAY
POOL SIDE BUILDING LIGHTS JETT OUTDOOR WALL SCONCE SKU 01242 COLOR: BLACK DARK SKY INTERNATIONAL COMPLIANT

neo studio

3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: 05.23.2023
REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION

SCALE: As indicated

SHEET TITLE: RESTROOM DRB

DRB 1.3

FLAGNOTES PER SHEET

- 6.9 COMPOSITE RAKE: 1x10 SMOOTH FINISH COMPOSITE FASCIA W/ PREFINISHED METAL RAKE FLASHING. - PAINT.
- 8.0 FRAMED MIRROR.
- 22.00 FLOOR DRAIN, RE: MECHANICAL.
- 22.01 STAINLESS STEEL MOP SINK.
- 22.03 BLOWOUT JET TOILET - OFF FLOOR. PROVIDE BLOCKING AS REQUIRED.
- 22.04 MERIDIAN STAINLESS STEEL CURVED FRONT UNI-BASIN - ADA COMPLIANT.
- 22.05 WALL MOUNTED HAND DRYERS.
- 23.00 WALL MOUNTED ELECTRIC HEATER ABOVE DOOR

PARTITION TYPES

EXTERIOR WALL:

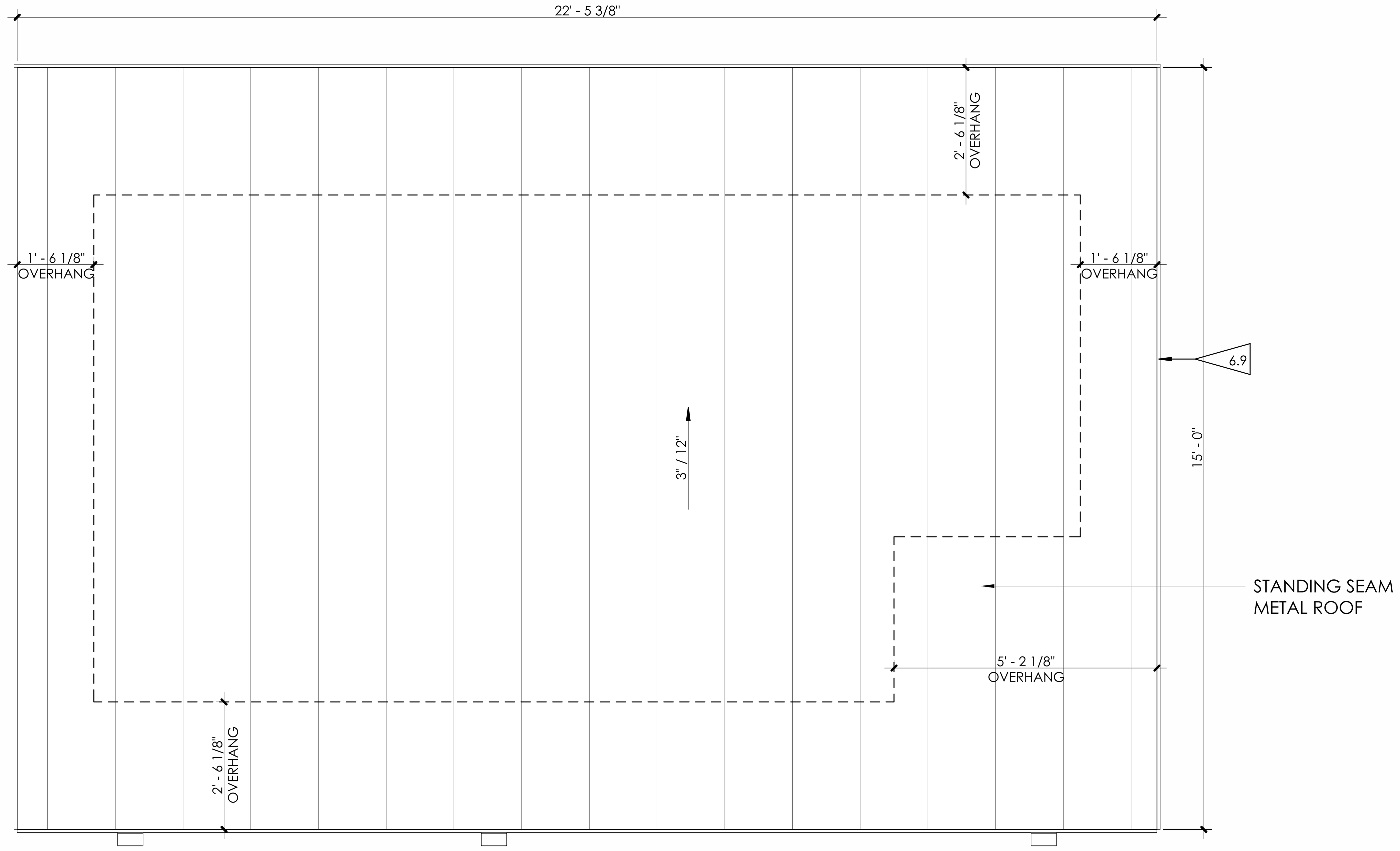
- 5 STONE VENEER, METAL LATH, 3" RIGID INSULATION, 8" CMU BLOCK - PAINTED
- 6 CEMENTITIOUS SIDING, FURRING STRIPS, 3" RIGID INSULATION, 8" CMU BLOCK - PAINTED.

INTERIOR WALL:

- 24 1/2" GYP. BD., 2 X 4 STUD (RE: STRUCTURE FOR SPACING), 1/2" GYP. BD.
- 26 1/2" GYP. BD., 2 X 6 STUD (RE: STRUCTURE FOR SPACING), R-30 BATT INSULATION, 1/2" GYP. BD.

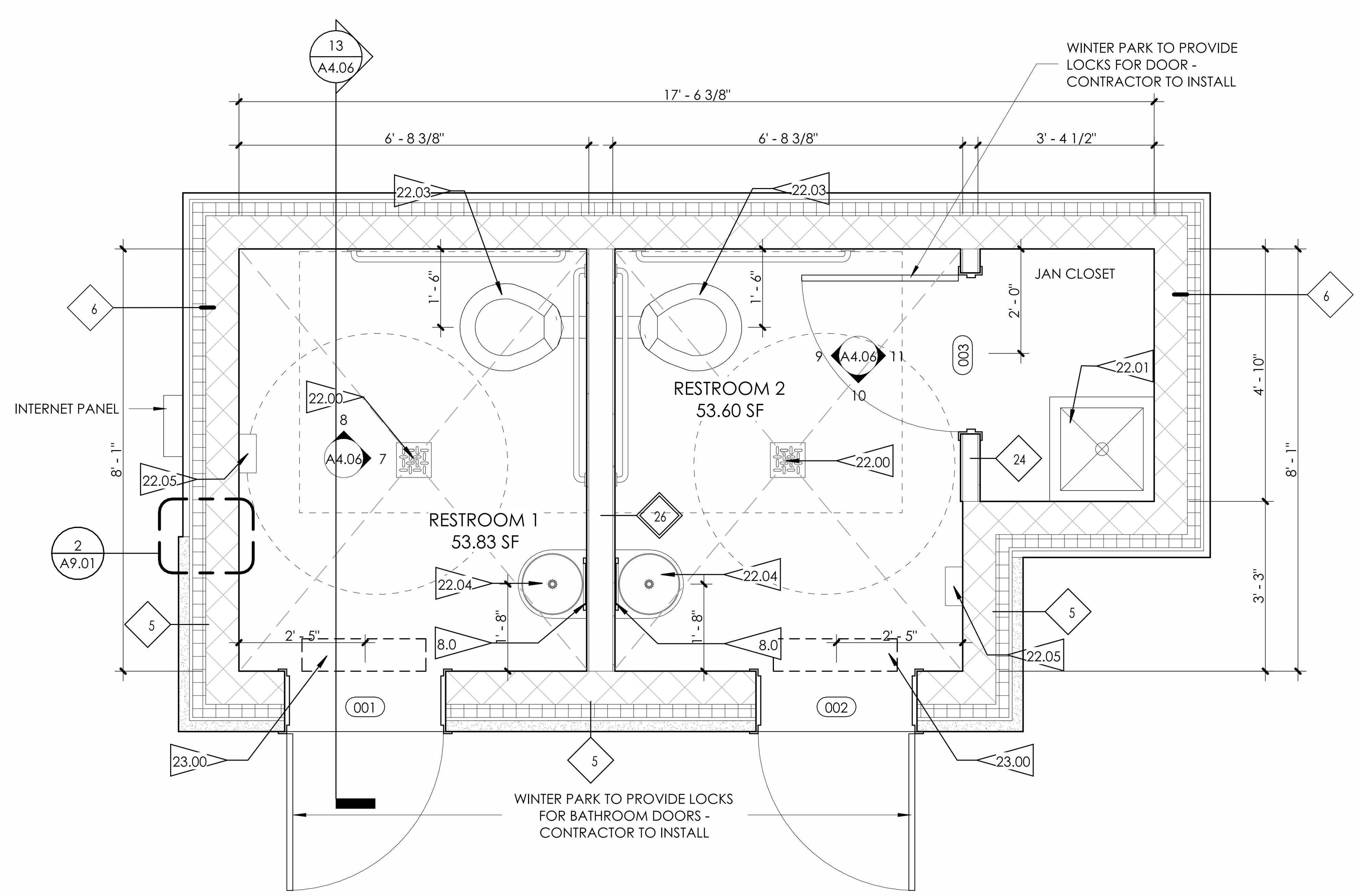
ROOF TYPES:

- R1 METAL ROOF: STANDING SEAM METAL, ICE AND WATERSHIELD, 3/4" OSB SHEATHING, 2X10'S AT 1'-4" O.C. (RE: STRUCTURAL), R-50 (SPRAY FOAM), 5/8" TYPE 'X' G.B. - PAINT.



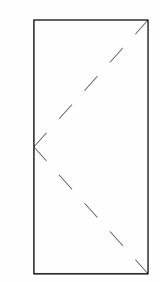
3 RESTROOM - ROOF PLAN

1/2" = 1'-0"



2 RESTROOM - FLOOR PLAN

1/2" = 1'-0"



TYPE F
FLUSH DOOR

DOOR SCHEDULE									
DOOR NUMBER	LEAF							FRAME	
	TYPE	WIDTH	HEIGHT	QUANTITY	THICKNESS	MATERIAL	FINISH	MATERIAL	FINISH
001	F	3' - 0"	6' - 8"	1	1 3/8"	HM	DARK GREY	HM	DARK GREY
002	F	3' - 0"	6' - 8"	1	1 3/8"	HM	DARK GREY	HM	DARK GREY
003	F	3' - 0"	6' - 8"	1	1 3/8"	HM	DARK GREY	HM	DARK GREY

neo studio

3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: 05.23.2023
REVISIONS

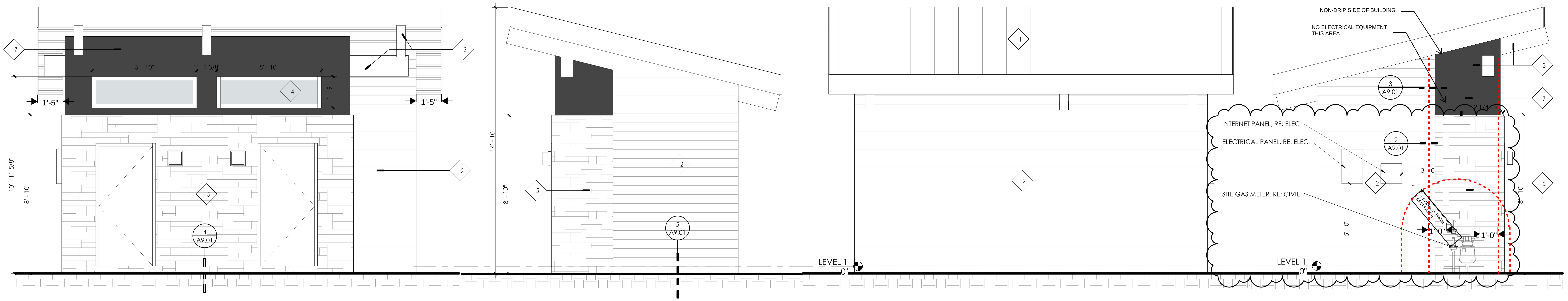
ISSUED FOR: NOT FOR CONSTRUCTION

SCALE: As indicated

SHEET TITLE: RESTROOM

A4.05

2/1/2024 10:08:14 AM

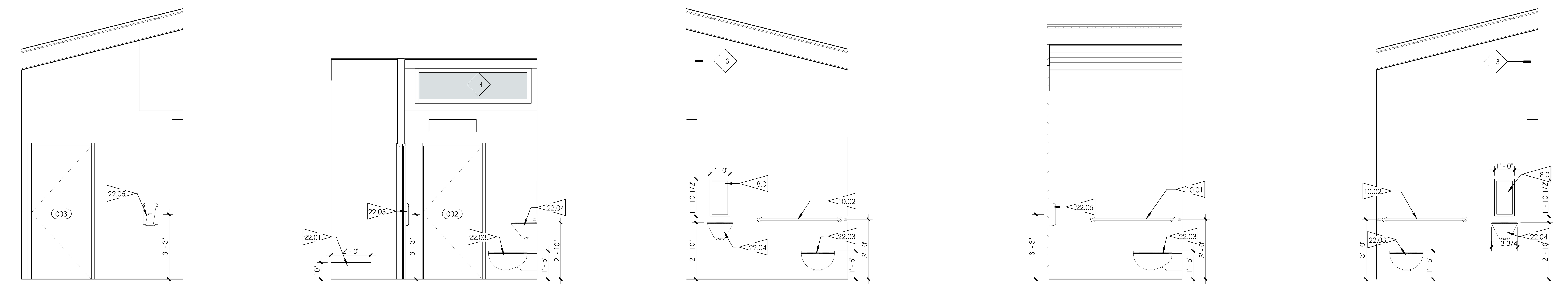


2 RESTROOM-ELEV.1 3/8" = 1'-0"

3 RESTROOM-ELEV.2 3/8" = 1'-0"

4 RESTROOM-ELEV.3 3/8" = 1'-0"

5 RESTROOM-ELEV.4 3/8" = 1'-0"



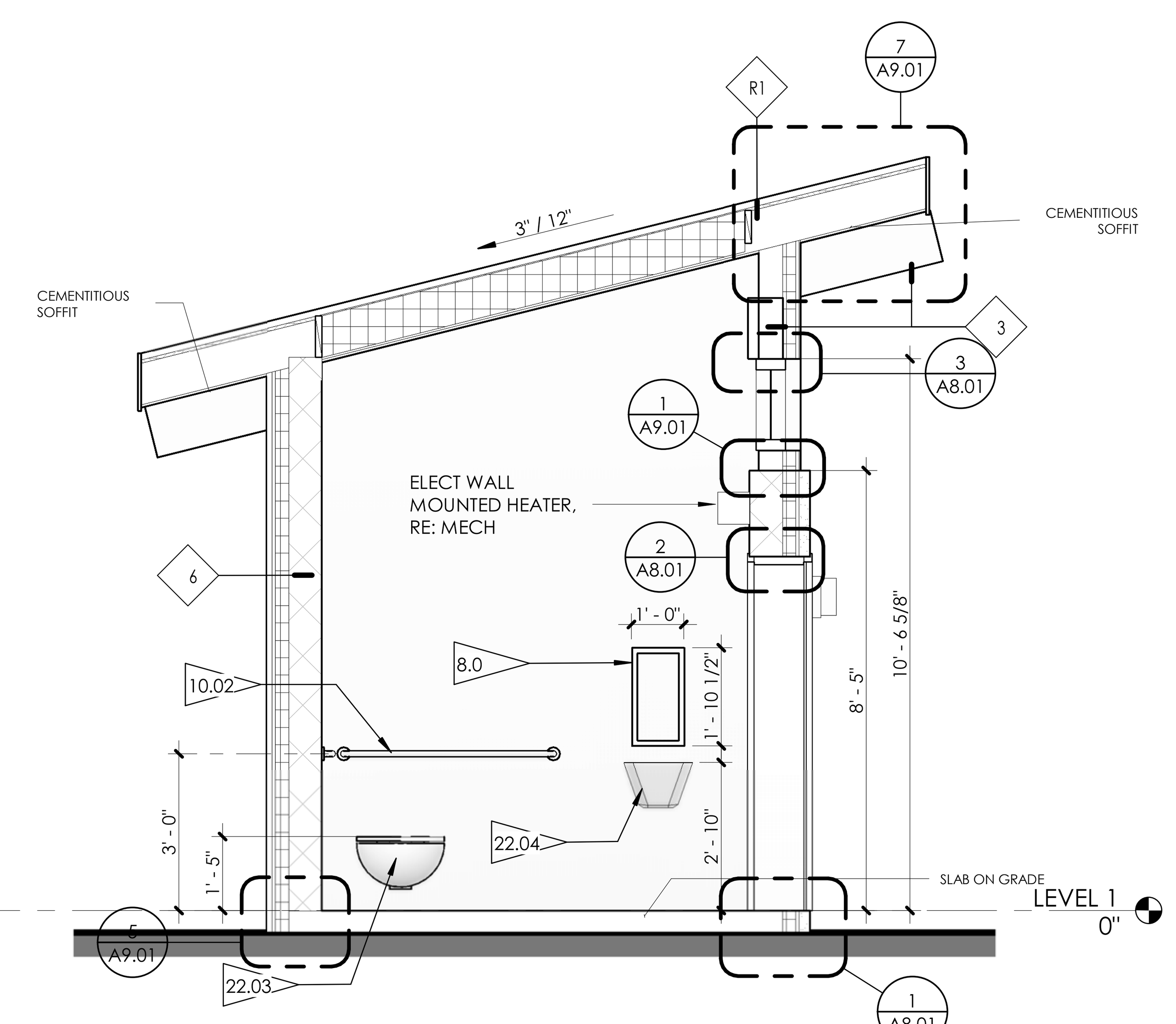
11 RESTROOM 2 - ELEV.3 3/8" = 1'-0"

10 RESTROOM 2 - ELEV.2 3/8" = 1'-0"

9 RESTROOM 2 - ELEV.1 3/8" = 1'-0"

8 RESTROOM 1 - ELEV.2 3/8" = 1'-0"

7 RESTROOM 1 - ELEV.1 3/8" = 1'-0"



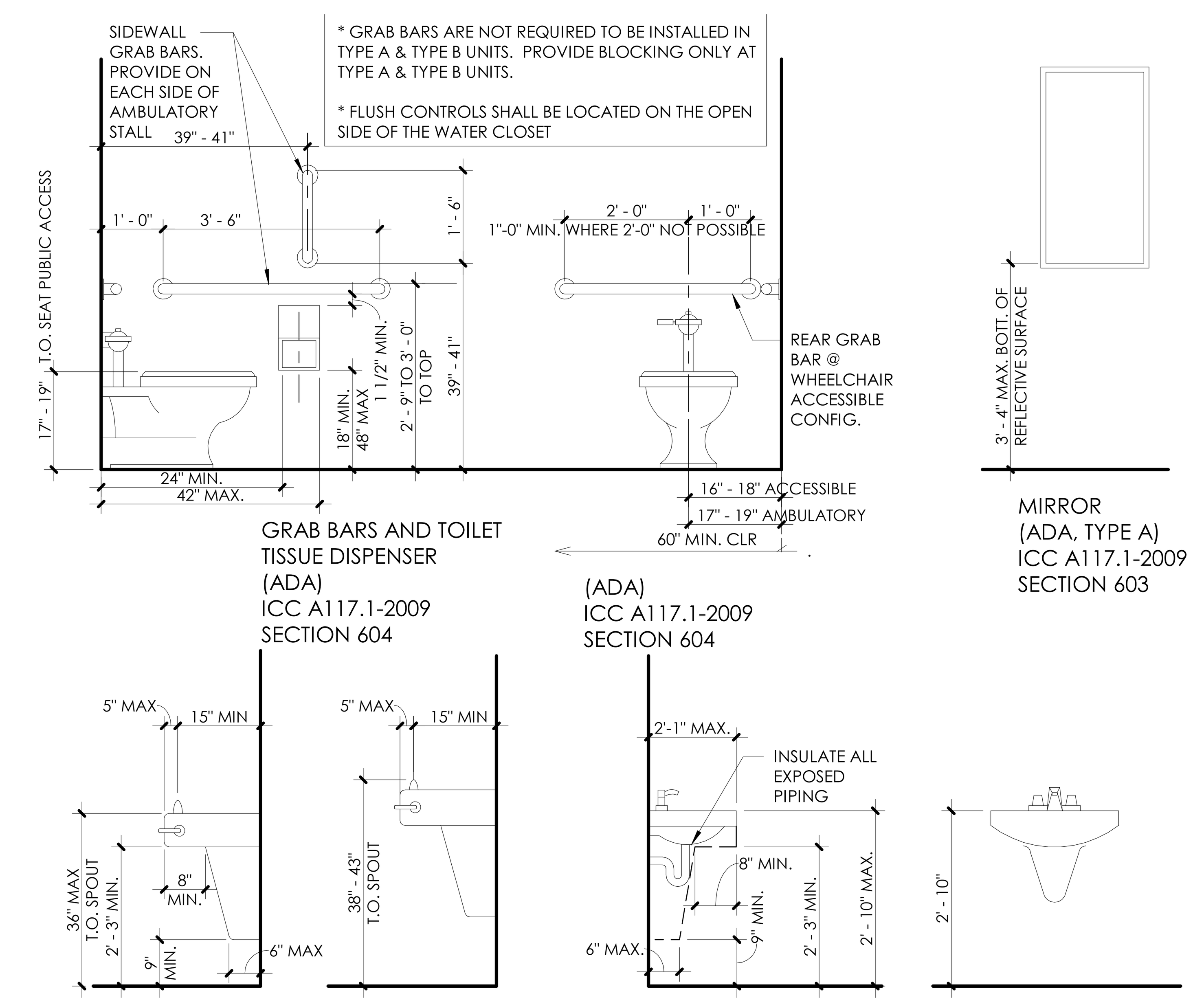
13 RESTROOM SECTION 3/8" = 1'-0"

FLAGNOTES PER SHEET

- 8.0 FRAMED MIRROR.
- 10.01 BOBRICK B5806-42 GRAB BAR.
- 10.02 BOBRICK B5806-36 GRAB BAR.
- 22.01 STAINLESS STEEL MOP SINK.
- 22.03 BLOWOUT JET TOILET - OFF FLOOR. PROVIDE BLOCKING AS REQUIRED.
- 22.04 MERIDIAN STAINLESS STEEL CURVED FRONT UNI-BASIN - ADA COMPLIANT.
- 22.05 WALL MOUNTED HAND DRYERS.

MATERIAL LEGEND

1	MATERIAL NAME: STANDING SEAM METAL ROOF - ZEE - LOCK PANEL MFR: BERRIDGE COLOR: CHARCOAL GREY
2	HORIZONTAL CEDAR LAP SIDING EXPOSURE: 6" TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
3	HEAVY TIMBER COLUMNS AND RAFTERS TEXTURE: SMOOTH COLOR: SW 3513 SPICE CHEST
4	ALUMINUM STOREFRONT COLOR: BLACK GLASS COLOR: CLEAR
5	MATERIAL NAME: STONE VENEER MFR: LOCAL STONE COLOR:
6	FASCIA AND RAKE MATERIAL: COMPOSITE BOARD TEXTURE: SMOOTH COLOR: SW 3022 BLACK ALDER
7	METAL ACCENT TEXTURE: METAL PANEL COLOR: BLACK



* GRAB BARS ARE NOT REQUIRED TO BE INSTALLED IN TYPE A & TYPE B UNITS. PROVIDE BLOCKING ONLY AT TYPE A & TYPE B UNITS.

* FLUSH CONTROLS SHALL BE LOCATED ON THE OPEN SIDE OF THE WATER CLOSET

GRAB BARS AND TOILET TISSUE DISPENSER (ADA) ICC A117.1-2009 SECTION 604

(ADA) ICC A117.1-2009 SECTION 604

MIRROR (ADA, TYPE A) ICC A117.1-2009 SECTION 603

DRINKING FOUNTAIN (ADA) ICC A117.1-2009 SECTION 602

DRINKING FOUNTAIN (STANDING) ICC A117.1-2009 SECTION 602

LAVATORY (ADA, TYPE A) ICC A117.1-2009 SECTION 306

LAVATORY (ADA, TYPE A) ICC A117.1-2009 SECTION 606

3/11/2024 8:34:13 PM

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

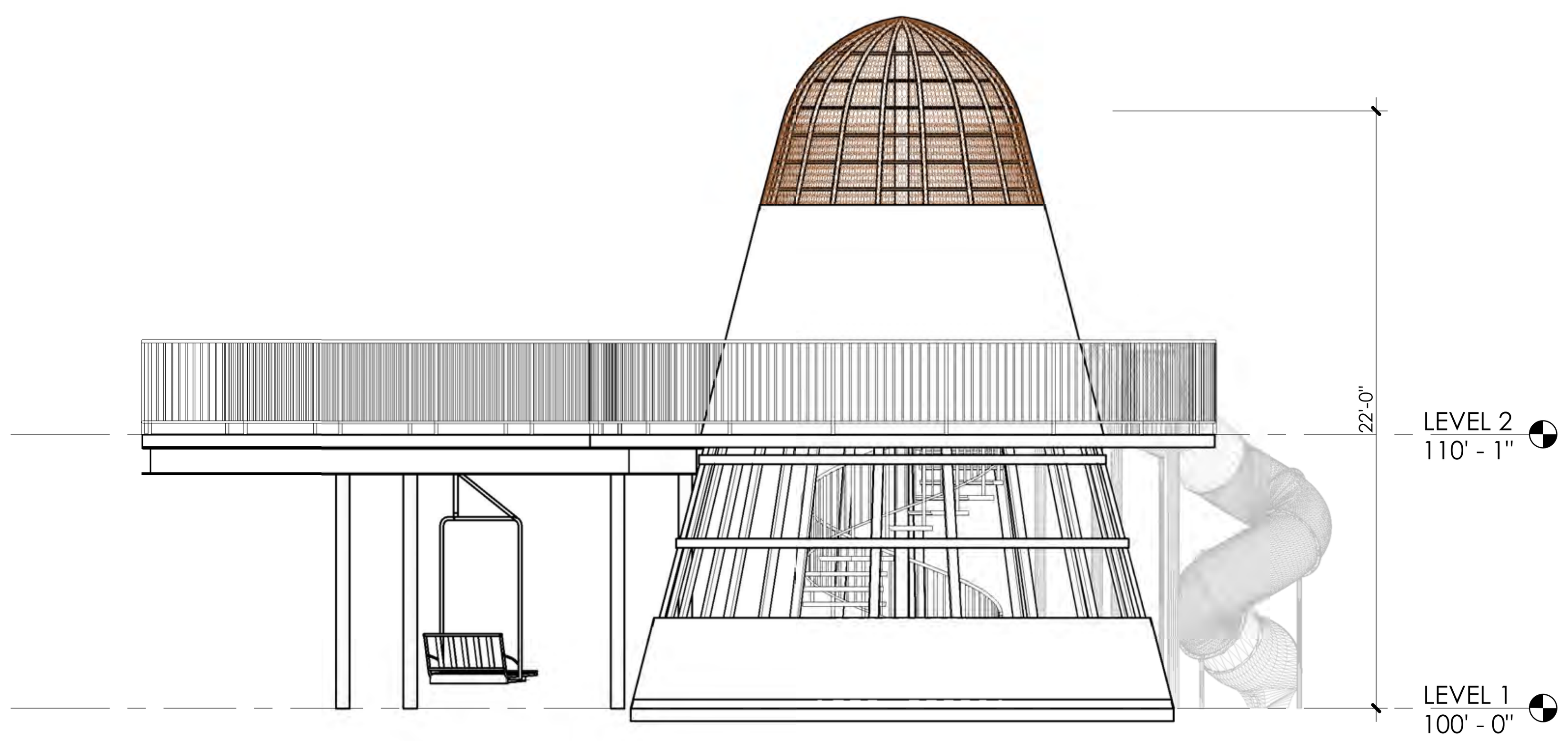
PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: 05.23.2023
REVISIONS
1 Date 1 Revision 1

ISSUED FOR: NOT FOR CONSTRUCTION

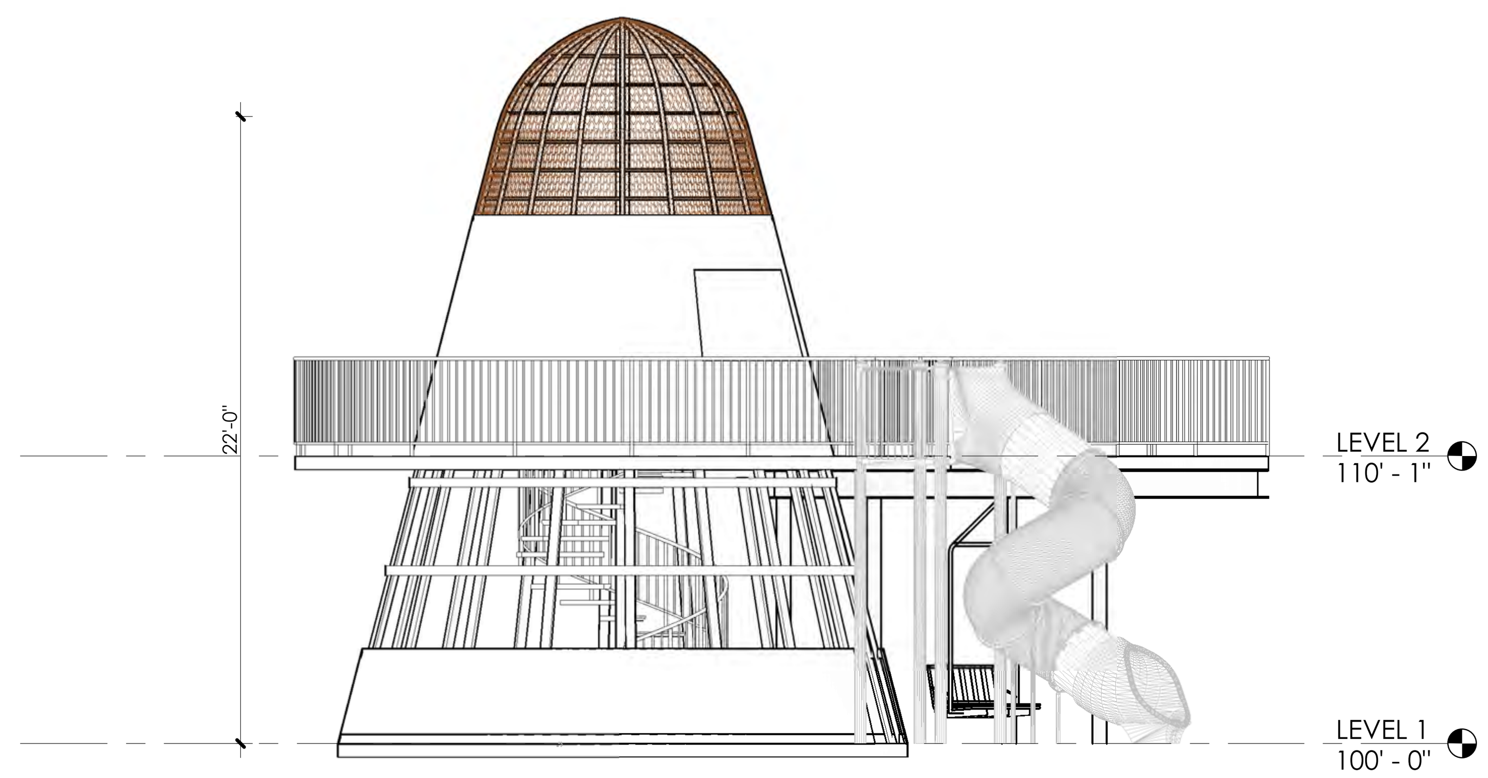
SCALE: As indicated

SHEET TITLE: RESTROOM

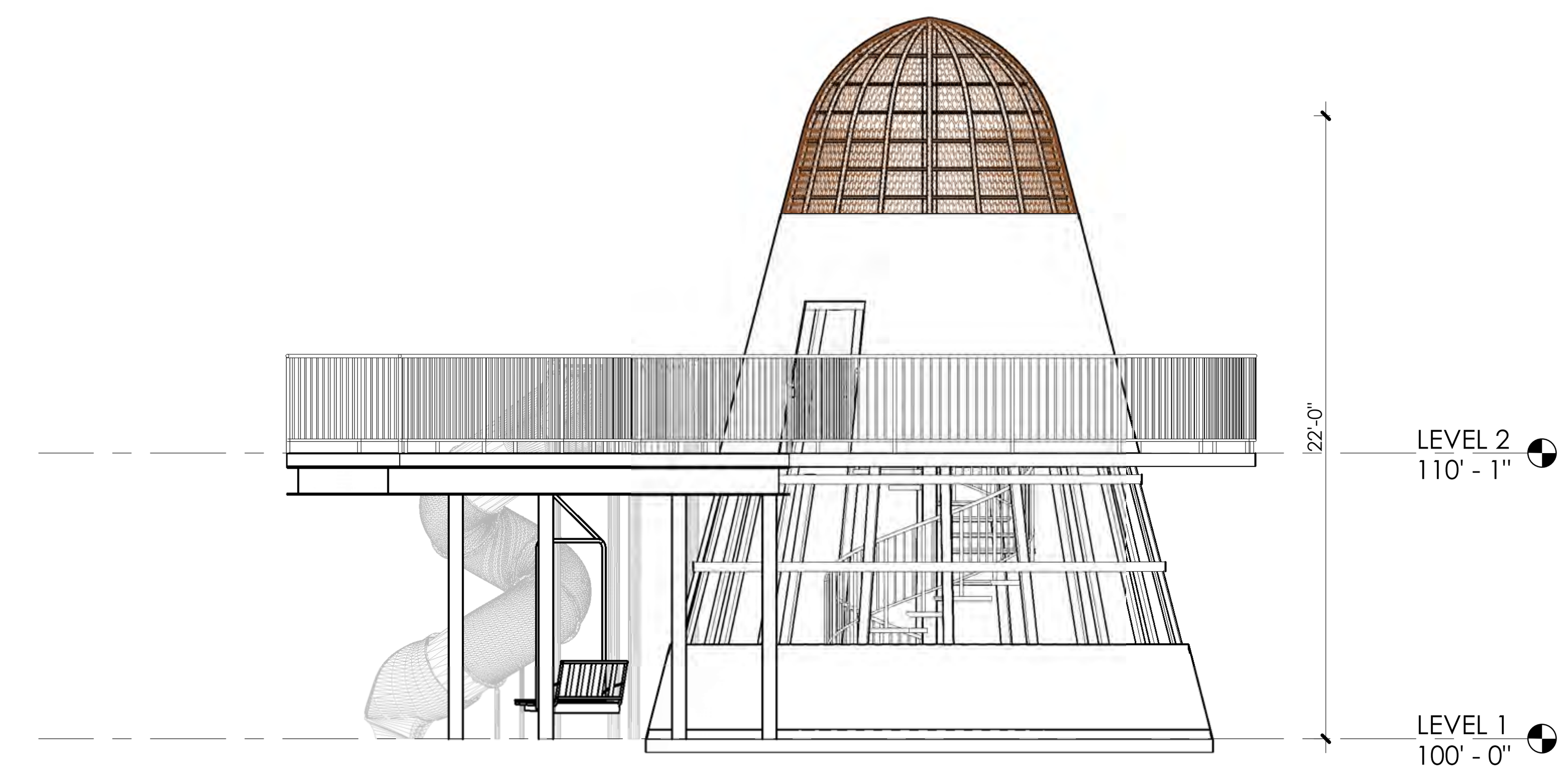
A4.06



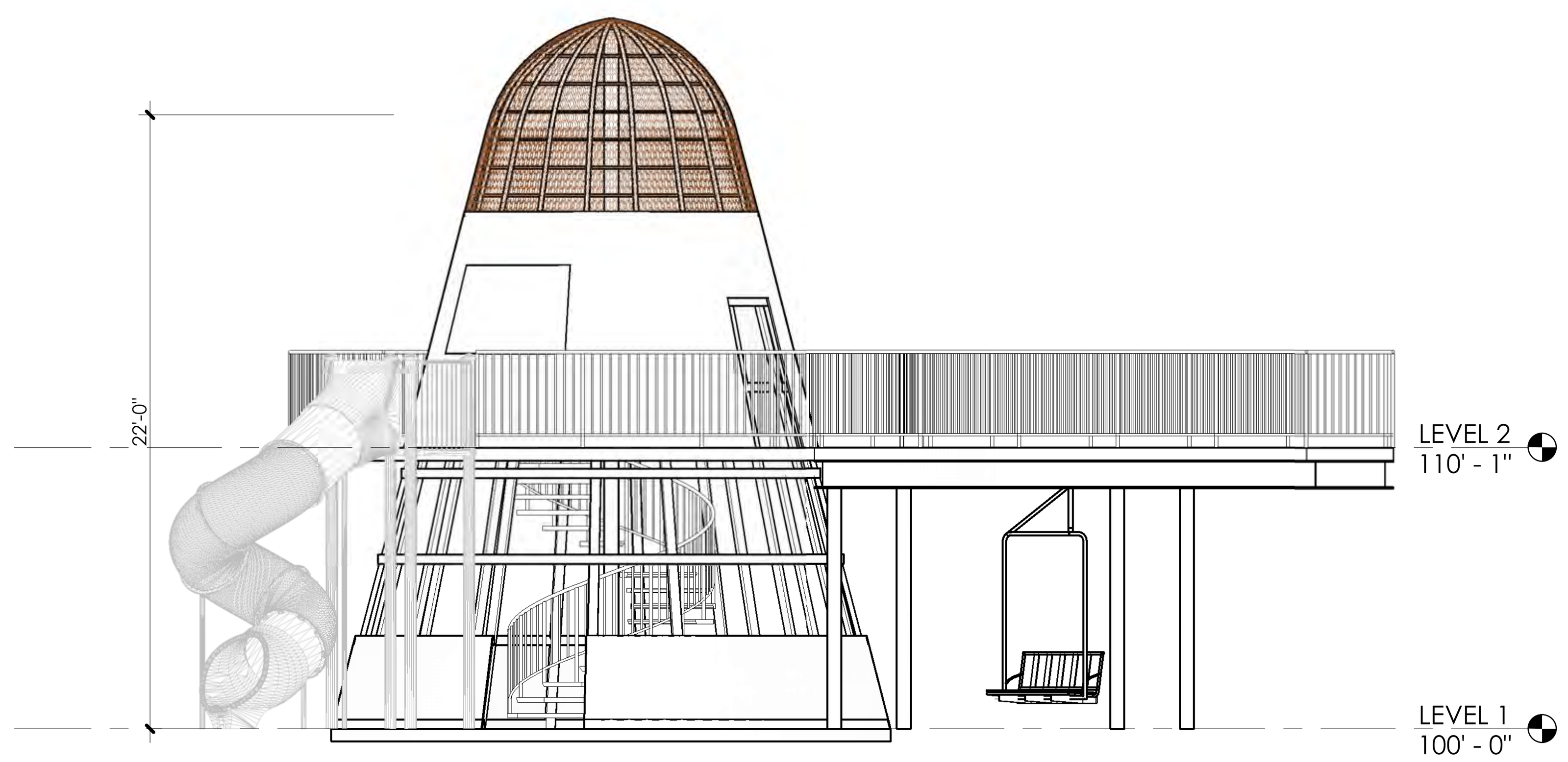
5 WEST ELEVATION_DRB
3/16" = 1'-0"



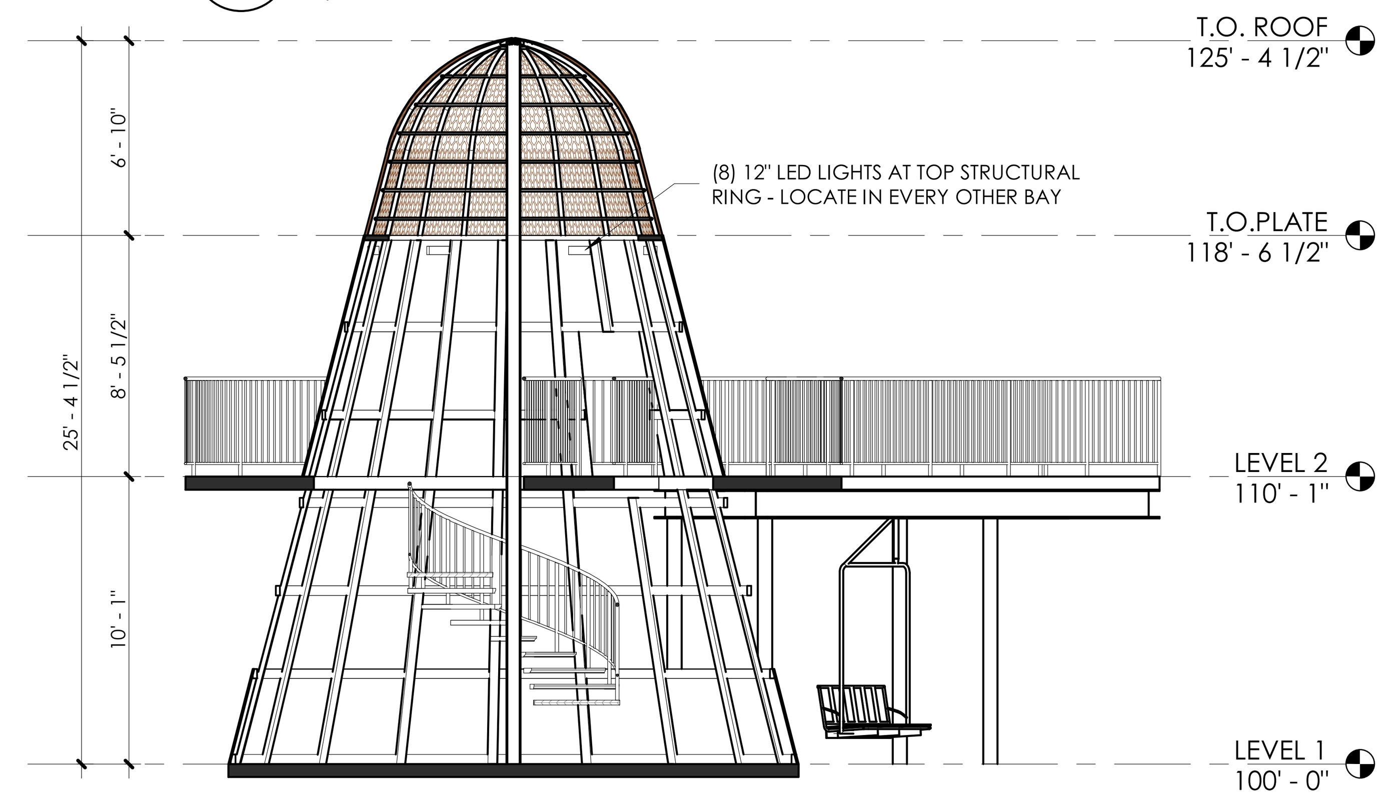
4 SOUTH ELEVATION_DRB
3/16" = 1'-0"



3 NORTH ELEVATION_DRB
3/16" = 1'-0"



2 EAST ELEVATION_DRB
3/16" = 1'-0"



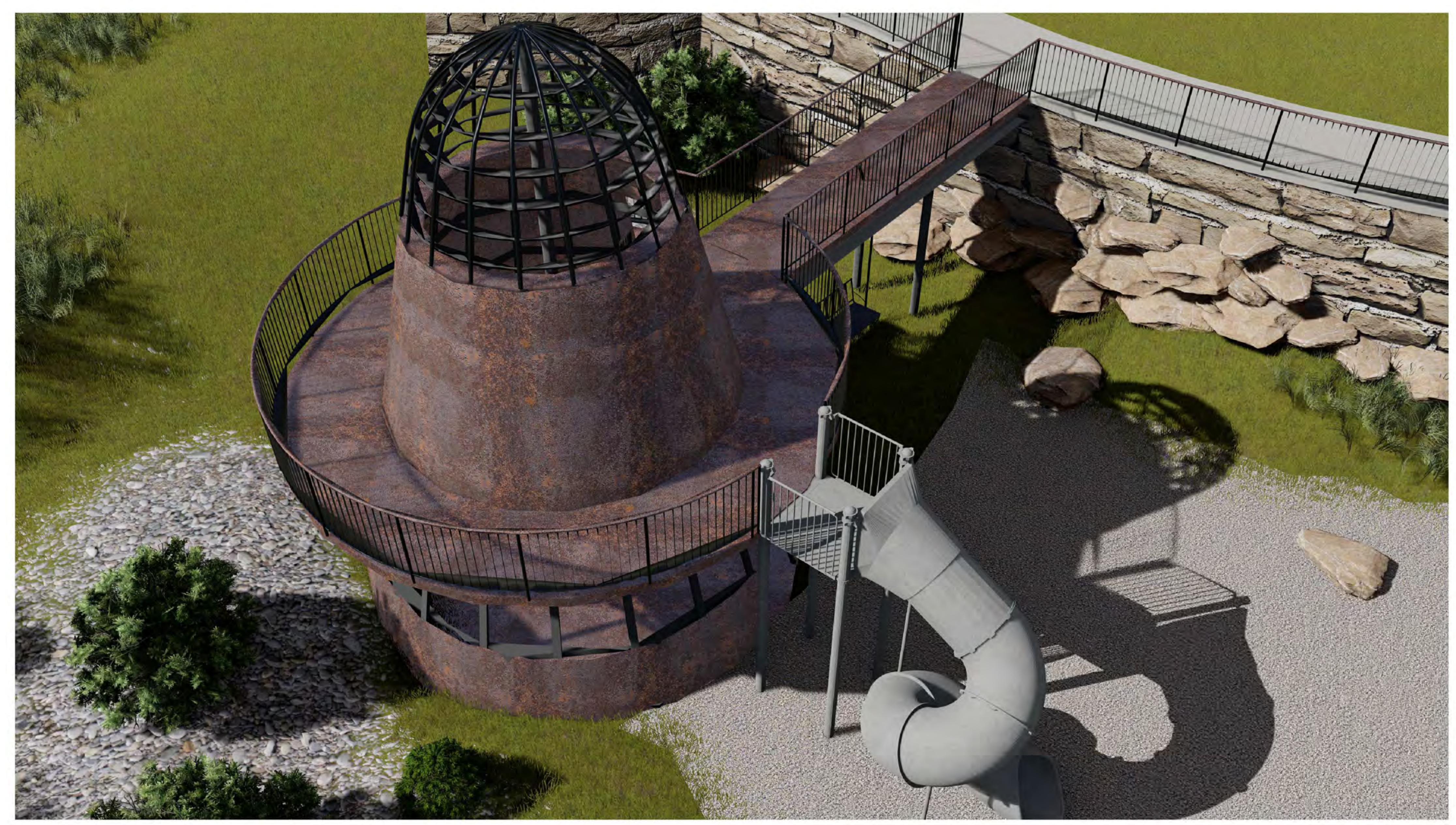
6 SECTION 1_DRB
3/16" = 1'-0"

OUTDOOR LIGHTING TABULATION

FIXTURE NAME	PROPOSED # OF FIXTURES	PROPOSED # LUMENS	PROPOSED CCT (IN KELVIN)
VOLT 12" HARDSCAPE LED LIGHT	8	65 EA	2700K

MATERIAL LEGEND

	STEEL PANELS COLOR: TERRA COTTA (SIMULATED TO CORTEN)
	STEEL TUBE POWDER COATED HANDRAILS COLOR: BLACK
	NEW TECH WOOD COMPOSITE DECKING COLOR: MADRID RED
	STEEL FRAME WITH DIAMOND PLATE MESH COLOR: BLACK FRAME, TERRA COTTA MESH



neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: ISSUE DATE
REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION

SCALE: As indicated

SHEET TITLE: SAWDUST WIGWAM

DRB 1.4

1/24/2024 4:13:49 PM

neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

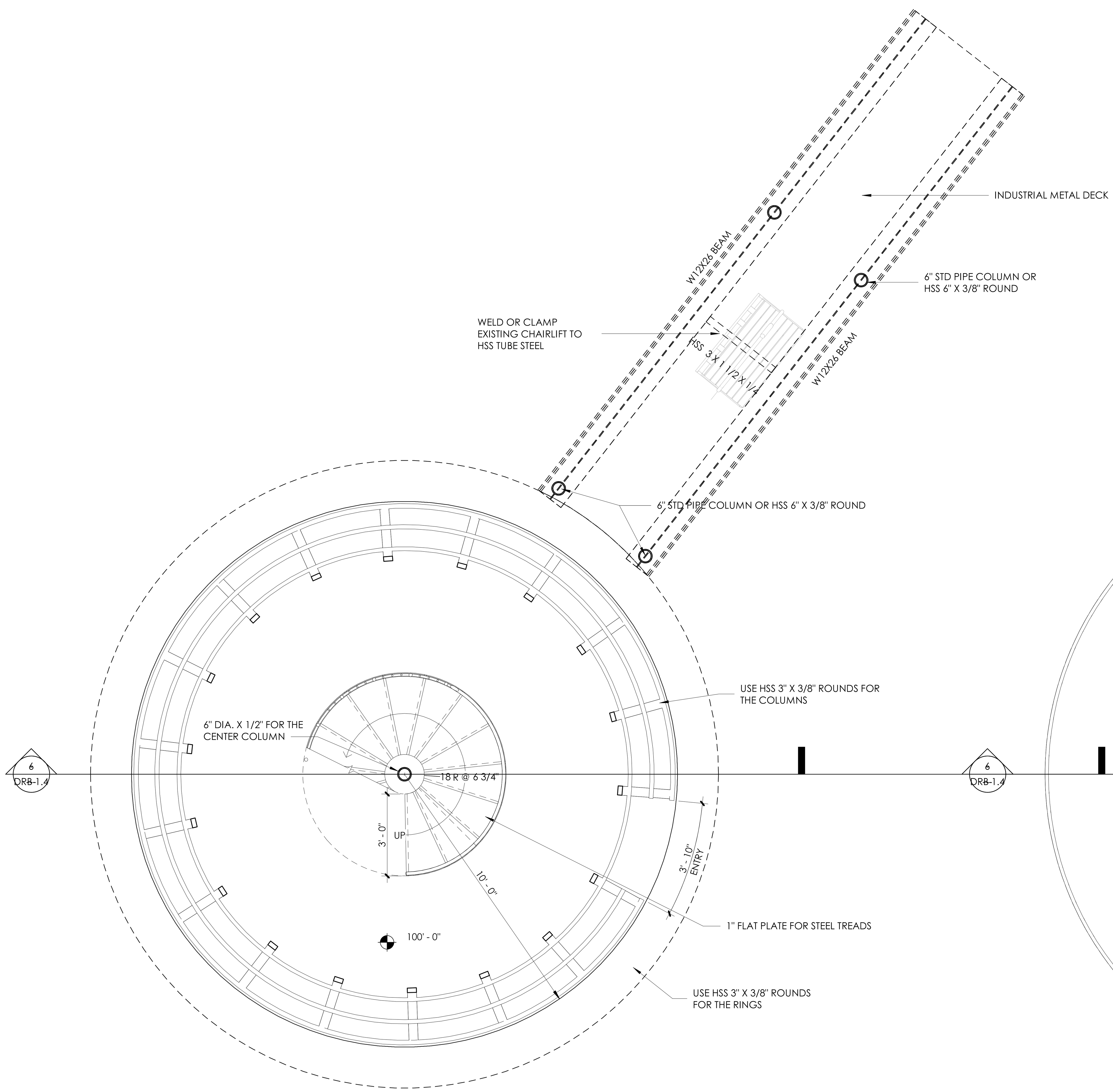
IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

GENERAL PLAN NOTES

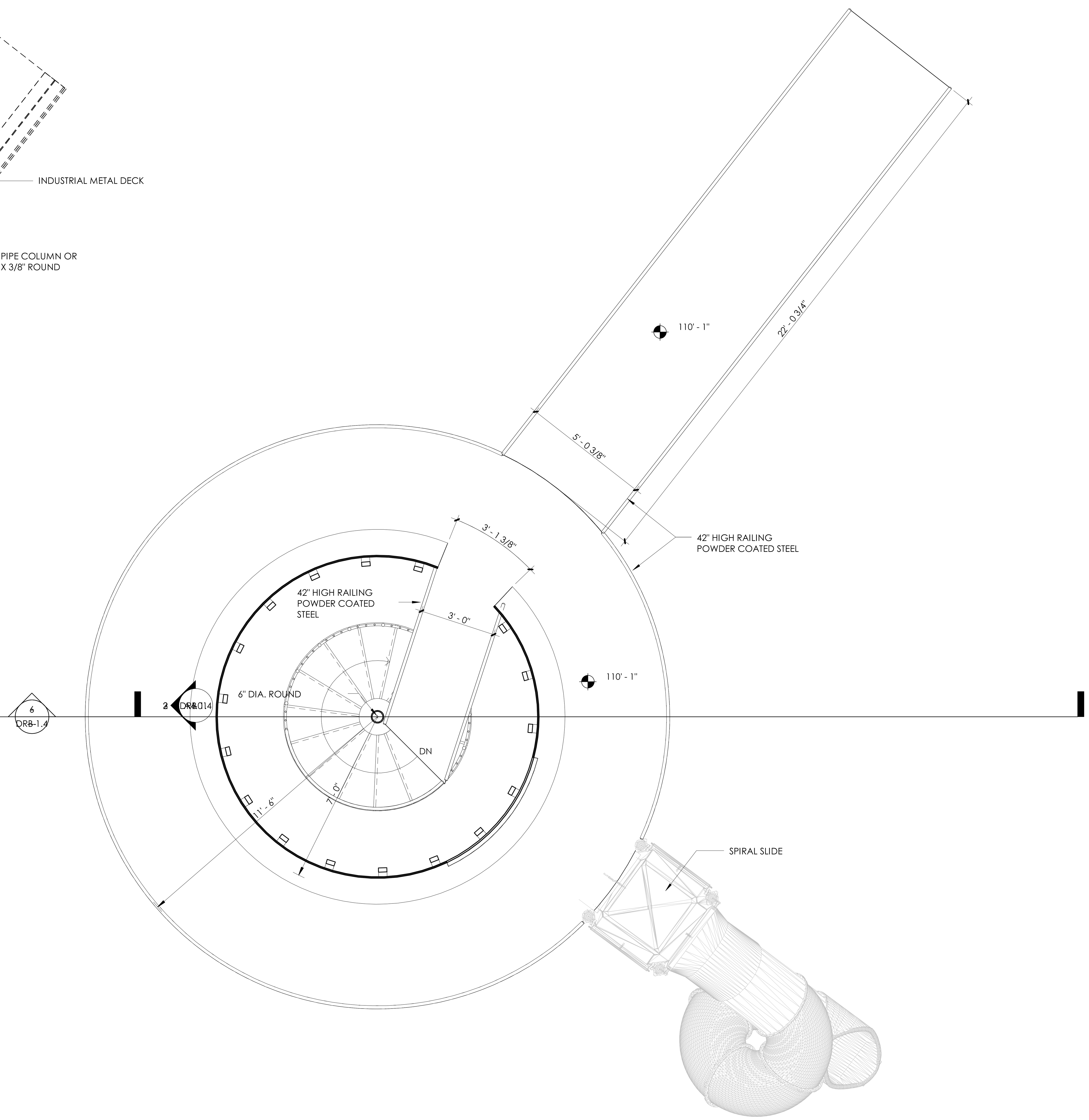
1.
2.
3.
4.
5.

FLAGNOTES



1 LEVEL 1 FLOOR PLAN

3/8" = 1'-0"



2 LEVEL 2 FLOOR PLAN

3/8" = 1'-0"

N

0' 1' 2' 4' 8' 16'

PROJ. NO. 000000
DRAWN: Author
CHECKED: Checker
APPROVED: Approver
DATE: ISSUE DATE
REVISIONS

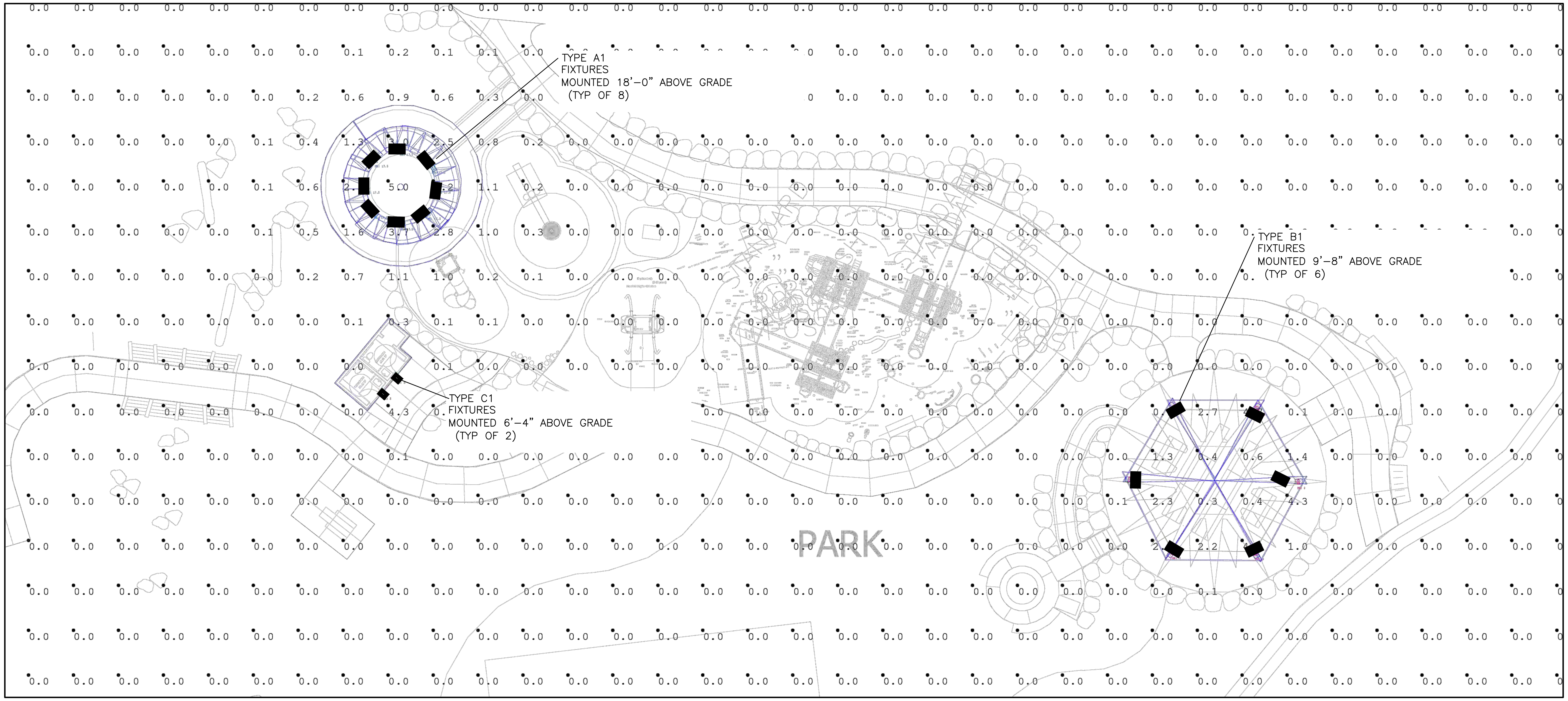
ISSUED FOR: NOT FOR CONSTRUCTION

SCALE: 3/8" = 1'-0"

SHEET TITLE:
FLOOR PLAN

A2.01

1/24/2024 4:13:40 PM



1 IDLEWILD PARK PHOTOMETRIC PLAN
1" = 20'-0"

N

Luminaire Schedule

Symbol	Qty	Label	Description	LLF	Luminaire Lumens	Total Watts
■	2	C1	EW39005	0.900	519	22.14
■	8	A1	B95-HE-BLK-LD4-16W-40-CL-120-EDC1	0.900	974	123.2
■	6	B1	BALLARD DESIGNS JETT SCONCE LD474	0.900	693	58.8

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
SITE	Illuminance	Fc	0.07	5.0	0.0	N.A.	N.A.
PATH	Illuminance	Fc	0.09	4.3	0.0	N.A.	N.A.
PAVILLION	Illuminance	Fc	1.78	4.3	0.3	5.93	14.33
RESTROOM	Illuminance	Fc	1.53	4.3	0.1	15.30	43.00
WIGWAM	Illuminance	Fc	2.75	5.0	1.1	2.50	4.55

COLORADO LICENSED
JEREMY NEAL JOHNSON
55872
3/15/24
PROFESSIONAL ENGINEER

EE PROJ #231216

ee LLC
EXCELLENCE IN ENGINEERING
12005 Antelope Trail
Parker, Colorado 80138
303-748-1189
info@eeparker.com

neo studio
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: KDA
CHECKED: SB/LP
APPROVED: SB/LP
DATE: 2.08.2024
REVISIONS

ISSUED FOR: NOT FOR CONSTRUCTION

SCALE:

SHEET TITLE:
IDLEWILD PARK PHOTOMETRIC PLAN

E0.12

NORDIC
EW3105
WALL

PROJECT

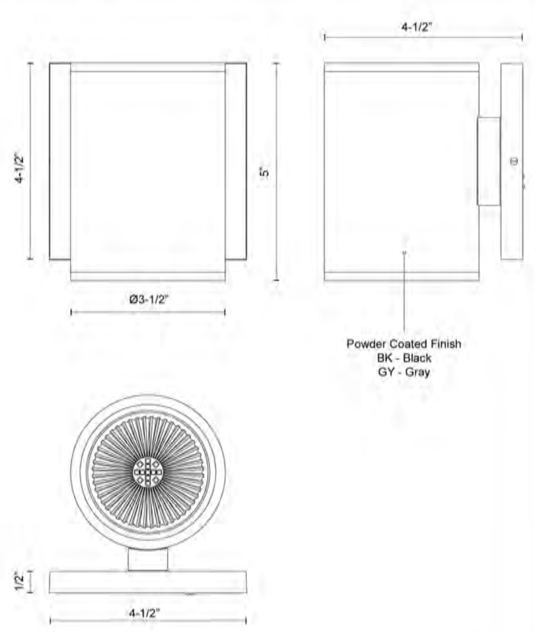
TYPE B1

EW3105-BK
Black

EW3105-GY
Gray

DESCRIPTION

High powered LED exterior single light wall mount fixture, die-cast aluminum housing molded into a cylinder shape with in powder coated black or gray finishes. Concealed inside is our 120V AC LED technology with a tempered glass diffuser radiating light either upward or downward depending how it is mounted on the wall. Certified ETL wet location listed and is available in different sizes and two light options (see Lund family for details).



SPECIFICATION DETAILS

Fixture Dimensions	D3-1/2" x H5" x E4-1/2"
Light Source	AC LED Module
Wattage	11W
Total Lumens	850lm
Delivered Lumens	BK-684lm; GY-693lm;
Voltage	120V
Color Temperature	3000K
CRI (Ra)	90CRI
Optional Color Temps	2700K - 5000K Available, Minimum Order Quantities Apply
LED Rated Life	50,000 hours
Dimming	100% - 10%, ELV Dimmer (Not Included)
Diffuser Details	Parabolic Aluminum Reflector
Glass Details	Clear Glass
Location	Wet
Illumination Direction	Downlight
Canopy Dimensions	W4-1/2" x H4-1/2" x E1/2"
Paint Finish	BK02; GY01;

* For custom options, consult factory for details.
* For warranty information, please visit www.kuzcolighting.com/warranty

KUZCO

CANADA: 19054 28TH AVENUE - SURREY, BC V3Z 6M3
USA: 3035 E. LONE MOUNTAIN ROAD - LAS VEGAS, NV 89081

WWW.KUZCOLIGHTING.COM

COMMENT

Intertek

Project	Idlewild Park	Catalog #	B95-HE-BLK-LD4-16W-40-CL-120-EDC1	Type	A1
Prepared by	Illumination Systems	Notes		Date	

Fail-Safe

B95

9"x5" Nominal
8/12/16/20 Watt IP65 rated
IP65 rated Wall or Ceiling
Polycarbonate Lens, Clear or Opal

Typical Applications:
Schools • Corridors • Dormitories • Rest Rooms • Public Gathering Places • Public Transportation Areas • Covered Walkways • Retail • Minimum Security

Interactive Menu

- Order Information page 2
- Product Specifications page 2
- Product Warranty

Product Certification

CERTIFIED IP65

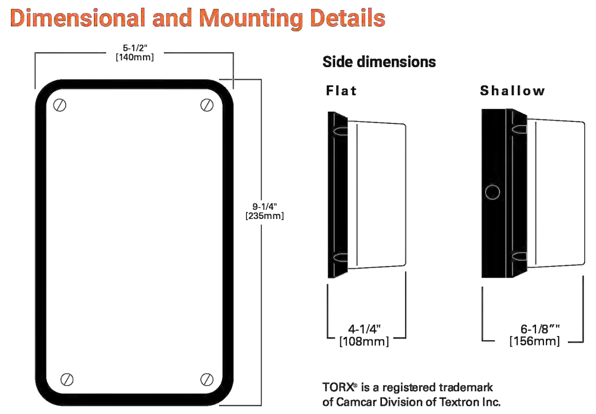
Product features

wet location BAA

Top Product Features

- 8, 12, 16, 20 watt / lumen packages
- Outdoor wet location listed
- IP65 ingress protection
- Full polycarbonate lens for ultimate protection
- Lens Lifetime Warranty against physical abuse
- Clear or opal lens, open or eyelid
- Shallow casting for surface conduit entry
- Stainless steel tamper proof hardware. Philips head available
- Custom colors available
- Options to meet Buy American Act requirements

Dimensional and Mounting Details



TORX® is a registered trademark of Camcar Division of Textron Inc.

COOPER Lighting Solutions

Fail-Safe — B95 LED

Order Information

SAMPLE ORDER NUMBER: **B95-HE-WHT-LD4-8W-35-CL-120-EDC1-PB120/SC95/WHT**
B95-PP-BLK-LD4-20W-30-OPL-UNV-EDC1

Domestic Preferences [6]	Product Family	Lens Paint Configuration	Lens Paint Color	LED	Wattage	Color Temperature	Lens	Voltage	Driver	Options	Accessories (Order separately) [7]
[Blank]=Standard **BAA**=Buy American Act	**B95**=Brick, nominal 9"x 5" [1], [2]	**[Blank]**=No Lens Paint **PP**=Perimeter Paint (Lens) **HE**=Eyelid (Paint upper half of Lens) [5] **VE**=Vertical Eyelid [5]	**[Blank]**=No Lens Paint **BLK**=Black **WHT**=White **BRZ**=Bronze **GRY**=Gray **DP**=Dark Platinum	**LD4**=LED Version 4.0	**8W**=8 Watt **12W**=12 Watt **16W**=16 Watt **20W**=20 Watt	**30**=3000K **35**=3500K **40**=4000K **50**=5000K	**CL**=Clear Prismatic Linear Ribbed **OPL**=Opal Polycarbonate	**UNV**=120V-277V **120**=120V **277**=277V	**EDC1**=Electronic Driver, Single Circuit, Non-Dim **ED1D1**=Electronic Driver, Single Circuit, Dimming, 1%	**F1**=Fuse (specify voltage), Shallow Casting only **SC95/Color**=Shallow Casting, B95 [3] **PB120/SC95/Color**=Photocell 120V, shallow casting [3], [4] **PB277/SC95/Color**=Photocell 277V, shallow casting [3], [4] **NTP**=Non tamper proof hardware (philips head)	**VRSD**=Vandal Resistant Screwdriver **VRSB**=Vandal Resistant Screw Bit **SCB-Color**=Shallow surface conduit box - field install kit example: SCB-WHT
Notes (6) Only product configurations with this designated prefix are built to be compliant with the Buy American Act of 1933 (BAA). Please refer to DOMESTIC PREFERENCES website for more information. Components shipped separately may be separately analyzed under domestic preference requirements.	**Notes** (1) Default Luminaire is flat mount. (2) Standard IP65 rated.	**Notes** (5) For HE and VE eyelids, the perimeter is always painted the color of the eyelid.								**Notes** (3) Always specify casting (SC95) paint color. SC95/BLK, as an example. (4) Example: PB120/SC95/GRY=gray casting paint	**Notes** (7) Accessories sold separately will be separately analyzed under domestic preference requirements. Consult factory for further information.

Product Specifications

Construction

- Injection molded polycarbonate lens, heavy gauge metal backpan and reflector.
- Cast aluminum surface box available.
- Gasket applied to back of fixture, to seal entire lens and housing.
- Standard Torx® T20 center pin reject screws.
- Non tamper-proof screws available.

Shallow Casting

- Die cast aluminum. Four 1/4" diameter fasteners required for maximum vandal resistance.
- Four 1/2" NPT entries for surface conduit.

Lens

- One-piece, injection-molded UV stabilized polycarbonate, min. 0.130" thick.
- Available in clear prismatic linear ribbed or opal.
- Optional perimeter and eyelid paint patterns.
- Lifetime Lens Warranty.

Gasket

- One piece, die-cut closed cell EPDM mounting gaskets seal entire lens and housing.

Electrical

- Energy efficient LEDs. Electronic driver, optional 0-10V dimming. 70% lumen maintenance at 50,000 hours, when operated in an environment as noted on the maximum ambient operating/ option matrix below.

Labels / Ratings

- UL/cUL listed for wet locations. IP65 ingress protection rating.
- Available to mount on combustible or non-combustible surfaces.

Warranty

- Five year warranty on the LEDs and electrical.
- **Lens Lifetime Warranty** Fail-Safe will repair or provide a replacement lens found to be inoperative due to physical abuse for the duration of the installation under normal conditions.

Energy and Performance Data

Maximum Ambient Operating/Option Matrix

	8W				12W			
	Flat Mount		Shallow Cast		Flat Mount		Shallow Cast	
	Ceiling	Wall	Ceiling	Wall	Ceiling	Wall	Ceiling	Wall
No Options	40C	40C	40C	40C	40C	40C	40C	40C
Fuse	N/A	N/A	40C	40C	N/A	N/A	40C	40C
Photocell	N/A	N/A	40C	40C	N/A	N/A	40C	40C
Fuse & Photocell	N/A	N/A	40C	40C	N/A	N/A	40C	40C

	16W				20W			
	Flat Mount		Shallow Cast		Flat Mount		Shallow Cast	
	Ceiling	Wall	Ceiling	Wall	Ceiling	Wall	Ceiling	Wall
No Options	25C	25C	40C	40C	25C	25C	40C	40C
Fuse	N/A	N/A	40C	40C	N/A	N/A	40C	40C
Photocell	N/A	N/A	40C	40C	N/A	N/A	25C	25C
Fuse & Photocell	N/A	N/A	40C	40C	N/A	N/A	25C	25C

Approximate Delivered Lumens

Wattage		Open	Eyelid
8W	Clear	825	475
	Opal	575	325
12W	Clear	1175	725
	Opal	850	475
16W	Clear	1575	950
	Opal	1125	625
20W	Clear	1975	1200
	Opal	1400	800

Reference actual IES files/LM79 data for exact lumen output values.

View IES files

COOPER Lighting Solutions

Cooper Lighting Solutions
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.cooperlighting.com

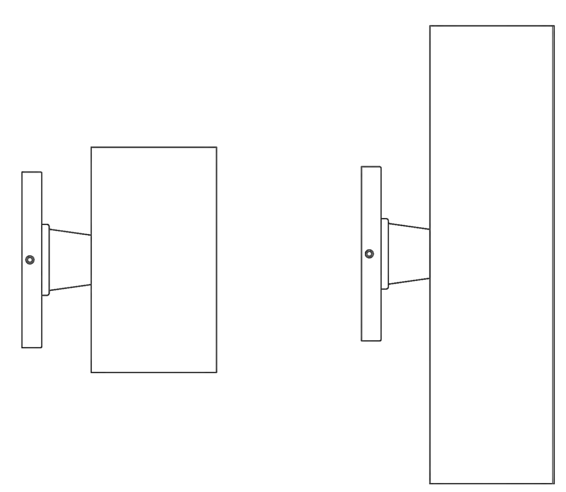
Specifications and dimensions subject to change without notice.

BALLARD DESIGNS

TYPE C1

Customer Service: 800-367-2810
Online: www.ballarddesigns.com

PRODUCT NAME: Jett Sconce
ITEM NUMBER: LO474
ASSEMBLED DIMENSIONS: 7"H x 5" Square (1 Light) or 14"H x 5" Square (2 Light)



IMPORTANT SAFETY INSTRUCTIONS:

- A licensed professional electrician should install direct wire fixtures.
- For your safety, please read instructions carefully and completely before beginning assembly or installation. If unsure, contact a licensed electrician.
- Fixture must be installed according to applicable code(s) by a person familiar with its construction and operation. If unsure, contact a licensed electrician.
- Fixture rated up to 65 Watt MAX Type A Medium Base Bulb (not included). LED recommended.
- Prior to installation or removal of a previous fixture, disconnect power by turning off power at circuit breaker or removing fuse at electrical panel.

WARNING:

- Deviation from assembly instructions may cause risk of fire or electric shock.
- To reduce risk of personal injury, always turn off fixture and allow bulbs to cool prior to replacement.
- Do not touch or look directly at illuminated bulbs.
- Keep flammable material away from illuminated bulbs.

PRODUCTS ARE NOT INTENDED FOR COMMERCIAL USE.
UPDATED: 9-22-2022

Prior to installation or removal of a previous fixture, disconnect power by turning off circuit breaker or removing fuse at electrical panel.

Remove all parts, hardware and protective packaging from carton and carefully arrange on a clean, level surface.

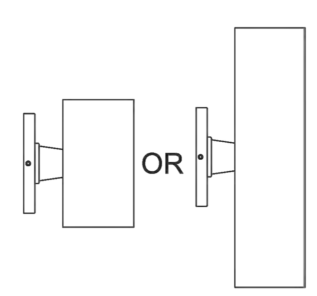
Prevent accidentally discarding small parts or hardware. Retain all carton contents until assembly and installation are complete.

Approved Location for Use: Dry/Damp/Wet Indoor or Outdoor
Assembly Time: 15 minutes
People Required: 1 or more

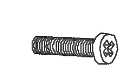
Tools Required: Screwdrivers (Phillips and Blade), Electrical Tape, Wire Strippers, Wire Cutters, Pliers

HARDWARE AND COMPONENTS

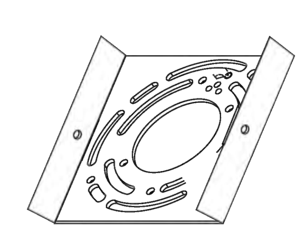
INCLUDED:



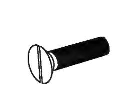
1 - Fixture Body (A)



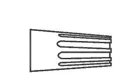
2 - Mounting Screws (C)



1 - Mounting Bracket (D)

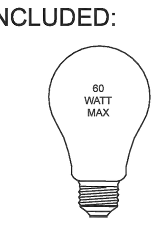


2 - Backplate Set Screws (B)

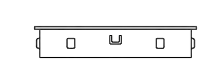


3 - Wire Connectors (E)

NOT INCLUDED:



1 or 2 - 60 Watt MAX
Type A Medium Base Bulb(s)
*LED recommended



1 - Top Cover (F)
(included with 2 Light Fixture only)
Use for Dark Sky Compliance

Cleaning and Care
Periodically wipe Fixture with a soft, dry cloth. Avoid harsh or abrasive chemicals as finish damage may result.

Customer Service: 800-367-2810
Online: www.ballarddesigns.com

neo studio

3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE 303.758.3800

IDLEWILD PARK AT RENDEZVOUS

WINTER PARK, COLORADO

PROJ. NO. 000000
DRAWN: KDA
CHECKED: SB/LP
APPROVED: SB/LP
DATE: 2.08.2024
REVISIONS

COLORADO LICENSED
JEREMY NEAL JOHNSON
55872
3/15/24
PROFESSIONAL ENGINEER

EE PROJ #231216A

ee LLC
EXCELLENCE IN ENGINEERING
12005 Antelope Trail
Parker, Colorado 80138
303-748-1189
info@eeparker.com

ISSUED FOR: NOT FOR CONSTRUCTION

SCALE:

SHEET TITLE:

IDLEWILD PARK
FIXTURE CUTSHEETS

E0.13

Jett Outdoor Wall Sconce

https://darksky.org/what-we-do/darksky-approved/products-companies/#!/Jett-Outdoor-Wall-Sconce/p/435534826

St. Thomas More Sc... Online Parenting Co... Member Login - MAC Amazon.com: Onlin... Executive Functioni... Dashboard | Khan A... Duolingo - The worl... (30) Art for Kids Hu... All Bookmarks

DarkSky Who we are What we do Get involved Donate / renew

What we do

DarkSky Approved

Products & companies

Devices & controls

Retailers

Outdoor Sports Lighting

Apply to be DarkSky Approved

Lodging

Find DarkSky Approved products

Jett Outdoor Wall Sconce

Store / Residential / Wall Mount

SKU 01242

Product Details

Product Website:
https://www.ballarddesigns.com/jett-outdoor-wall-sconce/lighting/outdoor-lighting/610930?listIndex=19&uniqueId=610930

Share this product with your friends

Share Share Pin it

Type here to search 50°F Mostly cloudy 7:52 PM 1/23/2024

VOLT 12" LED Hardscape Light
Jett Outdoor Wall Lighting Sco

https://darksky.org/what-we-do/darksky-approved/products-companies/#!/VOLT-12-LED-Hardscape-Light/p/67703453

St. Thomas More Sc... Online Parenting Co... Member Login - MAC Amazon.com: Onlin... Executive Functioni... Dashboard | Khan A... Duolingo - The worl... (30) Art for Kids Hu... All Bookmarks

DarkSky Who we are What we do Get involved Donate / renew

What we do

DarkSky Approved

Products & companies

Devices & controls

Retailers

Outdoor Sports Lighting

Apply to be DarkSky Approved

Lodging

Find DarkSky Approved products

VOLT 12" LED Hardscape Light

Store / Search by Use / Area

SKU 00576

Product Details

Product website:

http://www.voltlighting.com/landscape-lighting-12v...

Durable linear integrated 2700K LED fixture for mounting under capstones or overhangs

Share this product with your friends

Share Share Pin it

Type here to search 50°F Mostly cloudy 7:55 PM 1/23/2024

Dark Sky Compliant Outdoor Li × 6" Round Direct - Ceiling / Wall ×

darksky.org/what-we-do/darksky-approved/products-companies/#!/6-Round-Direct-Ceiling-Wall-Mount-Wildlife-Friendly/p/267974543/category=12627269

St. Thomas More Sc... Online Parenting Co... Member Login - MAC Amazon.com: Onlin... Executive Functioni... Dashboard | Khan A... Duolingo - The worl... (30) Art for Kids Hu... Note Identification All Bookmarks

DarkSky Who we are What we do Get involved Donate / renew

Search products

What we do

DarkSky Approved

Products & companies

Devices & controls

Retailers

Outdoor Sports Lighting

Apply to be DarkSky Approved

Lodging

6" Round Direct - Ceiling / Wall Mount - Wildlife Friendly

Store / Search by Use / Wall mount

SKU 01065

Product Details

Product Website: https://www.speclight.com/c955/6quot;-Round-Direct-Ceiling--Wall-Mount-Wildlife-Friendly.htm

Share this product with your friends

Share Share Pin it

Type here to search 46°F Cloudy 9:04 PM 3/11/2024

MEMO

TO	Town Council
FROM	James Shockey, AICP, Community Development Director
DATE	April 16, 2024
RE	Temporary Construction Easement / DIA – 820 Ski Idlewild Road – Idlewild (PLN23-115)

Temporary Construction Easement:
The Town of Winter Park owns the property where Idlewild Park (the "Park") is being constructed. Construction of the Park is required by the Rendezvous at Winter Park Final Development Plan (FDP). A Temporary Construction Easement Agreement (the "Agreement") is required to allow Rendezvous access for construction. The easement will be valid until completion of the Park with a final expiration of June 1, 2026. Rendezvous is expecting to complete the improvement by summer 2025.

Park improvements include earthwork, utility and drainage systems, concrete, guardrails, asphalt, signage, landscape, and irrigation, retaining walls, legacy wall, playground equipment, playground surfacing, restroom, pavilion, wigwam slide feature, fire pit and various site furnishings such as picnic tables, bike racks, and trash receptacles. Section 4 of the Agreement clarifies that the Town will purchase equipment for installation in the Park pursuant to its tax-exempt status and will be reimbursed for those costs as part of Rendezvous fulfilling its FDP requirements.

Development Improvement Agreement:

Included with this memo is a standard Development Improvement Agreement for approval of the identified public improvements. Rendezvous will be required to provide surety for completion of the Park at a cost of $1,995,612.00

Staff Recommendation:
Staff recommends the Town Council approve Resolution 2136, Series 2024, a resolution approving a Development Improvements Agreement and Temporary Construction Easement Agreement related to the construction of Idlewild Park.

However, this is a decision for the Council to make, and the Council may choose to approve or deny based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Council can rely on or the decision the Council makes.

Sample Motion for Approval:
I move to approve Resolution 2136, Series 2024, a resolution approving a Development Improvements Agreement and Temporary Construction Easement Agreement related to the construction of Idlewild Park.

Sample Motion for Denial:
I move to deny Resolution 2136, Series 2024, a resolution approving a Development Improvements Agreement and Temporary Construction Easement Agreement related to the construction of Idlewild Park, specifically: ***[articulate specific reasons for denial]***

TOWN OF WINTER PARK
RESOLUTION NO. 2136
SERIES 2024

A RESOLUTION APPROVING A DEVELOPMENT IMPROVEMENTS AGREEMENT AND TEMPORARY CONSTRUCTION EASEMENT AGREEMENT RELATED TO THE CONSTRUCTION OF IDLEWILD PARK

WHEREAS, the Town owns Tract A, Rendezvous at Winter Park Subdivision Exemption No. 2 and Tract A, Idlewild Subdivision Exemption No. 1, also known as 820 Ski Idlewild Road or Idlewild Park;

WHEREAS, pursuant to the Rendezvous at Winter Park Final Development Plan and related agreements, the developer of the Rendezvous Community shall design, construct and install Idlewild Park as a public park; and

WHEREAS, as part of construction an installation of Idlewild Park, a development improvements agreement and temporary construction easement agreement are necessary.

NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Winter Park, Colorado as follows:

Section 1. The Development Improvements Agreement by and between Arrowhead Winter Park Investors LLC, as developer of Idlewild Park, and the Town, is approved in substantially the form attached hereto, and the Mayor is authorized to execute the same on behalf of the Town.

Section 2. The Temporary Construction Easement Agreement by and between Arrowhead Winter Park Investors LLC, as developer of Idlewild Park, and the Town, is approved in substantially the form attached hereto, and the Mayor is authorized to execute the same on behalf of the Town.

PASSED, ADOPTED AND APPROVED this ___ day of _________, 2024.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

TEMPORARY CONSTRUCTION EASEMENT AGREEMENT

THIS TEMPORARY CONSTRUCTION EASEMENT AGREEMENT (the "**Agreement**") is made this _____day of ___________________, 2024 (the "**Effective Date**") by and between Arrowhead Winter Park Investors LLC ("**AWPI**"), a Colorado corporation with a legal address of 5291 E. Yale Avenue Denver, Colorado 80222, and the Town of Winter Park, a Colorado home rule municipality with a legal address of P.O. Box 3327, 50 Vasquez Road, Winter Park, Colorado 80482 (the "**Town**") (each a "Party" and collectively the "Parties").

WHEREAS, the Town is the owner of real property more particularly described in **Exhibit A**, attached hereto and incorporated herein by this reference (the "Property");

WHEREAS, the Town desires to grant AWPI a temporary construction easement on the Property for the purpose of constructing a neighborhood park as described and depicted in **Exhibit B**, attached hereto and incorporated herein by this reference (the "Easement"); and

WHEREAS, the Easement shall be owned by the Town after construction of the neighborhood park has been completed.

NOW THEREFORE, for and in consideration of the mutual promises and covenants contained herein and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Grant of Easement. The Town hereby grants and conveys to AWPI the Easement, in, under, over, above and across the Property in order to undertake all work necessary for the construction of the neighborhood park (the "**Improvements**").

2. Non-Exclusive Easement. The Easement is temporary and non-exclusive in nature. AWPI and its employees, licensees, invitees, agents, contractors, sub-contractors, and work personnel (collectively with AWPI, "AWPI Parties") may use the Easement for all purposes consistent with completing the Improvements, until the Easement is terminated as provided below.

3. Improvements. Prior to the use of the Easement described herein, AWPI shall provide the plans for the Improvements to the Town for the Town's approval. The Improvements shall be performed in a good and workmanlike and lien-free manner and in accordance with applicable Town requirements. All costs associated with completion of the Improvements shall be paid by AWPI.

4. Equipment Purchase. As part of the Town granting the Easement to AWPI, the Parties agree that AWPI shall select all equipment to be used to build the neighborhood park. Once AWPI has selected the equipment, the Town shall purchase the equipment pursuant to its tax-exempt status. AWPI shall reimburse the Town for all costs incurred related to the Town's purchase of equipment to build the neighborhood park. This shall be completed within a reasonable time once the Agreement has been executed.

5. Indemnification. AWPI shall defend, indemnify and hold the Town and its affiliated or related companies harmless from and against any and all liability for injury, damage, cost, loss and expense (including reasonable attorneys' fees and expenses) resulting from, arising out of, or in any way connected with AWPI's entry onto the Town Property and any activities conducted thereon by AWPI and AWPI's Parties employees, licensees, invitees, agents, contractors, sub-contractors, whether such injury or damage is sustained by AWPI, the Town or any third party, except to the extent caused by the negligence, intentional acts or breach of this Agreement by the Town or any employees, licensees, invitees, agents, contractors or sub-contractors thereof. The provisions of this Paragraph 5 shall survive termination of this Agreement.

6. Insurance. During the term of this Agreement, AWPI agrees to continuously maintain commercial general liability insurance, with liability limits not less than $1,000,000.00 per occurrence, $2,000,000.00 aggregate. Coverage shall insure against all liability of AWPI arising out of or in connection with the entry onto the Property and/or any activities conducted thereon by AWPI and the AWPI Parties. All insurance policies shall complement and supplement the indemnification provisions of this Agreement. The policy, or policies, shall: (i) name "its successors and assigns" as additional insureds; (ii) be issued by an insurance company that is reasonably acceptable to the Town; and (iii) provide that the insurance coverage shall not be cancelled, nor shall there be any change in the scope, or decrease in the amount or coverage without a minimum of ten (10) days prior written notice to the Town. Upon request, AWPI shall provide the Town with evidence of such insurance.

7. Duration of the Easement. The Easement shall automatically terminate on the date that is the earlier to occur of: (i) the completion of the Improvements; or (ii) June 1, 2026. Promptly following the termination of the Easement consistent with the foregoing, if requested by the Town, AWPI shall execute and deliver to the Town a written termination of this Easement in a form reasonably acceptable to the Town, to be filed of record in the real property records of Grand County, Colorado. Following the expiration date, if the surface of the Easement area is not restored to the Town's satisfaction, the Town shall give notice to AWPI to complete restoration within 30 days from notice being received by AWPI from the Town, or within a mutually agreed upon timeframe. If the restoration work is not completed within 30 days, or such mutually agreed upon timeframe, the Town may complete the restoration work and charge the reasonable costs incurred by the Town in completing the work to AWPI. AWPI shall pay the Town for such costs within 30 days of receipt of an invoice.

8. Notices. Any notice or demand made by a Party under the terms of this Agreement shall be in writing and shall be sent only by the following methods: personal delivery; United States Mail (first-class, certified, return-receipt requested, postage prepaid); or delivery by a national, overnight courier service which keeps records of deliveries (such as, by way of example but not limitation, Fed Ex, UPS and DHL). For purposes of giving notice hereunder, the respective addresses of the parties are, until changed as hereinafter provided, the following:

The Town: Town of Winter Park
50 Vasquez Road, PO Box 3327
Winter Park, Colorado 80482
Attn: Keith Reisberg

AWPI: Arrowhead Winter Park Investors
5291 E. Yale Avenue
Denver, Colorado 80222
Attn: Scott Chomiak

Any Party may change its address at any time by giving written notice of such change to the other Party in the manner provided herein. Counsel for a Party may give notice for that Party with the same force and effect as if given by the Party. All notices shall be deemed given on the date of personal delivery, or if mailed by certified mail, on the delivery date or attempted delivery date shown on the return-receipt, or if sent by overnight delivery, on the date delivered.

9. Integration. This Agreement constitutes the entire agreement between the Parties, superseding all prior oral or written communications.

10. Further Assurance. The Parties agree to execute and deliver, or shall otherwise cause to be executed and delivered, from time to time, such further instruments, notices and other documents and do such other and further acts and things as may be reasonably necessary to more fully and effectively consummate the transactions contemplated herein, as the other Party reasonably may request, all without further consideration.

11. Governing Law and Venue. This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado and any legal action concerning the provisions hereof shall be brought in Grand County, Colorado. In its use of the Easement, AWPI shall at all times comply with all applicable law, including without limitation all current and future federal, state and local statutes, regulations, ordinances and rules relating to: the emission, discharge, release or threatened release of a hazardous material into the air, surface water, groundwater or land; the manufacturing, processing, use, generation, treatment, storage, disposal, transportation, handling, removal, remediation or investigation of a hazardous material; and the protection of human health, safety or the indoor or outdoor environmental, including without limitation the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601, et seq. ("CERCLA"); the Hazardous Materials Transportation Act, 49 U.S.C. § 1801, et seq.; the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, et seq. ("RCRA"); the Toxic Substances Control Act, 15 U.S.C. § 2601, et seq.; the Clean Water Act, 33 U.S.C. § 1251, et seq.; the Clean Air Act; the Federal Water Pollution Control Act; the Occupational Safety and Health Act; all applicable environmental statutes of the State of Colorado; and all other federal, state or local statutes, laws, ordinances, resolutions, codes, rules, regulations, orders or decrees regulating, relating to, or imposing liability or standards of conduct concerning any hazardous, toxic or dangerous waste, substance or material, as now or at any time hereafter in effect.

12. Severability. If any provision of this Agreement is found by a court of competent jurisdiction to be unlawful or unenforceable for any reason, the remaining provisions hereof shall remain in full force and effect.

13. No Partnership. This Agreement shall not be construed to constitute any form of partnership or joint venture between the Town and AWPI.

14. Warranty. The Town warrants that it has the full right and legal authority to make the grant of the Easement.

15. Modification. This Agreement may only be modified upon written agreement of the Parties.

16. Recordation. Except as otherwise expressly provided herein, all provisions of this Agreement, including the benefits, burdens and covenants, are intended to run with the land and shall be binding upon and inure to the benefit of the respective successors and assigns of the Parties. The Town shall record this Agreement in a timely fashion in the official records of Grand County and may re-record it at any time as may be required to preserve its rights in this Agreement.

17. No Merger. It is the express intent of the Parties that the doctrine of merger shall not apply to this Agreement and there will be no merger of estate between the Easement granted by this Agreement and the Property.

18. Assignment. Neither this Agreement nor any of the rights or obligations of the Parties shall be assigned by either Party without the written consent of the other.

19. Governmental Immunity. The Town and its officers, attorneys and employees, are relying on, and do not waive or intend to waive by any provision of this Agreement, the monetary limitations or any other rights, immunities or protections provided by the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, *et seq.,* as amended, or otherwise available to the Town and its officers, attorneys or employees.

20. Subject to Annual Appropriation. Consistent with Article X, § 20 of the Colorado Constitution, any financial obligation of the Town not performed during the current fiscal year is subject to annual appropriation, shall extend only to monies currently appropriated and shall not constitute a mandatory charge, requirement, debt or liability beyond the current fiscal year.

[SIGNATURES FOLLOW]

IN WITNESS WHEREOF, the Parties have executed this Agreement on the Effective Date.

THE TOWN:

Town of Winter Park, Colorado

By: ________________________________
Keith Riesberg, Town Manager

ATTEST:

____
Danielle Jardee, Town Clerk

AWPI:

Arrowhead Winter Park Investors LLC, a Colorado limited liability company

By: Rendezvous Arrow LLC, a Colorado limited liability company
By: Koelbel and Company, a Colorado corporation, its Manager

By: ___________________________
Printed Name: ____________________
Its: ___________________________

STATE OF COLORADO)
)ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this ___ day of ____________, 2024, by ________________________, as _____________________ of Koelbel and Company, a Colorado corporation, Manager of Arrowhead Winter Park Investors LLC, a Colorado limited liability company.

WITNESS my hand and official seal.

____
Notary Public

My Commission Expires: __________________

EXHIBIT A

Legal Description:

Tract A, Rendezvous at Winter Park Subdivision Exemption No. 2 and
Tract A, Idlewild Subdivision Exemption No. 1

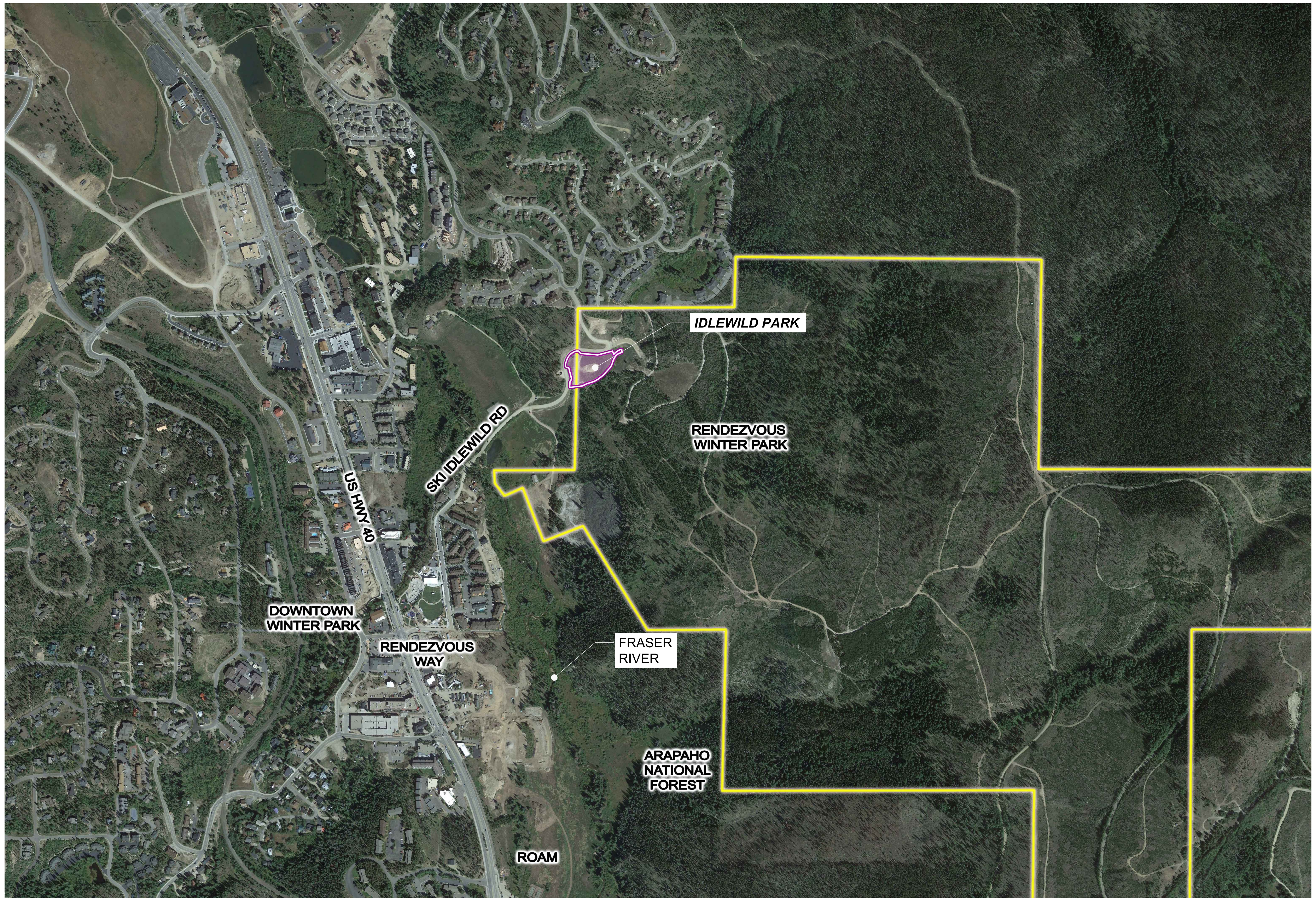
EXHIBIT B

Improvements to be purchased for Idlewild Park include:
earthwork, utility and drainage systems, concrete, guardrails, asphalt, signage, landscape and irrigation, retaining walls, legacy wall, playground equipment, playground surfacing, restroom, pavilion, wigwam slide feature, fire pit and various site furnishings such as picnic tables, bike racks, trash receptacles.

RENDEZVOUS - IDLEWILD PARK

MAJOR SITE PLAN APPLICATION

VICINITY MAP



SCALE: 1:500

LEGAL DESCRIPTION

SUBDIVISION EXEMPTION NO. 2, RENDEZVOUS AT WINTER PARK, FILING NO. 1, TRACT A, BEING A RE-PLAT OF SUBDIVISION EXEMPTION NO. 1, RENDEZVOUS AT WINTER PARK, FILING NO. 1, RECEPTION NO. 2021012863.

ZONING & SETBACKS & NOTES

ZONING - RENDEZVOUS FDP PARK

PLANNING AREA 5

FRONT- 10' SETBACK
SIDE- 5' SETBACK
REAR- 10' SETBACK

SITE DATA CHART

IDLEWILD PARK - SITE AREA

TYPE	AREA SQ.FT.	AREA ACRES	% OF TOTAL
CONCRETE WALK	5,288	0.12	8.1%
CRUSHER FINES TRAIL	3,219	0.07	4.9%
LANDSCAPE AREA	57,098	1.31	87.0%
SUBTOTAL	**65,605**	**1.51**	**100.0%**

*OUTSTANDING AREA INCLUDES PLAY SURFACES AND AREA UNDER THE PROPOSED PAVILION

SHEET INDEX

DEVELOPER

ARROWHEAD WINTER PARK INVESTORS, LLC.
5291 E. YALE AVE
DENVER, CO 80222
PHONE: 970-726-4500

ARCHITECTS

NEO STUDIO
MICHAEL NODA - REGISTERED ARCHITECT
3560 WALNUT ST. UNIT A
DENVER, CO 80205
PHONE: 303-758-3800

PLANNER/ LANDSCAPE ARCHITECT

VOGEL & ASSOCIATES
165 S. UNION BLVD., SUITE 440
LAKEWOOD, CO 80228
CONTACT: JEFF VOGEL
PHONE: 303-893-4288

DHM DESIGN
900 S. BROADWAY., SUITE 300
DENVER, CO 80209
CONTACT: BILL NEUMANN
PHONE: 303-892-5566

CIVIL ENGINEER

TOPKNOT ENGINEERING (TKE)
TONY KREMPIN
998 COUNTY ROAD 553 (POB 2225)
GRANBY, CO 80446
PHONE: 970-281-5280

SURVEYOR

TIM SHENK LAND SURVEYING, INC.
TIMOTHY R. SHENK
BOX 1670. GRANBY, CO 80446
PHONE: 970-887-1046

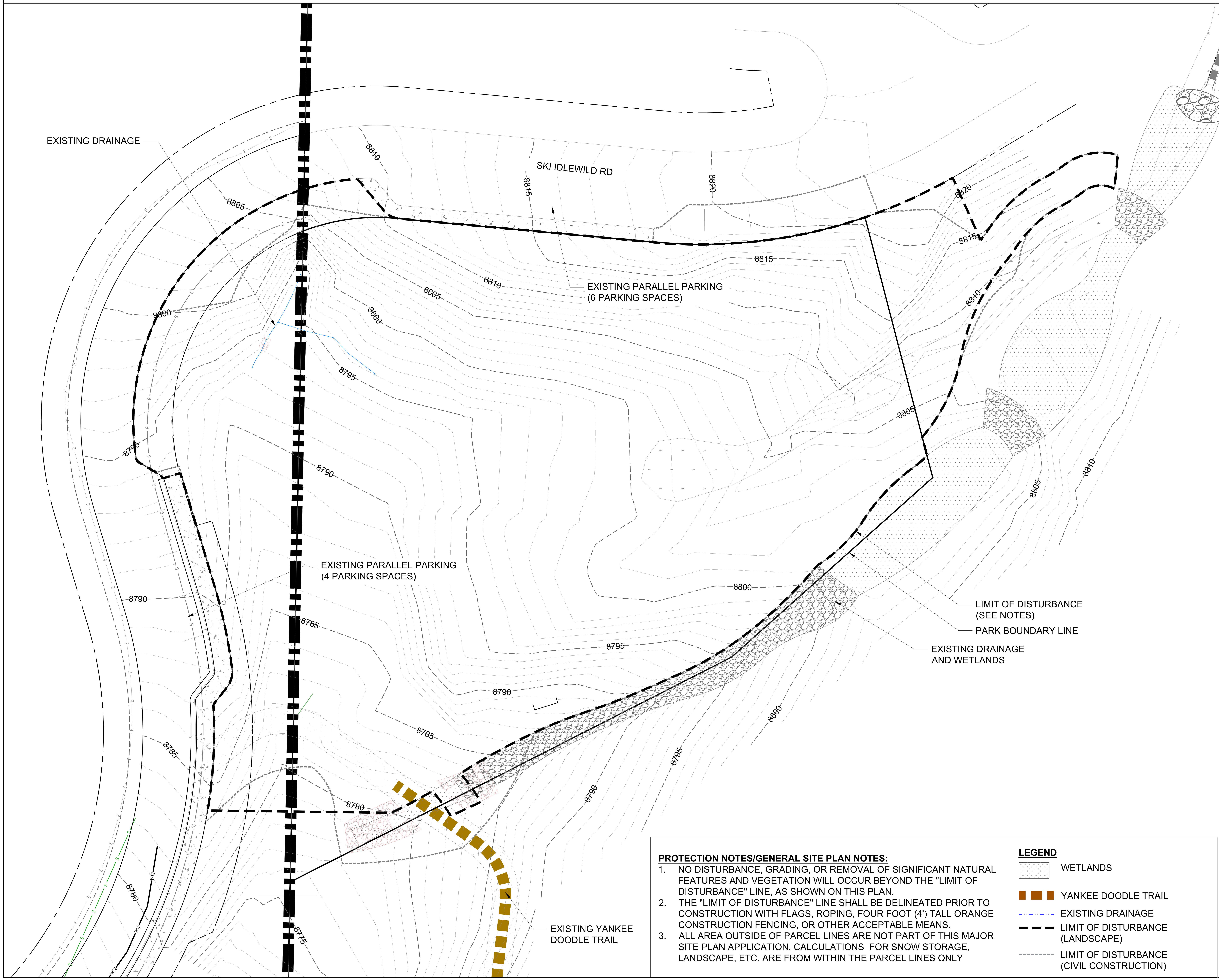
VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 2: 03/14/2024	

COVER SHEET

C



PROTECTION NOTES/GENERAL SITE PLAN NOTES:

1. NO DISTURBANCE, GRADING, OR REMOVAL OF SIGNIFICANT NATURAL FEATURES AND VEGETATION WILL OCCUR BEYOND THE "LIMIT OF DISTURBANCE" LINE, AS SHOWN ON THIS PLAN.
2. THE "LIMIT OF DISTURBANCE" LINE SHALL BE DELINEATED PRIOR TO CONSTRUCTION WITH FLAGS, ROPING, FOUR FOOT (4') TALL ORANGE CONSTRUCTION FENCING, OR OTHER ACCEPTABLE MEANS.
3. ALL AREA OUTSIDE OF PARCEL LINES ARE NOT PART OF THIS MAJOR SITE PLAN APPLICATION. CALCULATIONS FOR SNOW STORAGE, LANDSCAPE, ETC. ARE FROM WITHIN THE PARCEL LINES ONLY

LEGEND

- WETLANDS
- YANKEE DOODLE TRAIL
- EXISTING DRAINAGE
- LIMIT OF DISTURBANCE (LANDSCAPE)
- LIMIT OF DISTURBANCE (CIVIL CONSTRUCTION)

SCALE: 1"=20'

0 10 20 40

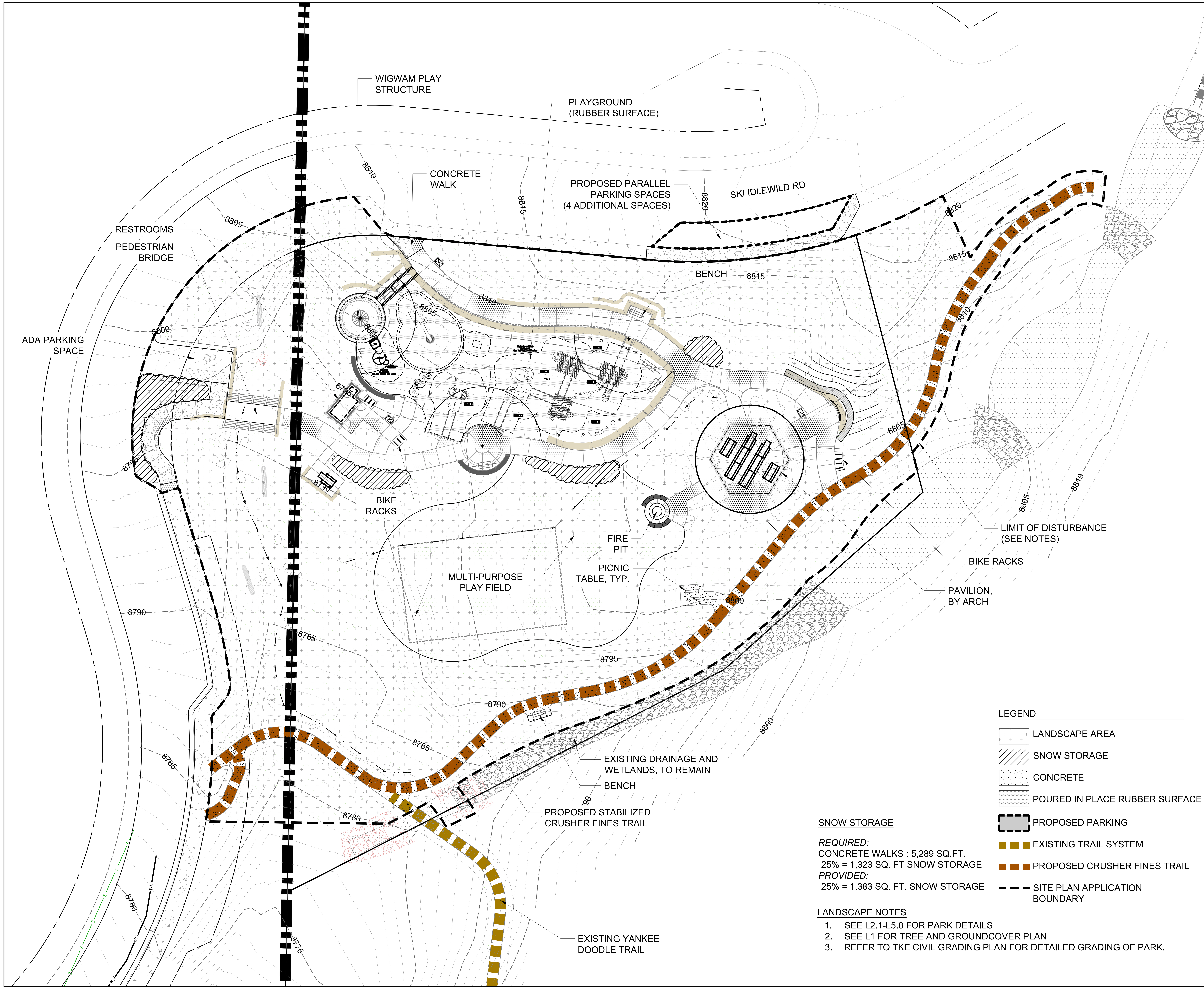
VOGEL & ASSOCIATES
Land Planning ◆ Landscape Architecture ◆
Development Consulting ◆
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS
IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 1: 03/14/2024	

SITE PLAN
EXISTING CONDITIONS

S1



LEGEND

- LANDSCAPE AREA
- SNOW STORAGE
- CONCRETE
- POURED IN PLACE RUBBER SURFACE
- PROPOSED PARKING
- EXISTING TRAIL SYSTEM
- PROPOSED CRUSHER FINES TRAIL
- SITE PLAN APPLICATION BOUNDARY

SNOW STORAGE

REQUIRED:
CONCRETE WALKS : 5,289 SQ.FT.
25% = 1,323 SQ. FT SNOW STORAGE
PROVIDED:
25% = 1,383 SQ. FT. SNOW STORAGE

LANDSCAPE NOTES

1. SEE L2.1-L5.8 FOR PARK DETAILS
2. SEE L1 FOR TREE AND GROUNDCOVER PLAN
3. REFER TO TKE CIVIL GRADING PLAN FOR DETAILED GRADING OF PARK.

SCALE: 1"=20'

0 10 20 40

VOGEL & ASSOCIATES
Land Planning ♦ Landscape Architecture ♦ Development Consulting ♦
475 W. 12th Avenue - Suite E
Denver, Colorado 80204-3688 - (303) 893-4288

RENDEZVOUS IDLEWILD PARK
WINTER PARK, CO 80482

DOCUMENT SET	ISSUE DATE
SUBMITTAL SET	12/06/2023
CONSTRUCTION SET	
DWN. BY:	MT
REVISIONS:	
REV 1: 02/14/2024	
REV 1: 03/14/2024	

SITE PLAN
IDLEWILD PARK

S2

DEVELOPMENT IMPROVEMENTS AGREEMENT

THIS DEVELOPMENT IMPROVEMENTS AGREEMENT ("Agreement") is made and entered into this_____ day of_____________, 20_, by and between the TOWN OF WINTER PARK, a Colorado municipal corporation having an address of P.O. Box 3327, 50 Vasquez Road, Winter Park, Colorado 80482 (the "Town"), and Arrowhead Winter Park Investors LLC, a Colorado Limited Liability Company, having an address of 5291 East Yale Avenue, Denver Colorado 80220 ("Developer") (collectively the "Parties").

WHEREAS, Developer is the owner of certain real property located in the Town, more particularly described in **Exhibit A** attached hereto and incorporated herein by reference (the "Property");

WHEREAS, the Town has approved Developer's development plan for the Property, which is attached hereto as **Exhibit B**, and incorporated herein by reference; and

WHEREAS, the Town's approval of the Developer's proposed development on the Property is contingent upon the express condition that all duties created by this Agreement are faithfully performed by Developer.

NOW, THEREFORE, for and in consideration of the mutual promises and covenants contained herein, the sufficiency of which is mutually acknowledged, the Parties hereto agree as follows:

1. Purpose. The purpose of this Agreement is to set forth the terms, conditions and fees to be paid by Developer in connection with the improvements for development of the Property. All conditions in this Agreement are in addition to any requirements of the Winter Park Town Code, state statutes and other Town ordinances, and are not intended to supersede any requirements contained therein.

2. Public Improvements. Developer agrees to complete or pay for, as described herein, the public improvements set forth in **Exhibit C**, attached hereto and incorporated herein by this reference ("Public Improvements") subject to this Agreement and in accordance with the approved development plan.

3. Construction.

   a. All Public Improvements shall be installed and completed at the expense of Developer and dedicated or conveyed to the Town upon the Town's acceptance thereof or dedicated or conveyed and accepted by an agency, association, or district as required by law or as acceptable to the Town. The estimated cost of the Public Improvements is set forth in **Exhibit C**.

   b. The Town may make reasonable engineering observations at Developer's expense. Observation, acquiescence in or approval by any inspector shall not constitute the approval by the Town of any portion of such Public Improvements.

   c. Developer shall provide all necessary engineering designs, surveys, field surveys and incidental services related to the construction of the Public Improvements at its sole cost and expense, including reproducible "as-built" drawings certified accurate by a professional engineer registered in the State of Colorado.

4. Completion and Preliminary Acceptance. Except as otherwise provided above, the obligations of Developer in Section 3 hereof shall be performed within three years. A certificate of occupancy shall not be issued until such obligations have been satisfied unless expressly agreed to otherwise. Proper application to the Town for preliminary acceptance of Public Improvements shall be made by Developer in advance. Upon completion of construction of the Public Improvements, the Town or a Town-accepted agency, association, or district shall inspect the Public Improvements and certify with specificity their conformity or lack thereof to the Town's specifications. Developer shall make all corrections necessary to bring the Public Improvements into conformity with the Town's specifications. Upon determination by the Town that the Public Improvements conform with all of the Town's specifications, the Town shall preliminarily accept the Public Improvements and the two-year warranty period set forth in Section 5, below, shall commence.

5. Phasing: The Public Improvements are planned to be constructed continuously, but in phases as outlined in Exhibit C.

6. Warranty. Upon preliminary acceptance of the Public Improvements by the Town, Developer shall warrant any and all Public Improvements for a period of two (2) years from the date the Town grants preliminary acceptance of the Public Improvements. Developer shall be responsible for scheduling the necessary inspections for preliminary acceptance. Specifically, but not by way of limitation, Developer shall warrant that all Public Improvements are free of defects in materials or workmanship for a period of two (2) years, as stated above. Developer shall be responsible, at Developer's cost to maintain all Public Improvements until such improvements are finally accepted and conveyed by the Town. The Town or a Town-accepted agency, association, or district will accept for maintenance all Public Improvements after the warranty period has expired, provided all warranty work has been completed. The Town shall accept for snow removal purposes only all dedicated public streets after preliminary acceptance has been granted in writing by the Town.

7. Final Acceptance of Public Improvements. Upon completion of the two (2) year warranty period set forth in Section 5, above, the Town shall inspect the Public Improvements and certify with specificity their conformity or lack thereof to the Town's specifications. Developer shall make all corrections necessary to bring the Public Improvements into conformity with the Town's specifications. Upon determination by the Town that the Public Improvements conform with all of the Town's specifications, the Town shall accept the Public Improvements. Developer shall convey the Public Improvements to the Town by bill of sale or warranty deed as determined acceptable by the Town in its sole judgment. Upon conveyance of the Public Improvements Developer shall warrant that the title conveyed is marketable and its transfer rightful.

8. Ownership. All Public Improvements shall be conveyed to the Town upon final acceptance.

9. Performance Guarantee.

a. To secure the construction and installation of the Public Improvements, Developer shall furnish the Town, at Developer's expense and prior to commencement of construction, cash or an irrevocable letter (or letters) of credit in which the Town is designated as beneficiary in an amount equal to one hundred and twenty percent (120%) of the total Estimated Costs of development (the "Performance Guarantee").

b. The Performance Guarantee shall be in a form approved by the Town in its sole discretion.

c. The purpose of the Estimated Costs is solely to determine the amount of security. No representations are made as to the accuracy of these estimates, and Developer agrees to pay all costs of the Public Improvements for which it is legally obligated, regardless of the Estimated Costs.

d. The Estimated Costs may increase in the future. Accordingly, the Town reserves the right to review and adjust the Estimated Costs at the time a building permit is issued and annually if the Public Improvements have not been completed. Adjustments shall be made according to changes in the Construction Costs Index as published by the Engineering News Record. If the Town adjusts the Estimated Costs, the Town shall give written notice to Developer. Developer shall, within thirty (30) days after receipt of said written notice, provide the Town with a new or amended Performance Guarantee in the amount of the adjusted Estimated Costs. If Developer fails to provide a new or amended Performance Guarantee, the Town may exercise the remedies provided for in Section 12 hereof; provided, however, that prior to increasing the amount of the Performance Guarantee, the Town shall give credit to Developer for all Public Improvements which have actually been completed and accepted, so that the amount of the Performance Guarantee relates to the cost of required Public Improvements not yet constructed.

e. If the Public Improvements are not constructed or completed within the period of time specified by Section 4 hereof, the Town may draw on the Performance Guarantee to complete the Public Improvements. If the Performance Guarantee is to expire within fourteen (14) calendar days and Developer has not yet provided a satisfactory replacement, the Town may draw on the Performance Guarantee and either hold such funds as security for performance of this Agreement or spend such funds to finish the Public Improvements or correct problems with the Public Improvements as the Town deems appropriate.

f. Upon preliminary acceptance, the Performance Guarantee shall be reduced to the amount of twenty percent (20%) of the total actual cost of construction and installation of such phase of Public Improvements. The reduced Performance Guarantee shall be held by the Town until expiration of the two (2) year warranty period.

10. Land Dedication; Fee in Lieu. To the extent it does not conflict with this Agreement, land dedications and fees-in-lieu shall be provided as stated in Winter Park Town Code. In the case of a conflict between the Winter Park Town Code and this Agreement, the terms of this Agreement shall apply.

11. Nuisance Conditions. Developer shall prevent the existence of any nuisances by way of its construction activities, as nuisances are defined by the Winter Park Town Code. If the Town determines that a nuisance exists, Developer shall be subject to the provisions of the Winter Park Town Code regarding the abatement of nuisances and the cost assessed therefor. If the nuisance is not abated or an abatement plan is not submitted to the satisfaction of the Town, the Town may, upon thirty (30) days' notice under this Agreement, draw upon the Performance Guarantee to pay the cost of abating the nuisance, including any expenses and penalties incurred under the Winter Park

Town Code. The Town may exercise this right in addition to, or in lieu of, the withholding of permits or certificates of occupancy. The decision to draw on the Performance Guarantee shall be within the sole discretion of the Town.

12. Indemnification.

a. Developer hereby agrees to indemnify and hold harmless the Town, its officers, employees, agents or servants from any and all suits, actions and claims of every nature and description caused by, arising from or on account of any act or omission of Developer, or of any other person or entity for whose act or omission Developer is liable, with respect to construction of the Public Improvements; and Developer shall pay any and all judgments rendered against the Town as the result of any suit, action or claim within the scope of the indemnification provision contained in the prior clause, together with all reasonable expenses and attorney fees incurred by the Town in defending any such suit, action or claim.

b. Developer shall pay all property taxes on the Property dedicated to the Town accrued as of the date of dedication, and shall indemnify and hold harmless the Town for any property tax liability.

13. Breach.

a. If Developer breaches this Agreement, the Town may take such action as permitted or authorized by law, this Agreement or the ordinances of the Town, as the Town deems necessary to protect the public health, safety and welfare. The remedies include, but are not limited to:

i. The refusal to issue any building permit or certificate of occupancy;

ii. The revocation of any building permit previously issued under which construction directly related to such building permit has not commenced, except a building permit previously issued to a third party;

iii. A demand that the security given for the completion of the public improvements be paid or honored; and

iv. Any other remedy available at law or in equity.

b. Unless necessary to protect the immediate health, safety and welfare of the Town, or to protect the interest of the Town with regard to security given for the completion of the public improvements, the Town shall provide Developer thirty (30) days' written notice of its intent to take any action under this Section, during which Developer may cure the breach and prevent further action by the Town.

c. The rights and remedies of the Town under this Agreement are in addition to any other rights and remedies provided by law. The expiration of this Agreement shall in no way limit the Town's legal or equitable remedies, or the period in which such remedies may be asserted, for Public Improvement work negligently or defectively performed.

d. Should this Agreement become the subject of litigation to resolve a claim of breach by Developer and a court of competent jurisdiction determines that Developer was in breach of this Agreement, Developer shall pay the attorney fees, expenses and court costs of the Town.

14. Waiver. In executing this Agreement, Developer waives all objections it may have concerning defects, if any, in the formalities whereby it is executed, or concerning the power of the Town to impose conditions on Developer as set forth herein, and concerning the procedure, substance and form of the resolution adopting this Agreement. Developer expressly agrees that the Town cannot be legally bound by the representations of any of its officers or agents or their designees, except in accordance with the Winter Park Town Code and the laws of the State of Colorado.

15. Modification. This Agreement shall not be modified, except by subsequent written agreement of the parties hereto.

16. Integration; Annexation Agreement. This Agreement and any attached exhibits constitute the entire agreement between Developer and the Town.

17. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and assigns.

18. Severability. If any provision of this Agreement is determined to be void by any court of competent jurisdiction, such determination shall not affect any other provision hereof, and all of the other provisions shall remain in full force and effect. It is the intention of the parties hereto that if any provision of this Agreement is capable of two constructions, one of which would render the provision void, and the other which would render the provision valid, then the provision shall have the meaning which renders it valid.

19. Governing Law and Venue. This Agreement shall be governed by the laws of the State of Colorado, and any legal action concerning the provisions hereof shall be brought in Grand County, Colorado.

20. Assignment. There shall be no transfer or assignment of any of the rights or obligations of Developer under this Agreement without the prior written approval of the Town, which may be withheld in the Town's sole discretion; except that this Agreement and Developer's rights hereunder may be assigned by Developer in whole, but not in part, to a company wholly owned by Developer. In the event of an assignment as permitted herein, the assignee shall assume full responsibility for fulfilling the remaining obligations of Developer under this Agreement, and shall execute an acknowledgement of this responsibility in the Town's favor. Failure of the assignee to execute such an acknowledgement shall result in Developer being jointly and severally liable with the assignee for the remaining obligations under this Agreement.

21. Recordation. This Agreement shall be recorded in the real estate records of Grand County and shall be a covenant running with the Property.

22. Title and Authority. Developer expressly warrants and represents to the Town that, together with the undersigned individuals, that the undersigned individuals have full power and

authority to enter into this Agreement. Developer and the undersigned individuals understand that the Town is relying on such representations and warranties in entering into this Agreement.

23. Third Parties. There are no intended third-party beneficiaries to this Agreement.

WHEREFORE, the parties hereto have executed this Agreement on the day and year first above written.

TOWN OF WINTER PARK

____
Nick Kutrumbos, Mayor

ATTEST:

____
Danielle Jardee, Town Clerk

DEVELOPER

____
Print Name______________________________
Title___________________________________

STATE OF ________________)
) SS.
COUNTY OF__________________)

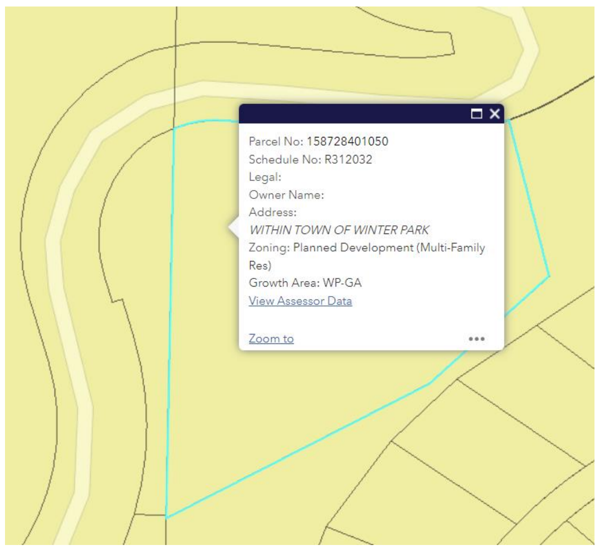
This instrument was acknowledged before me on this___day of____________, 20_, by _________________________, as____________________________of _________________________.

____
Notary Public; Commission No.___________

My Commission Expires:
____
(SEAL)

EXHIBIT A

LEGAL DESCRIPTION



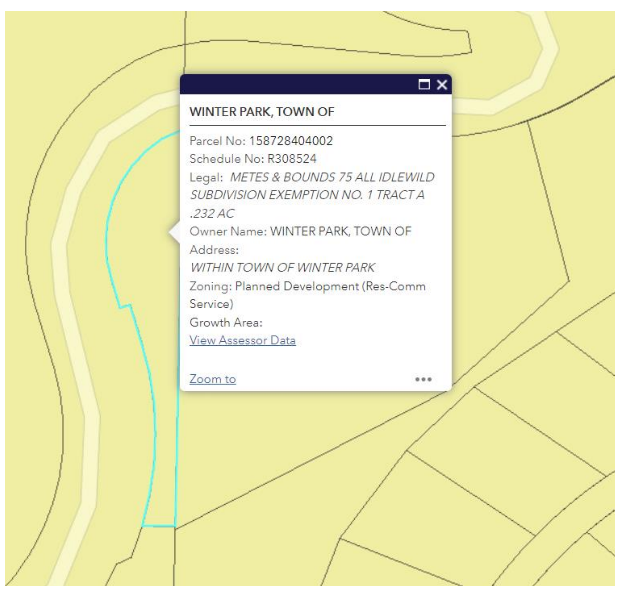
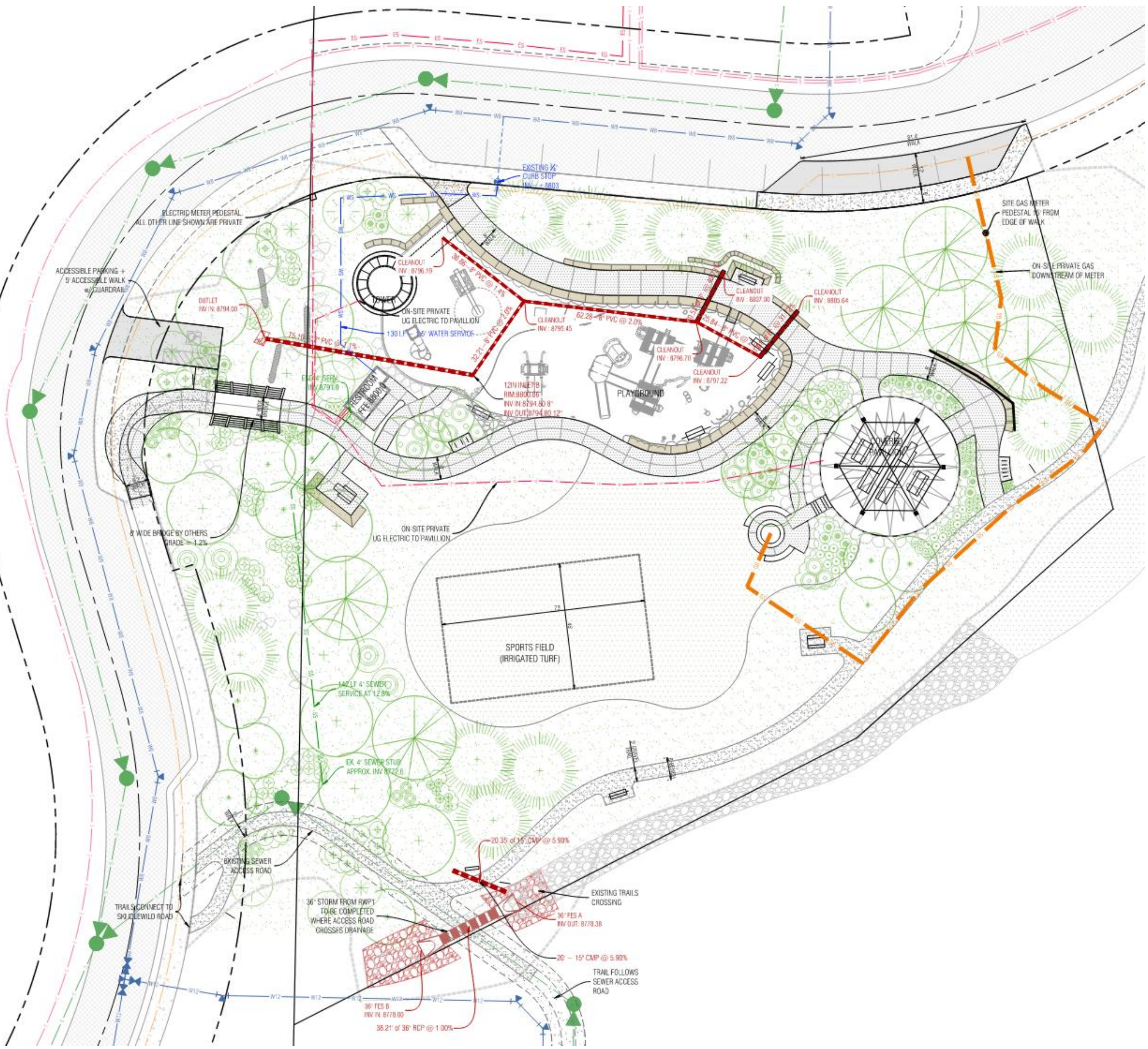


EXHIBIT B

DEVELOPMENT PLAN



ENGINEER'S OPINION OF PROBABLE COST

RWP IDLEWILD PARK

TKE ENGINEERING

By: TK | Prepared: 12/5/2023
Checked: | Revised:
JN: 23007

A. GRADING & EROSION CONTROL		Phase	QUANTITY	UNIT	UNIT PRICE	TOTAL
A1	Clearing and grubbing	1	1.9	AC	$ 3,200.00	$ 6,080
A2	Strip and store topsoil (assume 4" depth)	1	200	CY	$ 1.00	$ 200
A3	Cut to Fill onsite	1	1300	CY	$ 12.00	$ 15,600
A4	Import Material	1	2000	CY	$ 40.00	$ 80,000
A5	rock check dams	1	2	EA	$ 600.00	$ 1,200
A6	Stabilized Staging Area	1	1	EA	$ 5,000.00	$ 5,000
A7	Vehicle Tracking Control	1	1	EA	$ 2,500.00	$ 2,500
A8	Concrete Washout Area	1	1	EA	$ 1,000.00	$ 1,000
A9	Seed and Mulch	1	2.0	AC	$ 3,000.00	$ 6,000
A10	Silt Fence	1	300	LF	$ 6.00	$ 1,800
	SUBTOTAL - "A. GRADING & EROSION CONTROL"					***$ 119,380***
B. ROADWAY CONSTRUCTION			QUANTITY	UNIT	UNIT PRICE	
B1	Saw Cut Existing Asphalt	1	20	LF	$ 10.00	$ 200
B2	Aggregate Base Course (Class 6) 8" depth	1	109	TONS	$ 25.00	$ 2,718
B3	8" ABC Shoulder	1	10	TONS	$ 26.00	$ 260
B4	Gravel Trail	1	136	TONS	$ 200.00	$ 27,200
B5	Concrete paving stamped	1	622	SY	$ 55.00	$ 34,222
B6	Concrete Sidewalk	1	72	SY	$ 55.00	$ 3,936
B7	Street Signs	1	3	EA	$ 300.00	$ 900
B8	Retaining Wall	1	991	FF	$ 75.00	$ 74,314
B9	Storm Inlets	1	2	EA	$ 1,500.00	$ 3,000
B10	8" PVC Storm	1	75	LF	$ 40.00	$ 3,000
B11	15" CMP	1	21	LF	$ 120.00	$ 2,520
B12	36" Flared End Section	1	2	EA	$ 1,200.00	$ 2,400
B13	36" Storm Sewer	1	38	LF	$ 150.00	$ 5,700
B14	Type M Riprap	1	60	TONS	$ 80.00	$ 4,800
	SUBTOTAL - "B. ROADWAY CONSTRUCTION"					***$ 165,170***
C. UTILITY CONSTRUCTION			QUANTITY	UNIT	UNIT PRICE	
WATER - ONSITE						
C1	Connection to existing system (Include Pothole, Valve, Coord W/District)	1	1	EA	$ 2,000	$ 2,000
C2	Water services (1.5")	1	82	LF	$ 40	$ 3,280
	SUBTOTAL - "WATER - ONSITE"					***$ 5,280***
SANITARY SEWER						
C11	Connection to existing system (Include Pothole, Valve, Coord W/District)	1	1	EA	$ 2,000	$ 2,000
C12	4" Sanitary Sewer Services (Include Wye & Cleanout)	1	142	LF	$ 40	$ 5,680
	SUBTOTAL - "SANITARY SEWER"					***$ 7,680***
	SUBTOTAL - "C. UTILITY CONSTRUCTION "					***$ 12,960***

ENGINEER'S OPINION OF PROBABLE COST

RWP IDLEWILD PARK

TKE ENGINEERING

By: TK | Prepared: 12/5/2023
Checked: | Revised:
JN: 23007

D. MISCELLANEOUS			QUANTITY	UNIT	UNIT PRICE	TOTAL
D1	Mobilization	1	1	EA	$ 15,000	$ 15,000
D2	Traffic Control	1	1	LS	$ 1,000	$ 1,000
D3	Landscaping + Turf + Irrigiation	2	1	LS	$ 200,000	$ 200,000
D4	Playground Structures and surface	3	1	LS	$ 750,000	$ 750,000
D5	Bathroom Building	4	1	LS	$ 120,000	$ 120,000
D6	Fire pits, tables, bike racks, etc.	4	1	LS	$ 12,000	$ 12,000
D7	Covered Bulding + Stamped Paving Underneath	4	1	LS	$ 200,000	$ 200,000
D8	trail bridge	4	1	LS	$ 60,000	$ 60,000
D9	Monument Signs	4	1	LS	$ 10,000	$ 10,000
	SUBTOTAL - "D. MISCELLANEOUS"					***$ 1,368,000***
					SUBTOTAL	*$ 1,665,510*
	Contingency (does not include Mobilization)				*20%*	*$ 330,102*
					TOTAL	*$ 1,995,612*

Landscape Improvements

IMPROVEMENT	SIZE Height & Caliper	QTY	UNIT	UNIT COST	TOTAL COST	COMPLETION DATE
SUBTOTAL (Carry over to previous page.)						

MEMO

TO	Mayor and City Council (Acting as the Winter Park Housing Authority)
FROM	Alisha Janes, Assistant Town Manager
CC	Keith Riesberg, Town Manager
DATE	March 15, 2024
RE	Housing Authority Resolution 29: subordinating the restrictive covenant for Hideaway Junction Phase II for CHFA financing.

Background:

The Town Council acting as the Winter Park Housing Authority approved the initial operating agreement of Hideaway Junction II, LLC in resolution 12 on May 2nd, 2023, and a first amendment to the agreement on February 6, 2024, in Housing Authority resolution 22. Based on these agreements, Town staff have worked with the development partner, Mountain Affordable Housing Development (MAHD) to advance the Hideaway Junction Phase II. The development partner has worked to advance financing for the project with the Colorado Housing and Finance Authority (CHFA). CHFA, to proceed with lending on the project, has requested a subordination of the restrictive covenant on the project. This agreement has been reviewed by the authority's legal counsel.

Analysis:

CHFA was selected as the lender for the project as they can provide favorable interest rates subsequently making the project more affordable. The financing is provided directly to the Hideaway Junction II LLC partnership and not directly to the Town of Winter Park. This subordination agreement allows for the Winter Park Housing authority to cure any loan default prior to CHFA being able to act to recoup its funding. If the Housing Authority did not act and allowed the loan to remain in default, this subordination agreement would allow CHFA to finish homes and sell them at market-rate without the affordable housing restrictive covenant in place.

While there is limited risk that a default would occur and the Housing Authority would have the chance to correct, it is Council's discretion (acting as the Winter Park Housing Authority) to accept or deny this request for a subordination of the restrictive covenant. Without approval, CHFA may not move forward with funding on the project. It is likely that in that case, the Development Partner may ask the Housing Authority to close the funding gap. This subordination agreement will only apply while the loan is outstanding.

As CHFA is requesting this item, staff has requested CHFA to be present at the Council meeting to present and answer questions on this item. The Development partner may also present on their behalf.

Recommendation

Should the Town Council (acting as the Winter Park Housing Authority) wish to approve the resolution, the following motion should be made:

> I move to approve Housing Authority Resolution 29, a resolution authorizing the chair to execute a subordination of declaration of restrictive covenant for affordable housing at hideaway junction phase II to allow CHFA financing for the development.

Should the Town Council (acting as the Winter Park Housing Authority) wish to deny the ordinance, the following motion should be made:

> I move to deny Housing Authority Resolution 29, a resolution authorizing the chair to execute a subordination of declaration of restrictive covenant for affordable housing at hideaway junction phase II to allow CHFA financing for the development.

Should you have any questions or need additional information regarding this matter, please contact me.

WINTER PARK HOUSING AUTHORITY

RESOLUTION NO. 29
SERIES OF 2024

A RESOLUTION AUTHORIZING THE CHAIR TO EXECUTE A SUBORDINATION OF DECLARATION OF RESTRICTIVE COVENANT FOR AFFORDABLE HOUSING AT HIDEAWAY JUNCTION PHASE II TO ALLOW CHFA FINANCING FOR THE DEVELOPMENT

WHEREAS, by conveyance from the Town of Winter Park, as evidenced by Ordinance No. 600, Series of 2023, Winter Park Housing Authority (the "WPHA") is the owner of certain real property known as Hideaway Junction Phase II;

WHEREAS, by adoption of Resolution No. 12, Series of 2024, approved May 12, 2023, the WPHA approved an operating agreement as special limited partner in Hideaway Junction Phase II, LLC, an agreement for project management services, as well as an option to lease portions of the Property for vertical construction;

WHEREAS, by adoption of Resolution No. 24, Series of 2024, and Resolution No. 28, Series of 2024, WPHA approved an affordable housing restrictive covenant and amended and restated restrictive covenant, recorded in the records of the Grand County Clerk and Recorder at Reception Nos. 2024001191 and 2024001586, respectively (together, the "Restrictive Covenant");

WHEREAS, by adoption of Resolution No. 28, Series of 2024, WPHA approved a second amended and restated restrictive covenant applying to lots 7-9 and 14-20, which staff has been directed to record with the Grand County Clerk and Recorder;

WHEREAS, Hideaway Junction Phase II, LLC, has pursued and could receive a construction loan through the Colorado Housing and Finance Authority ("CHFA"); and

WHEREAS, in order to approve the construction loan CHFA requires the Restrictive Covenant be subordinated to CHFA's Leasehold Deed of Trust and the CHFA Covenant, as defined in the Subordination of Declaration of Restrictive Covenant for Affordable Housing, for the duration of the construction loan; and

WHEREAS, in order to support Hideaway Junction Phase II, LLC, and its receipt of the CHFA construction loan, and having ensured that WPHA will have opportunities to cure any breach or default before dispossession of its property, the WPHA is willing to subordinate the Restrictive Covenant to CHFA.

NOW THEREFORE, BE IT RESOLVED by the Winter Park Housing Authority that:

1. The Chair is authorized to execute the Subordination of Declaration of Restrictive Covenant for Affordable Housing in substantially the form attached hereto, subject to final approval by the Housing Authority’s legal counsel.

PASSED, ADOPTED AND APPROVED this 19th day of March, 2024.

WINTER PARK HOUSING AUTHORITY

____
Nick Kutrumbos, Chair

ATTEST:

____
Alisha Janes, Executive Director

CHFA Loan No: 5007510

<u>After Recording Return To</u>:
Colorado Housing and Finance Authority
1981 Blake Street
Denver, Colorado 80202-1272
Attn: General Counsel

SUBORDINATION OF DECLARATION OF RESTRICTIVE COVENANT FOR AFFORDABLE HOUSING

THIS SUBORDINATION OF DECLARATION OF RESTRICTIVE COVENANT FOR AFFORDABLE HOUSING (the "**<u>Agreement</u>**") is dated as of ____________________, 2024, by **HIDEAWAY JUNCTION II LLC**, a Colorado limited liability company ("**<u>Borrower</u>**") and **WINTER PARK HOUSING AUTHORITY** ("**<u>WPHA</u>**") and **COLORADO HOUSING AND FINANCE AUTHORITY**, a body corporate and political subdivision of the State of Colorado (the "**<u>Lender</u>**").

RECITALS:

A. WPHA, as ground lessor of the real property legally described on <u>Exhibit A</u>, attached hereto and made a part hereof by this reference (the "**<u>Property</u>**"), has recorded the Amended and Restated Declaration of Restrictive Covenant for Affordable Housing, dated March 19, 2024, recorded under Reception No. 2024001586, and as to only Lots 7-9 and 14-20 within the Property, a Second Amended and Restated Declaration of Restrictive Covenant for Affordable Housing dated March 19, 2024, recorded under Reception No. ___________________ (together, the "**<u>Subordinate Covenant</u>**") in the real estate records of the Clerk and Recorder of the Grand County, Colorado (the "**<u>Records</u>**"), which contain certain occupancy requirements.

B. Borrower has executed, or is about to execute, a Promissory Note payable to the Lender (the "**<u>Note</u>**") in up to the original principal amount of Three Million Four Hundred Seventy-Eight Thousand and No/100 Dollars ($3,478,000.00) (the "**<u>Loan</u>**"), upon the terms and conditions of a Loan Agreement of even date herewith, between Lender and Borrower ("**<u>Loan Agreement</u>**"). The Note is secured by a Leasehold Deed of Trust (With Assignment of Rents, Security Agreement, and Fixture Filing), executed by Borrower, of even date herewith, and which will be recorded in the Records and encumber Borrower's leasehold interest in the Property (the "**<u>Leasehold Deed of Trust</u>**"). The Note, Loan Agreement, Leasehold Deed of Trust and that certain Declaration of Covenant, of even date herewith, between Lender and Borrower (the "**<u>CHFA Covenant</u>**"), and all other documents and agreements evidencing, securing and/or executed in connection with the Loan are collectively referred to herein as the "**<u>Loan Documents</u>**").

C. It is a condition precedent to obtaining the Loan, that the Leasehold Deed of Trust and CHFA Covenant shall unconditionally be and remain at all times a lien or charge upon the Property prior and superior to the lien or charge of any other lien or encumbrance, including the Subordinate Covenant.

D. The Lender is willing to make the Loan to Borrower provided WPHA will specifically and unconditionally subordinate the lien or charge of the Subordinate Covenant to the lien or charge of the Leasehold Deed of Trust and CHFA Covenant.

E. It is to the mutual benefit of all parties to this Agreement that the Lender make such loan to Borrower; and WPHA agrees that the Leasehold Deed of Trust and CHFA Covenant, when recorded, will constitute a lien or charge upon the Property, which is unconditionally prior and superior to the lien or charge of the Subordinate Covenant.

F. Notwithstanding the subordination of the Subordinate Covenant as agreed herein, WPHA and Lender acknowledge that in the event Lender forecloses on the improvements located on the Property under the terms of the Leasehold Deed of Trust, Lender intends to allow the Subordinate Covenant to remain as an encumbrance against the Property unless doing so will materially affect Lender's ability to sell or otherwise transfer the Property to a new owner, as determined by Lender in its sole discretion.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual benefits accruing to the parties hereto and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and in order to induce the Lender to make the Loan to Borrower, it is hereby declared, understood and agreed as follows:

1. **Subordination**. WPHA hereby represents to Lender that it is the current beneficiary of the Subordinate Covenant, and the WPHA does hereby agree that the Subordinate Covenant, and all of the WPHA's rights thereunder, shall be in all respects subordinate, secondary, inferior and junior to the liens, terms, covenants, conditions, operations, and effects of the Leasehold Deed of Trust, the CHFA Covenant, and the other Loan Documents, and all extensions, renewals or modifications thereof, all as executed and delivered by Borrower to the Lender as security for the Lender.

2. **WPHA Acknowledgement**. For the purposes of this Agreement, WPHA acknowledges and agrees that all disbursement of loan proceeds and other advances made by the Lender pursuant to the Loan Documents shall be conclusively presumed to have been disbursed in accordance therewith and for the purposes therein provided.

3. **Attorney In Fact**. WPHA and Borrower hereby appoint the Lender, or any person or entity acting upon the directions of the Lender, as their attorney-in-fact for the sole and limited purpose of inserting information in this Agreement regarding the date and recording of the Subordinate Covenant.

4. **Default Under Subordinate Covenant**. WPHA hereby agrees that upon the occurrence of a default by the Borrower under the terms of the Subordinate Covenant, WPHA shall provide written notice to the Lender no less than sixty (60) days prior to commencing the exercise of any remedies against Borrower and/or the Property.

5. **Lender Right to Cure**. Except as otherwise set forth below, WPHA agrees that it will not, without first providing written notice to the Lender and a reasonable opportunity for the Lender to cure, commence, prosecute, or participate in any administrative, legal or equitable action against Borrower with respect to the Subordinate Covenant.

6. **Authorization**. All necessary action on the part of WPHA necessary for the authorization of this Agreement and the performance of all obligations of WPHA hereunder has been taken. This Agreement constitutes the legal, valid and binding obligation of WPHA, enforceable against WPHA in accordance with its terms. The execution, delivery and performance of and compliance with this Agreement by WPHA will not (i) result in any material violation or default of any term of any of WPHA's charter, formation or other organizational documents, or (ii) violate any material applicable law, rule or regulation.

7. **Further Assurances**. WPHA hereby agrees to execute such documents and/or take such further action as WPHA may at any time or times reasonably request in order to carry out the provisions and intent of this Agreement, including, without limitation, ratifications and confirmations of this Agreement from time to time hereafter, as and when requested by Lender.

8. **Severability**. If any provision of this Agreement shall be invalid or unenforceable to any extent, the remainder of this Agreement shall not be affected thereby and shall be enforced to the greatest extent permitted by law.

9. **Entire Agreement**. This Agreement contains the entire agreement between and among the parties hereto with respect to the subordination of the Subordinate Covenant to the Leasehold Deed of Trust, the CHFA Covenant and the Loan Documents.

10. **Inurement**. This Agreement and each and every covenant, agreement and other provisions hereof shall be binding upon the parties hereto and their respective successors and assigns. This Agreement shall remain effective until terminated in writing by Lender. This Agreement is solely for the benefit of WPHA and Lender and not for the benefit of Borrower or any other party.

11. **Remedies**. Each party to this Agreement acknowledges that if any party fails to comply with its obligations under this Agreement, the other parties will have all rights available at law and in equity, including the right to obtain specific performance of the obligations of such defaulting party and injunctive relief.

12. **Governing Law**. This Agreement is made and executed under and in all respects will be governed and construed by the laws of the State of Colorado.

13. **Counterparts**. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original and all of which, when taken together, shall be deemed one and the same instrument.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

SIGNATURE PAGES TO FOLLOW]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date and year first written.

WPHA:

WINTER PARK HOUSING AUTHORITY

____
Nick Kutrumbos, Chair

ATTEST:

____
Alisha Janes, Executive Director

BORROWER:

HIDEAWAY JUNCTION II LLC,
a Colorado limited liability company

By: MAHD HJII MGR LLC,
a Colorado limited liability company,
its Manager

By: ____________________________
Name: ____________________________
Title: ____________________________

STATE OF COLORADO)
) ss.
COUNTY OF ______________________)

The foregoing instrument was acknowledged before me on __________________, 2024, by ________________, as ________________ of MAHD HJII MGR LLC, a Colorado limited liability company, as Manager of Hideaway Junction II LLC, a Colorado limited liability company.

Witness my hand and official seal.

[SEAL]

____
Notary Public

LENDER:

COLORADO HOUSING AND FINANCE AUTHORITY, a body corporate and political subdivision of the State of Colorado

By: ______________________________
Steve Johnson, Director, Community Development

STATE OF COLORADO)
) ss.
CITY AND COUNTY OF DENVER)

The foregoing instrument was acknowledged before me on __________________, 2024 by Steve Johnson, Director, Community Development, Colorado Housing and Finance Authority, a body corporate and political subdivision of the State of Colorado.

Witness my hand and official seal.

[SEAL]

____
Notary Public

EXHIBIT A

LEGAL DESCRIPTION

Lots 1 thru 20, inclusive;
HIDEAWAY JUNCTION SUBDIVISION - FILING NO. 2, according to the Plat thereof filed March 14, 2024, at Reception No. 2024001569.

TOWN OF WINTER PARK

TOWN OF WINTER PARK
QUARTERLY REPORT
Q1 2024

MARCH 31, 2024

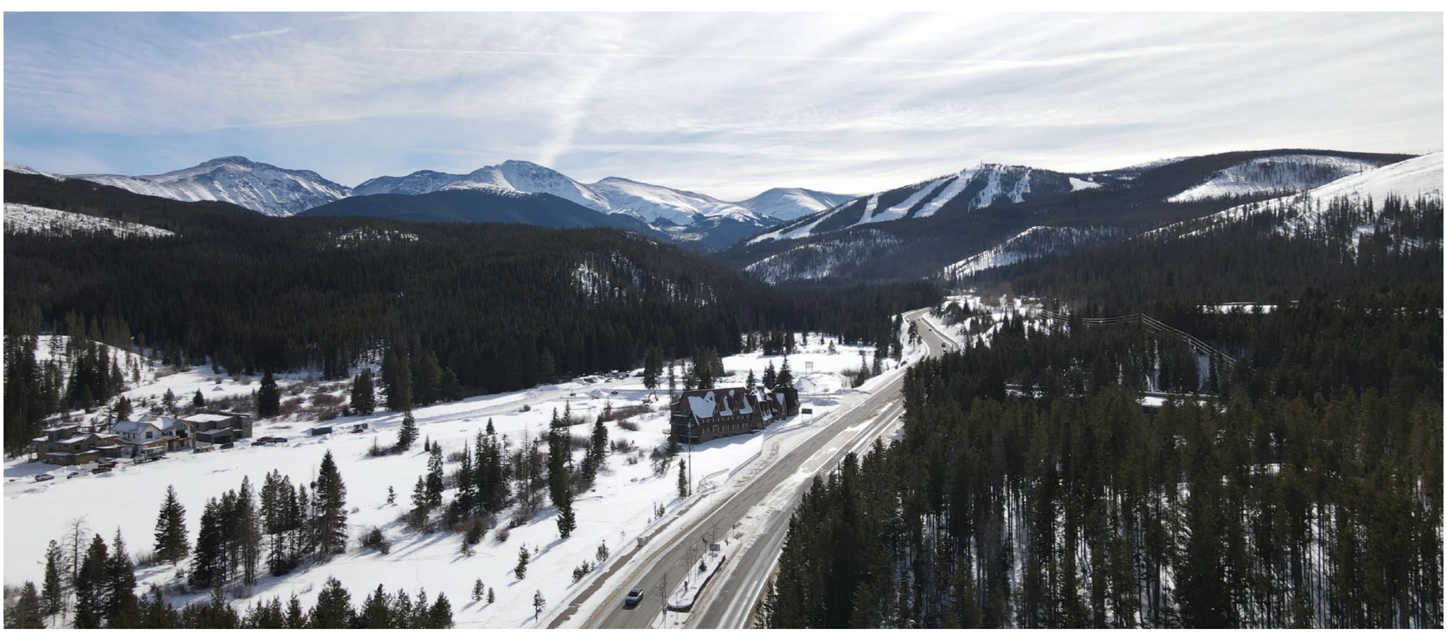
QUARTERLY REPORT
TABLE OF CONTENTS

TOWN OF WINTER PARK
QUARTERLY REPORT Q1 2024

TABLE OF CONTENTS

TOWN MANAGER

- Initiated meetings with CDOT staff and key community contacts to address concerns regarding failed communications during the MLK weekend storm event and extended closure of Berthoud Pass. Through ongoing efforts and meetings, communication with CDOT is improving, as are communications within Grand County.
- Attended Governor Polis' event at Winter Park Resort promoting the proposed NW Colorado Passenger Rail proposal. Met with key individuals from the State to discuss support for the proposal and how to expand passenger rail connectivity to Winter Park.
- Engaged WELConsulting to assess the Town's Unified Development Code and the Community Development Department processes. Key stakeholders were identified for interviews to provide feedback on the Town's processes and codes. A report of the feedback and recommendations will be delivered to the Town in Q2.
- Hired WSP to serve as the project manager to advance the plans and funding applications for the Downtown/Winter Park Resort gondola connection. This included preparing an application for Congressionally Directed Spending to fund the Connect Winter Park study.
- Hired Aponte & Busam to serve as the Town's lobbyist at the State level. This will allow the Town additional opportunities to monitor legislation and propose changes to legislation as it is being considered for adoption.



ASSISTANT TOWN MANAGER

HOUSING

- Advanced the vertical construction of 10 single-family homes at Hideaway Junction Phase II with development partners through the final phases of development, including:
    - finalizing and recording restrictive covenants
    - advancing project financing with CHFA
    - development of purchase and sales agreements
    - working with a variety of appraisers and lenders to prepare for home sales
    - finalizing and recording the Homeowners Association documents and organizing the initial operations of the HOA, including management services, banking, and insurance
    - held a buyer education class for selected buyers
    - closing on the first two home sales in the development
- Conducted two housing lotteries for owner-occupied housing. Screened a total of 45 applications.
    - The January 3 lottery included 25 qualified applicants for Hideaway Junction Phase I home on Lot 2
    - The January 30 lottery included 35 qualified applicants for Hideaway Junction Phase II homes available in 2024 (9 homes in the open public lottery and 1 for the Town of Winter Park Recruitment and Retention Program)
- Coordinated the sale of two Hideaway Junction Phase I homes, including coordination with appraisers, lenders, contractors, and the Title Company
- Finalized the payments and close-out of the Short-Term Fix program for the final year, receiving 12 lease renewals from 7 local businesses for 22 bedrooms. The total amount of incentives awarded was $105,000

ASSISTANT TOWN MANAGER, CONT.

HR

- Worked with the finance department to implement and communicate a 4.7% cost of living pay adjustment
- Developed a new performance evaluation form with the leadership team
- Advanced the development of a remote and flexible work policy
- Placed job ads for a Police Records Manager and Senior Planner

SUSTAINABILITY

- Onboarded a new Sustainable Community Coordinator and monitored initial program planning

QUARTERLY REPORT
COMMUNITY DEVELOPMENT

PLANNING DIVISION

Downtown Streetscape Plan

30% drawings are being produced. They will be presented to the Town Council for review on May 7.

Open Space, Trails, Parks, and Campground Plan

The second review of the Parks Assessment will start in April. The Trail Assessment is being drafted to share with the public this summer.

Parking Study

Parking counts were taken during spring break. Additional counts will be taken this summer.

Development Projects

- RailWater Major Site Plan
- Gondola Townhomes Major Site Plan
- Roam Filing 4 Final Plat
- Lakota Pointe Final Plat
- Connor Bertron Annexation
- Valley Hi Enclave Annexation
- Homewood Suites by Hilton Major Site Plan

PLANNING DIVISION, CONT.

PLANNING ACTIVITY THROUGH MARCH 2024 (THROUGH PLN24-027)

	Applications (Q1)	Applications (Q2)	Applications (Q3)	Applications (Q4)
BOA Variances	1			
Code Text Amendments				
Major Site Plan	4			
Minor Site Plan/Admin	7			
Final Plats	2			
Preliminary Plats	1			
DIA				
Rezoning Permits				
Sign Permits	3			
Minor Plat	1			
Subdivision Exemptions	1			
Special Use Permits	1			
As-Builts	2			
Grading Permits				
Planned Development				
Misc.	2			
Withdrawn	1			
Pre-Application				
Temporary Use Permit				
Appeal				
Annexation	1			

BUILDING DIVISION

BUILDING ACTIVITY THROUGH MARCH 2024

	Winter Park Applications (Q1)	Fraser Applications (Q1)	Granby Applications (Q1)
Permits	14	10	24
Valuation	$953,208.20	$2,465,111.80	$4,417,434.39
Fees Collected	$6,7878.03	$27,378.16	$65,049.80
Inspections	316	195	211

	Winter Park Applications (Q2)	Fraser Applications (Q2)	Granby Applications (Q2)
Permits			
Valuation			
Fees Collected			
Inspections			

	Winter Park Applications (Q3)	Fraser Applications (Q3)	Granby Applications (Q3)
Permits			
Valuation			
Fees Collected			
Inspections			

	Winter Park Applications (Q4)	Fraser Applications (Q4)	Granby Applications (Q4)
Permits			
Valuation			
Fees Collected			
Inspections			

QUARTERLY REPORT FINANCE

FYE 2023 CLOSE AND AUDIT PREPARATION ACTIVITIES:

- Analyzed and recorded 2023 investment accounts activity, reconciled to Caselle, and recorded interest and related allocations to funds for 2023.
- Met with auditors, scheduled 2023 audit (beginning May 27, 2024).

Sales Tax activities

- Support, implementation, planning, communications regarding 2% lodging tax increase, including MuniRevs modifications to accommodate effective date of July 1, 2024.
- Continued training and staff development regarding monthly sales tax reports.

Transit Support

- Support close out of Saunders contract payments for the Transit Facility.
- Support financial analysis of spending vs. prior year and budget and resolutions regarding new buses.

2024 Budget activities

- Prepared 2024 budget reports in the format required by DOLA and submitted them to DOLA.
- Support implementation of 2024 COLA pay adjustments.
- Prepared budget brief.
- Created monthly allocations of budget line items for all funds and uploaded them into Caselle for department head reporting.

Payroll and AP activities

- Prepared and submitted 2023 W-2s, 1099s and quarterly payroll reports to IRS.
- Provided detailed information to CIRSA for 2023 Workers' Comp Audit.
- Provided payroll study information to CML.

Other

- Finance Director completed GFOA Governmental Accounting training.
- Support review and delivery of EPS economic development impact study.
- Annual reporting requirements (i.e., Opioid Abatement, Conservation Trust Fund)
- ERP Implementation – researched Oracle and Tyler, completed Oracle demo.
- Support settlement of property tax refund to Winter Development Co.
- Prepared preliminary calculation of Building Services fund distribution for 2023.
- STR renewal follow-up work – resolved most issues regarding registration violations, prepared notice to send to short list of remaining violations.

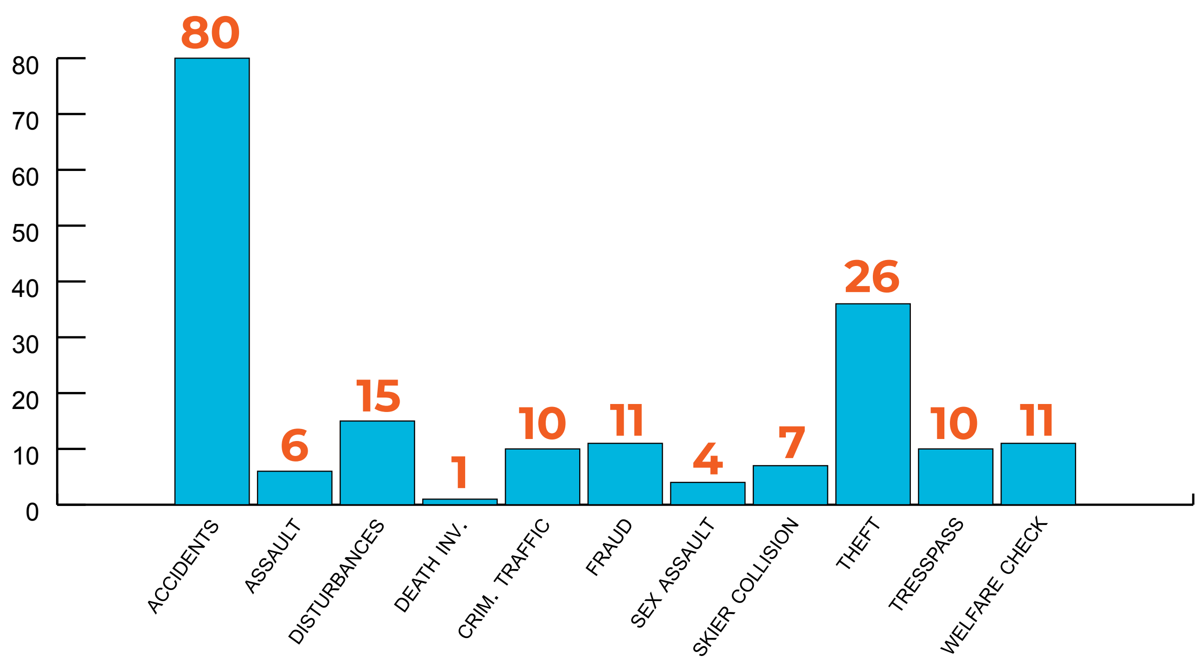
QUARTERLY REPORT POLICE

CALLS FOR SERVICE

January – March 2024 was extremely busy for the Police Department. Our limited staff responded to 1,459 calls for service during this time, with 561 of those being in Fraser and 839 occurring in Winter Park. The remainder were outside agency assists. This is fewer calls than we responded to last year for the same period, but we also have three fewer officers and, as such, fewer self-initiated calls for service.

Of these calls, we completed 264 written reports with the major events listed below. As can be seen, and as is typical in winters with heavy snow, we spent a significant amount of time working vehicle accidents:

FOURTH QUARTER INCIDENT REPORTS



We also issued 159 traffic citations during the last quarter, of which 60 were parking violations in various places throughout the two towns.

CODE ENFORCEMENT

- Our Code Enforcement Officer kept busy doing parking enforcement and other calls as he had time. He responded to a total of 227 calls during the first quarter of the year.

RECRUITMENT AND RETENTION

- We continue to seek applications from prospective candidates and have paid for an advertisement on the website GoLawEnforcement.com.
- Our newest officer, Anna Rosa, is progressing through the FTO Program and should be working on her own by May 1.
- Our Court Clerk/Office Manager, Carol McHenry, has announced her retirement effective May 1. We are currently interviewing applicants for her replacement.
- We will be sending Code Enforcement Officer Jack Towne through the Western Colorado University Law Enforcement Academy beginning May 19. He is expected to graduate in early September and will begin our field training officer program then.
- We are actively recruiting CO Towne's replacement and a second code officer approved in our 2024 budget request.

OTHER HAPPENINGS

- Two officers attended an "Investigating Missing Persons" seminar by the Colorado Bureau of Investigation and the Westminster Police Department.
- Two new officers attended a 40-hour "Crisis Intervention Training" class in early March. All sworn non-command officers in our agency are now certified in Crisis Intervention Techniques, which are specifically designed to assist in dealing with those suffering from a mental health crisis.
- Our agency is again conducting a modified DARE training program at the Fraser Valley Elementary School.
- Sgt. Matt Murdoch will attend the "Supervising Critical Incidents" class in Steamboat Springs in April.
- We have applied for POST grant funding to pay for Police Academy Tuition for one officer and for other law enforcement training resources. The total amount of the grant request is approximately $13,500.

QUARTERLY REPORT
PUBLIC WORKS

WINTER OPERATIONS

The focus of our winter operations centers on snow plowing, snow removal, and sanding to keep the roadways passable and safe for our residents and guests. Over the past three months, our team has diligently plowed snow-covered roadways to maintain accessibility and facilitate smooth travel. Additionally, sanding operations were carried out proactively to improve traction on icy surfaces, reducing the risk of accidents. During heavy snowfall, snow removal efforts were successful in clearing excess snow from critical areas. Overall, our winter operations have been instrumental in safeguarding the well-being of those navigating our roadways during the challenging winter season. We observed a significant increase in winter trail pedestrian usage for the first quarter, indicating a growing interest in outdoor activities during the colder months. The recreational contribution of the trail system has been substantial, providing a valuable resource for the community and visitors.

- Finalized the purchase of Snowcat for Winter Operations Trail Grooming.
- Two part-time Snowcat Operators were hired for winter trail grooming.
- Two successful winter events.
    - February 2, 2024: "Winter Wonderland" snow dash from A-Frame Club in Old Town to Hideaway Park with live music on stage.
    - March 9, 2024: "Alpenglow Bounce" snow dash from A-Frame Club to Hideaway Park featuring live DJs on the trail and a free EDM concert at the Rendezvous Event Center. Also had a "White-Out" party in the Green Room for a KFFR Radio Station Fundraiser.
- Added new CASE Loader 621G to the fleet. Improved the time it takes to clear snow from Highway 40 corridor.
- Added new TORO UTX with BOSS plow to the fleet. Improved sidewalk plowing in ROAM and de-icing ADA ramps.
- Added new Erskine snowblower attachment for the skid steer. Improved service to the ROAM development and the narrow sidewalks.
- Welcomed Nate Bechard to the crew. He works the night plow shift.
- Completed all signage and baby changing station installations to comply with Colorado House Bill 23-1057 Amenities for All Genders in Public Building Act.

QUARTERLY REPORT
PUBLIC WORKS

- PlowOps, a customized tracing solution platform tailored to the Town of Winter Parks plowing needs in use, digitizing winter operations and modernizing snowplow functions.
- **1st Quarter Winter Operations – Equipment Hours and Snowfall**
  - 2024 Equipment Hours: **3,086.6** Snowfall: **164.9"**
  - 2023 Equipment Hours: **2,755.3** Snowfall: **101.25"**
- **1st Quarter Trail Usage**
  - January Total: **898** February Total: **1,110** March Total: **1,118**
- Achieved compliance with Town of Winter Park website web content accessibility guidelines outlined in WCAG 2.0/2.1
- *The Whole SCOOP – "Our Winter Warriors" – A glimpse of our Public Works Department*
  Our Public Works Department makes up a large portion of the Town Staff. You likely see our team out and about often, either plowing streets in the wintertime or tending to the gardens and trails in the summer. Public Works is taking big steps to live out our core values. In this edition, you learned about our recent sustainability initiatives, including electric vehicles, road and trail maintenance in the winter, and a glimpse of the people behind the great work Public Works does.

- Daily coordination with Slate Communications on the Town's communication to residents and guests continues via our E-Newsletter, "The Scoop," E-blasts, "The Whole Scoop" (digital publications), and the Town's website. In February, with direction from Council, Staff put out an RFP (Request for Proposal) for an annual social media contract. The contract was awarded to Local Social, which has taken over the Town's social media accounts, as well as Lift's and the Police Department's social media accounts. Local Social has previously been contracted with Slate Communications, so has experience working with Town Staff and Slate Communications.
- Spring and summer are on the horizon, so Town Council will start to see special event permit applications ramp up.
- No new liquor licenses this past quarter. The Town of Winter Park and the Town of Fraser are still providing RAST (Responsible Alcohol Service Training) classes at least once a month, which are free to attend for people who serve alcohol in the community. The next training sessions are April 8 and May 13 from 2 p.m. to 4 p.m. at the Fraser Library. The two marijuana licenses granted in the Downtown Zone are now operational. Both marijuana stores opened their doors towards the end of January.
- Monthly Staff appreciation events are still being conducted. This month, we will host our beloved Staff Ski Day. Town Council hosted a successful "Ski with Council" day in March and will be giving the annual "State of the Town" messaging along with an open Q & A forum on April 16 at 5:30 p.m.
- On April 2, 2024, the Town held its biennial municipal election. This year there were five candidates running for four open seats. Four incumbents ran along with one new candidate. The results were as follows, Jeremy Henn – four-year term, Jennifer Hughes – four-year term, Art Ferrari – four-year term, and Michael Periolat – two-year term. The councilors will be sworn in at the April 16, 2024, Town Council meeting at 5:30 p.m., and at that meeting the current Council will appoint the Mayor and Mayor Pro Tem for the next two years.
- The Town hosted WP 101 in January for those interested in running for Town Council. The first evening featured a brief presentation and a panel of Town Council members who answered attendees' questions. It received much interest from the community and had a great turnout.

Town of Winter Park

QUARTERLY REPORT
TRANSIT

RIDERSHIP	
Q1 2022	**219,908**
Q1 2023	**277,615**
Q1 2024	**312,870**

TOWN OF WINTER PARK TRANSIT DEVELOPMENT PLAN RFP

- Fehr & Peers has released the second survey of the Five-Year Transit Development Plan, which includes potential service alternatives such as options for expanded service hours, increased frequencies, and the creation of micro-transit zones. This survey can be found at **https://fp.mysocialpinpoint.com/the-lift-transit-survey-1**.

WINTER SERVICE

- Ridership continues to rise to pre-pandemic levels in 2024, with a Q1 passenger count of 312,870 over 277,615 riders in Q1 2023. This represents an approximate increase of 13%. While most lines increased from Q1 2023 to Q1 2024, the Black Line represented the largest change, with an increase of almost 17,000 riders.

FLEET AVAILABILITY

- The Town of Winter Park continues to replace transit vehicles, with the expected purchase of three additional buses from the Denver auction in April. Staff expects these vehicles to be available for service by late summer.
- The Town of Winter Park will also receive two new buses from Gillig in June, which Staff expects to be available for use in late summer.
- In early May, Town Staff and Transdev will conduct an operational debrief where Staff and Transdev will review the 2023-24 winter service operations to identify potential issues in service ahead of the 2024-25 winter service season.
- Town Staff has purchased an additional electric bus, which brings the total number of electric buses ordered to two. Staff does not expect these buses to arrive until 2026. However, Staff will continue to monitor the vehicle lead times.

TOWN OF WINTER PARK

QUARTERLY REPORT Q1 2024

MARCH 31, 2024

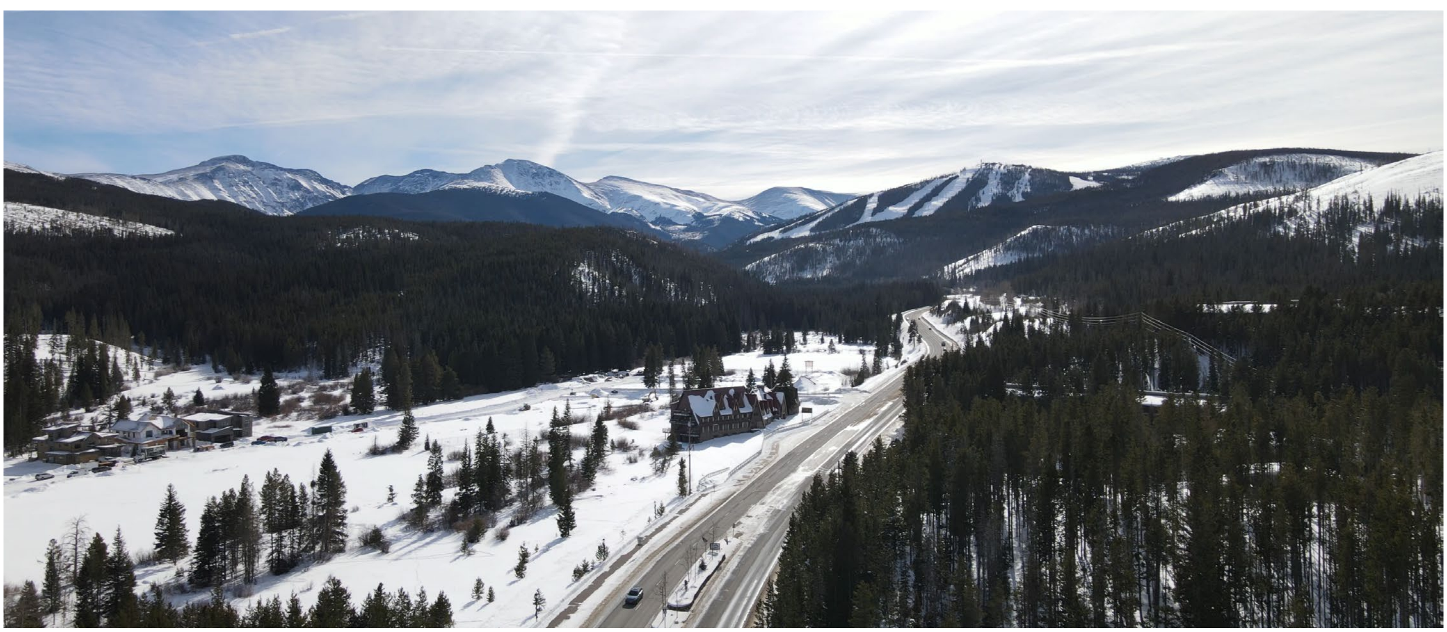
QUARTERLY REPORT
TABLE OF CONTENTS

TOWN OF WINTER PARK
QUARTERLY REPORT Q1 2024

TABLE OF CONTENTS

TOWN MANAGER

- Initiated meetings with CDOT staff and key community contacts to address concerns regarding failed communications during the MLK weekend storm event and extended closure of Berthoud Pass. Through ongoing efforts and meetings, communication with CDOT is improving, as are communications within Grand County.
- Attended Governor Polis' event at Winter Park Resort promoting the proposed NW Colorado Passenger Rail proposal. Met with key individuals from the State to discuss support for the proposal and how to expand passenger rail connectivity to Winter Park.
- Engaged WELConsulting to assess the Town's Unified Development Code and the Community Development Department processes. Key stakeholders were identified for interviews to provide feedback on the Town's processes and codes. A report of the feedback and recommendations will be delivered to the Town in Q2.
- Hired WSP to serve as the project manager to advance the plans and funding applications for the Downtown/Winter Park Resort gondola connection. This included preparing an application for Congressionally Directed Spending to fund the Connect Winter Park study.
- Hired Aponte & Busam to serve as the Town's lobbyist at the State level. This will allow the Town additional opportunities to monitor legislation and propose changes to legislation as it is being considered for adoption.



ASSISTANT TOWN MANAGER

HOUSING

- Advanced the vertical construction of 10 single-family homes at Hideaway Junction Phase II with development partners through the final phases of development, including:
  - finalizing and recording restrictive covenants
  - advancing project financing with CHFA
  - development of purchase and sales agreements
  - working with a variety of appraisers and lenders to prepare for home sales
  - finalizing and recording the Homeowners Association documents and organizing the initial operations of the HOA, including management services, banking, and insurance
  - held a buyer education class for selected buyers
  - closing on the first two home sales in the development
- Conducted two housing lotteries for owner-occupied housing. Screened a total of 45 applications.
  - The January 3 lottery included 25 qualified applicants for Hideaway Junction Phase I home on Lot 2
  - The January 30 lottery included 35 qualified applicants for Hideaway Junction Phase II homes available in 2024 (9 homes in the open public lottery and 1 for the Town of Winter Park Recruitment and Retention Program)
- Coordinated the sale of two Hideaway Junction Phase I homes, including coordination with appraisers, lenders, contractors, and the Title Company
- Finalized the payments and close-out of the Short-Term Fix program for the final year, receiving 12 lease renewals from 7 local businesses for 22 bedrooms. The total amount of incentives awarded was $105,000

ASSISTANT TOWN MANAGER, CONT.

HR

- Worked with the finance department to implement and communicate a 4.7% cost of living pay adjustment
- Developed a new performance evaluation form with the leadership team
- Advanced the development of a remote and flexible work policy
- Placed job ads for a Police Records Manager and Senior Planner

SUSTAINABILITY

- Onboarded a new Sustainable Community Coordinator and monitored initial program planning

QUARTERLY REPORT
COMMUNITY DEVELOPMENT

PLANNING DIVISION

Downtown Streetscape Plan

30% drawings are being produced. They will be presented to the Town Council for review on May 7.

Open Space, Trails, Parks, and Campground Plan

The second review of the Parks Assessment will start in April. The Trail Assessment is being drafted to share with the public this summer.

Parking Study

Parking counts were taken during spring break. Additional counts will be taken this summer.

Development Projects

- RailWater Major Site Plan
- Gondola Townhomes Major Site Plan
- Roam Filing 4 Final Plat
- Lakota Pointe Final Plat
- Connor Bertron Annexation
- Valley Hi Enclave Annexation
- Homewood Suites by Hilton Major Site Plan

PLANNING DIVISION, CONT.

PLANNING ACTIVITY THROUGH MARCH 2024 (THROUGH PLN24-027)

	Applications (Q1)	Applications (Q2)	Applications (Q3)	Applications (Q4)
BOA Variances	1			
Code Text Amendments				
Major Site Plan	4			
Minor Site Plan/Admin	7			
Final Plats	2			
Preliminary Plats	1			
DIA				
Rezoning Permits				
Sign Permits	3			
Minor Plat	1			
Subdivision Exemptions	1			
Special Use Permits	1			
As-Builts	2			
Grading Permits				
Planned Development				
Misc.	2			
Withdrawn	1			
Pre-Application				
Temporary Use Permit				
Appeal				
Annexation	1			

BUILDING DIVISION

BUILDING ACTIVITY THROUGH MARCH 2024

	Winter Park Applications (Q1)	Fraser Applications (Q1)	Granby Applications (Q1)
Permits	14	10	24
Valuation	$953,208.20	$2,465,111.80	$4,417,434.39
Fees Collected	$6,7878.03	$27,378.16	$65,049.80
Inspections	316	195	211

	Winter Park Applications (Q2)	Fraser Applications (Q2)	Granby Applications (Q2)
Permits			
Valuation			
Fees Collected			
Inspections			

	Winter Park Applications (Q3)	Fraser Applications (Q3)	Granby Applications (Q3)
Permits			
Valuation			
Fees Collected			
Inspections			

	Winter Park Applications (Q4)	Fraser Applications (Q4)	Granby Applications (Q4)
Permits			
Valuation			
Fees Collected			
Inspections			

QUARTERLY REPORT
FINANCE

FYE 2023 CLOSE AND AUDIT PREPARATION ACTIVITIES:

- Analyzed and recorded 2023 investment accounts activity, reconciled to Caselle, and recorded interest and related allocations to funds for 2023.
- Met with auditors, scheduled 2023 audit (beginning May 27, 2024).

Sales Tax activities

- Support, implementation, planning, communications regarding 2% lodging tax increase, including MuniRevs modifications to accommodate effective date of July 1, 2024.
- Continued training and staff development regarding monthly sales tax reports.

Transit Support

- Support close out of Saunders contract payments for the Transit Facility.
- Support financial analysis of spending vs. prior year and budget and resolutions regarding new buses.

2024 Budget activities

- Prepared 2024 budget reports in the format required by DOLA and submitted them to DOLA.
- Support implementation of 2024 COLA pay adjustments.
- Prepared budget brief.
- Created monthly allocations of budget line items for all funds and uploaded them into Caselle for department head reporting.

Payroll and AP activities

- Prepared and submitted 2023 W-2s, 1099s and quarterly payroll reports to IRS.
- Provided detailed information to CIRSA for 2023 Workers' Comp Audit.
- Provided payroll study information to CML.

Other

- Finance Director completed GFOA Governmental Accounting training.
- Support review and delivery of EPS economic development impact study.
- Annual reporting requirements (i.e., Opioid Abatement, Conservation Trust Fund)
- ERP Implementation – researched Oracle and Tyler, completed Oracle demo.
- Support settlement of property tax refund to Winter Development Co.
- Prepared preliminary calculation of Building Services fund distribution for 2023.
- STR renewal follow-up work – resolved most issues regarding registration violations, prepared notice to send to short list of remaining violations.

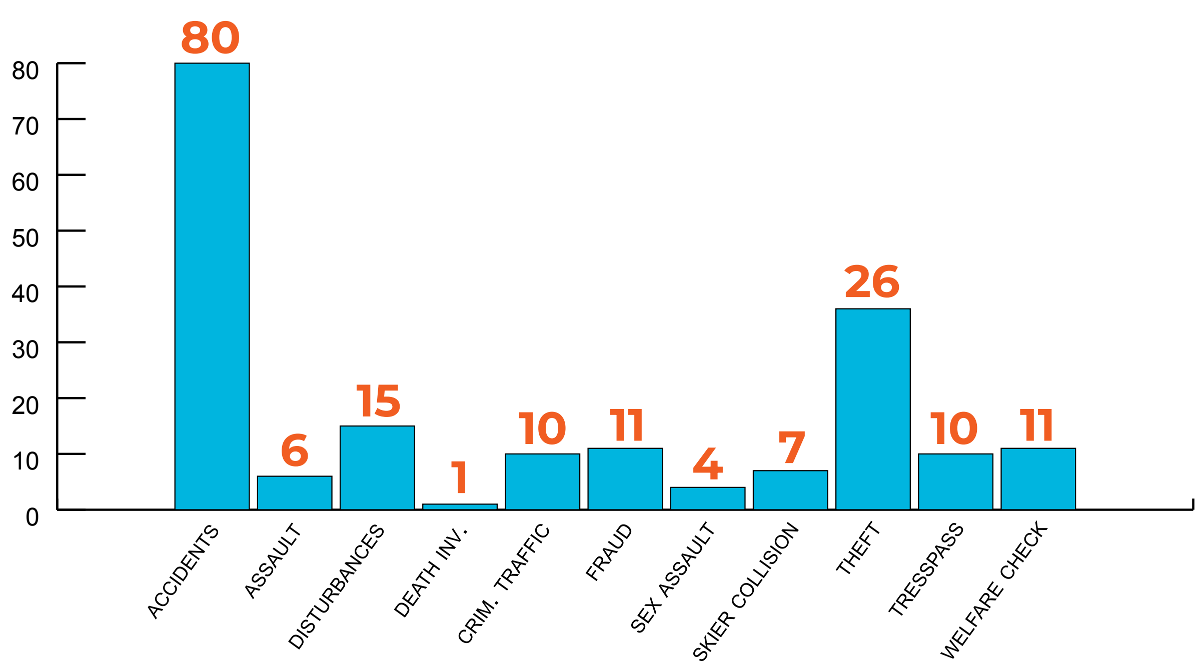
QUARTERLY REPORT POLICE

CALLS FOR SERVICE

January – March 2024 was extremely busy for the Police Department. Our limited staff responded to 1,459 calls for service during this time, with 561 of those being in Fraser and 839 occurring in Winter Park. The remainder were outside agency assists. This is fewer calls than we responded to last year for the same period, but we also have three fewer officers and, as such, fewer self-initiated calls for service.

Of these calls, we completed 264 written reports with the major events listed below. As can be seen, and as is typical in winters with heavy snow, we spent a significant amount of time working vehicle accidents:

FIRST QUARTER INCIDENT REPORTS



We also issued 159 traffic citations during the last quarter, of which 60 were parking violations in various places throughout the two towns.

CODE ENFORCEMENT

- Our Code Enforcement Officer kept busy doing parking enforcement and other calls as he had time. He responded to a total of 227 calls during the first quarter of the year.

RECRUITMENT AND RETENTION

- We continue to seek applications from prospective candidates and have paid for an advertisement on the website GoLawEnforcement.com.
- Our newest officer, Anna Rosa, is progressing through the FTO Program and should be working on her own by May 1.
- Our Court Clerk/Office Manager, Carol McHenry, has announced her retirement effective May 1. We are currently interviewing applicants for her replacement.
- We will be sending Code Enforcement Officer Jack Towne through the Western Colorado University Law Enforcement Academy beginning May 19. He is expected to graduate in early September and will begin our field training officer program then.
- We are actively recruiting CO Towne's replacement and a second code officer approved in our 2024 budget request.

OTHER HAPPENINGS

- Two officers attended an "Investigating Missing Persons" seminar by the Colorado Bureau of Investigation and the Westminster Police Department.
- Two new officers attended a 40-hour "Crisis Intervention Training" class in early March. All sworn non-command officers in our agency are now certified in Crisis Intervention Techniques, which are specifically designed to assist in dealing with those suffering from a mental health crisis.
- Our agency is again conducting a modified DARE training program at the Fraser Valley Elementary School.
- Sgt. Matt Murdoch will attend the "Supervising Critical Incidents" class in Steamboat Springs in April.
- We have applied for POST grant funding to pay for Police Academy Tuition for one officer and for other law enforcement training resources. The total amount of the grant request is approximately $13,500.

WINTER OPERATIONS

The focus of our winter operations centers on snow plowing, snow removal, and sanding to keep the roadways passable and safe for our residents and guests. Over the past three months, our team has diligently plowed snow-covered roadways to maintain accessibility and facilitate smooth travel. Additionally, sanding operations were carried out proactively to improve traction on icy surfaces, reducing the risk of accidents. During heavy snowfall, snow removal efforts were successful in clearing excess snow from critical areas. Overall, our winter operations have been instrumental in safeguarding the well-being of those navigating our roadways during the challenging winter season. We observed a significant increase in winter trail pedestrian usage for the first quarter, indicating a growing interest in outdoor activities during the colder months. The recreational contribution of the trail system has been substantial, providing a valuable resource for the community and visitors.

- Finalized the purchase of Snowcat for Winter Operations Trail Grooming.
- Two part-time Snowcat Operators were hired for winter trail grooming.
- Two successful winter events.
  - February 2, 2024: “Winter Wonderland” snow dash from A-Frame Club in Old Town to Hideaway Park with live music on stage.
  - March 9, 2024: “Alpenglow Bounce” snow dash from A-Frame Club to Hideaway Park featuring live DJs on the trail and a free EDM concert at the Rendezvous Event Center. Also had a “White-Out” party in the Green Room for a KFFR Radio Station Fundraiser.
- Added new CASE Loader 621G to the fleet. Improved the time it takes to clear snow from Highway 40 corridor.
- Added new TORO UTX with BOSS plow to the fleet. Improved sidewalk plowing in ROAM and de-icing ADA ramps.
- Added new Erskine snowblower attachment for the skid steer. Improved service to the ROAM development and the narrow sidewalks.
- Welcomed Nate Bechard to the crew. He works the night plow shift.
- Completed all signage and baby changing station installations to comply with Colorado House Bill 23-1057 Amenities for All Genders in Public Building Act.

- PlowOps, a customized tracing solution platform tailored to the Town of Winter Parks plowing needs in use, digitizing winter operations and modernizing snowplow functions.
- **1st Quarter Winter Operations – Equipment Hours and Snowfall**
  - 2024 Equipment Hours: **3,086.6** Snowfall: **164.9"**
  - 2023 Equipment Hours: **2,755.3** Snowfall: **101.25"**
- **1st Quarter Trail Usage**
  - January Total: **898** February Total: **1,110** March Total: **1,118**
- Achieved compliance with Town of Winter Park website web content accessibility guidelines outlined in WCAG 2.0/2.1
- *The Whole SCOOP – "Our Winter Warriors" – A glimpse of our Public Works Department*
  Our Public Works Department makes up a large portion of the Town Staff. You likely see our team out and about often, either plowing streets in the wintertime or tending to the gardens and trails in the summer. Public Works is taking big steps to live out our core values. In this edition, you learned about our recent sustainability initiatives, including electric vehicles, road and trail maintenance in the winter, and a glimpse of the people behind the great work Public Works does.

QUARTERLY REPORT
TOWN CLERK

- Daily coordination with Slate Communications on the Town's communication to residents and guests continues via our E-Newsletter, "The Scoop," E-blasts, "The Whole Scoop" (digital publications), and the Town's website. In February, with direction from Council, Staff put out an RFP (Request for Proposal) for an annual social media contract. The contract was awarded to Local Social, which has taken over the Town's social media accounts, as well as Lift's and the Police Department's social media accounts. Local Social has previously been contracted with Slate Communications, so has experience working with Town Staff and Slate Communications.
- Spring and summer are on the horizon, so Town Council will start to see special event permit applications ramp up.
- No new liquor licenses this past quarter. The Town of Winter Park and the Town of Fraser are still providing RAST (Responsible Alcohol Service Training) classes at least once a month, which are free to attend for people who serve alcohol in the community. The next training sessions are April 8 and May 13 from 2 p.m. to 4 p.m. at the Fraser Library. The two marijuana licenses granted in the Downtown Zone are now operational. Both marijuana stores opened their doors towards the end of January.
- Monthly Staff appreciation events are still being conducted. This month, we will host our beloved Staff Ski Day. Town Council hosted a successful "Ski with Council" day in March and will be giving the annual "State of the Town" messaging along with an open Q & A forum on April 16 at 5:30 p.m.
- On April 2, 2024, the Town held its biennial municipal election. This year there were five candidates running for four open seats. Four incumbents ran along with one new candidate. The results were as follows, Jeremy Henn – four-year term, Jennifer Hughes – four-year term, Art Ferrari – four-year term, and Michael Periolat – two-year term. The councilors will be sworn in at the April 16, 2024, Town Council meeting at 5:30 p.m., and at that meeting the current Council will appoint the Mayor and Mayor Pro Tem for the next two years.
- The Town hosted WP 101 in January for those interested in running for Town Council. The first evening featured a brief presentation and a panel of Town Council members who answered attendees' questions. It received much interest from the community and had a great turnout.

QUARTERLY REPORT
TRANSIT

RIDERSHIP	
Q1 2022	**219,908**
Q1 2023	**277,615**
Q1 2024	**312,870**

TOWN OF WINTER PARK TRANSIT DEVELOPMENT PLAN RFP

- Fehr & Peers has released the second survey of the Five-Year Transit Development Plan, which includes potential service alternatives such as options for expanded service hours, increased frequencies, and the creation of micro-transit zones. This survey can be found at **https://fp.mysocialpinpoint.com/the-lift-transit-survey-1**.

WINTER SERVICE

- Ridership continues to rise to pre-pandemic levels in 2024, with a Q1 passenger count of 312,870 over 277,615 riders in Q1 2023. This represents an approximate increase of 13%. While most lines increased from Q1 2023 to Q1 2024, the Black Line represented the largest change, with an increase of almost 17,000 riders.

FLEET AVAILABILITY

- The Town of Winter Park continues to replace transit vehicles, with the expected purchase of three additional buses from the Denver auction in April. Staff expects these vehicles to be available for service by late summer.
- The Town of Winter Park will also receive two new buses from Gillig in June, which Staff expects to be available for use in late summer.
- In early May, Town Staff and Transdev will conduct an operational debrief where Staff and Transdev will review the 2023-24 winter service operations to identify potential issues in service ahead of the 2024-25 winter service season.
- Town Staff has purchased an additional electric bus, which brings the total number of electric buses ordered to two. Staff does not expect these buses to arrive until 2026. However, Staff will continue to monitor the vehicle lead times.

TOWN OF winter park

MAR 2024 REPORT

MONTHLY REPORT

PREPARED BY LOCAL SOCIAL FOR THE TOWN OF WINTER PARK

SUMMARY

This month, the Winter Park social media channels have been a hub of vital updates and engaging community news. We kept our residents and visitors informed about road closures and conditions, ensuring everyone's safety and convenience. With the upcoming municipal election, we provided timely information to encourage civic participation and informed voting. Highlighting our community spirit, we promoted the "Ski with the Council" event, a unique opportunity for residents to connect with local leaders in a fun and dynamic setting. Overall, this month's social media efforts have not only kept everyone well-informed but also reinforced Winter Park's core priorities.

On March 19th, 2024 the Winter Park Town Council approved Local Social's new contract for one-year of contracted social media professional services. The contract begins in April and includes an increase in Local Social's scope of work. I've included analytics for The Lift and FWPPD in this report. I look forward to continuing to work with the Town of Winter Park.

Your top-performing Facebook posts in March were:

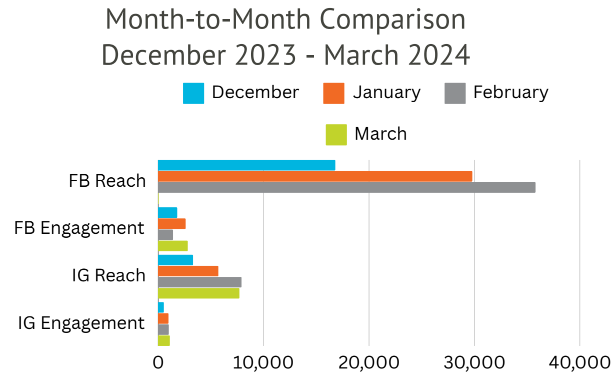
- Scenes from our snowy mountain town photos
- A boosted We're Hiring post promoting a job opportunity for the FWPPD
- A video of what Spring in the Rockies looks like ❄️
- A photo of the Berthoud Pass road conditions sign warning about Spring driving concerns
- A reminder of Town Codes to protect Local Wildlife

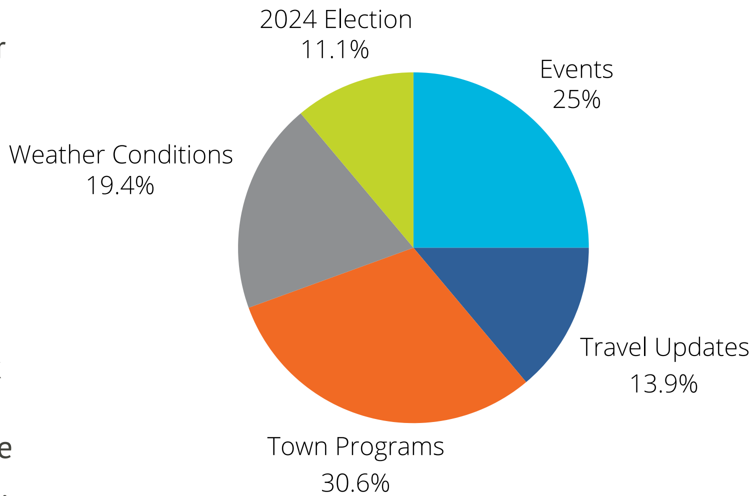
A collaboration post with the Chamber about Spring road and avalanche conditions on Berthoud Pass was your top-reaching post with 4.2K impressions and 120 engagements. A Reel with a trending audio and snow falling in Winter Park showed off "Spring in the Rockies" was played over 3.4K times and received 140 engagements. A post of people snowshoeing and trails in the background discussed the good neighbor policy and received 125 enggements.

THE STATISTICS

There were a total of 16 posts to your Instagram account in March. Local Social posted 11 times with 14 pictures, 4 Reels, and 60 Stories. Your Instagram stories reached approximately 9K people. This month you gained 26 new followers on Instagram and now have 1,650 Followers. Your Instagram content was shared almost 100 times.

There were 36 posts to your Facebook account, and you gained 99 new followers in March. You currently have 2,334 Facebook followers. In addition, your Facebook page received 1.6K visits last month.





Above is a pie chart showing what topics were covered by your Social Media posts throughout the month of March.

TOWN OF WINTER PARK AT A GLANCE

FACEBOOK:

34.5K PEOPLE REACHED

169 LINK CLICKS

2.8K ENGAGEMENTS

INSTAGRAM:

7.7K ACCOUNTS REACHED

30.5K IMPRESSIONS

1.1K CONTENT INTERACTIONS

SUMMARY

In March, I shared changes in service times and asked for patience during severe weather on your The Lift social media platforms.

A collaborative post with the Town of Winter Park and Winter Park & Fraser Chamber of Commerce's Instagram accounts was your top-performing post reaching almost 1.7K people and receiving 65 engagements. The post showed a Lift Bus on Main Street and promoted the Share the Ride & Win campaign.

A Reel announcing the start of Spring Break 30-minute service and providing info on the Night Lift service reached 2.3K people on Instagram.

There were a total of 6 posts to your Instagram account in March. Local Social posted 4 pictures, 2 Reels, and 20 Stories. Your Instagram stories reached approximately 1.2K people. This month you gained 8 new followers on Instagram and now have 1,533 Followers. Your Instagram content was shared 22 times.

There were 8 posts to your Facebook account, and you gained 20 new followers in March.

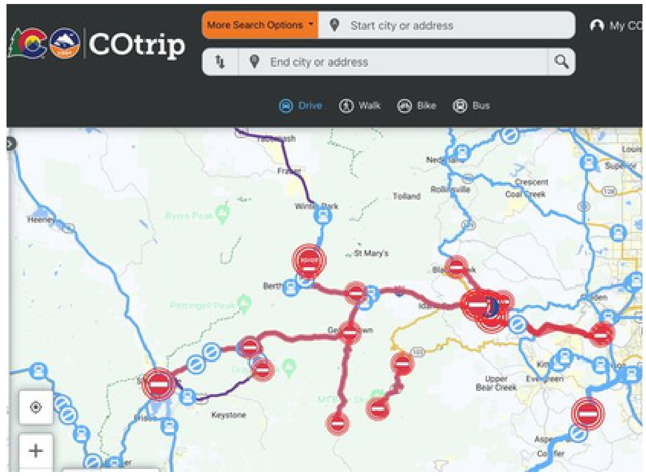
THE LIFT AT A GLANCE

FACEBOOK:		INSTAGRAM:	
2.4K	PEOPLE REACHED	5.1K	ACCOUNTS REACHED
351	PAGE VISITS	9.3K	IMPRESSIONS
225	ENGAGEMENTS	280	CONTENT INTERACTIONS

SUMMARY

Upon viewing the analytics of the Fraser Winter Park Police Department Facebook page, I was shocked to find the reach and following in March. It is clear that people in the area value the page and its updates and I look forward to creating a more consistent presence on the account.

The top post in March reached over 64.4K people and received 734 engagements. The post was during one of the severe weather instances we had in March and was a post that was updated multiple times to share conditions on Berthoud Pass.



There were 18 posts to your Facebook account, and you gained 153 new followers in March. The FWPPD Facebook account currently has 3,995 followers. In addition, there were 3.7K visits to your Facebook page.

FWPPD AT A GLANCE

FACEBOOK:

93.9K PEOPLE REACHED

416 LINK CLICKS

8K ENGAGEMENTS

A NOTE FROM LOCAL SOCIAL

Now that the Town of Winter Park's monthly social media reports encompass 6 different accounts, the reports will look differently moving forward. My plan is to introduce a more efficient structure that will save time for both myself and anyone reviewing these reports. If any specific information is requested, it can be supplied.