

ARCADIS

Attachment 1

Wetland Restoration/Creation and
Adjacent Area Restoration Plan
Narrative
Plan Drawings - Sheets 1, 2, 3 and 4
Plates 1, 2 and 3
Monitoring and Maintenance Plan

Cricket Valley Energy (CVE)

Area W2-A Wetland Restoration/Creation and Adjacent Area in Project Development Area and Former RASCO Parcel Wetland D (US 8) Adjacent Area Restoration Plan

To compensate for both the future permanent loss of approximately 0.08 acres of wetlands, (0.05 acres jointly regulated NYSDEC and USACE freshwater wetlands identified as Wetland 2 and 0.03 acres regulated by the USACE identified as Wetland F {US 4}), 0.8 acres of NYSDEC-regulated Adjacent Area, temporary disturbance to approximately 1.0 acres of Adjacent Area in the project development area, (Tables 1 and 2), as well as temporary disturbance to approximately 1.4 acres of Adjacent Area associated with Wetland D (US 8) in the former RASCO parcel, Cricket Valley Energy (CVE) proposes this Wetland Restoration/Creation and Adjacent Area Restoration Plan (the Plan). The Plan provides for improvements both within and beyond the limits of Wetland Restoration Work Area W2-A (Sheets 1, 2, 3 and 4; Plates 1, 2 and 3).

Area W2-A as designated for the purpose of this Plan, is a funnel-shaped section of NYSDEC Wetland 2 and comprised of both regulated freshwater wetlands (~0.6-acres) and Adjacent Area (~0.4-acres). Area W2-A is located in the southern portion of Wetland 2 and terminates at the base of the future CVE facility access road. The designation of this specific area represents proposed disturbance resulting from removing slag and debris resulting from the site's prior industrial uses, and not disturbance directly associated with facility construction (Sheet 1).

Wetland Restoration and Creation

The design for Area W2-A envisions restoring a significantly degraded wetland pocket in addition to the surrounding Adjacent Area (Sheet 2). The Adjacent Area surrounding this wetland has a moderate to steep slope comprised primarily of buried and exposed industrial waste materials. The dominant vegetative cover-type within Area W2-A is characterized by sparsely distributed and stunted *P. australis*. The predominant sediment/soil matrix in existing wetland Area W2-A is comprised of what appears to be residual sawdust-like waste product generated by the former on-site industrial operation. As part of future site clean-up activities, industrial waste materials will be removed, effectively lowering existing elevations and, therefore, providing an opportunity to create an open water area, as well as uniformly extending the existing wetland limits to the east and west to create 0.08 acres of emergent zone (Sheets 2 and 3).

Open water habitat is currently limited in Wetland W2 given the expanse of *P. australis*. Open water provides expanded opportunities for other wildlife species and wetland functions not now afforded within Wetland W2. The open water area below contour 420' will be allowed to naturally revegetate as based on existing hydrogeologic conditions within Wetland 2; it is anticipated that this zone will be submerged at depths ranging from 0.5 – 3 feet for the majority of the growing season. In time, the shallow depth of this wetland will encourage rooted, floating and emergent growth. Areas between contour 420'-424' (which will include the created 0.05 acres of emergent zone), are anticipated to experience natural, seasonally fluctuating water levels. This will result in relatively extended periods of exposed saturated substrate during the growing season's warmer/drier months. Therefore, the wetland areas between contour 420'-424' will be broadcast seeded with an appropriate wetland seed mix at a rate of 15 pounds per acre comprised of native herbaceous species to create the emergent area. It is anticipated that over time, an assemblage of plant species adapted to these saturated/flooded conditions will become recruited from the surrounding environment and become established in this wetland. In time, a natural distribution pattern of

P. australis interspersed with more desirable species should become established at least in some areas. Note that although *P. australis* is not generally viewed as “desirable” from a wildlife standpoint, it does provide important benefits such as sediment retention, water quality treatment, nutrient assimilation, and erosion control. In addition, some species of wading and passerine birds utilize *P. australis* stands for feeding and cover while aquatic mammals such as muskrat feed on the rhizomes in addition to using the above ground stems to create seasonal dens.

Adjacent Area Restoration – Project Development Area

Beyond the limits of Area W2-A, a total of approximately 0.9 acres comprised of additional Adjacent Area (~0.6-acres) and bordering upland area (~0.3-acres) may be temporarily disturbed, or may be immediately adjacent to areas temporarily disturbed, as part of facility and bioretention basin construction (Sheet 3). This 0.9 acre area is characterized by relatively steep to moderate slopes with vegetation consisting of mostly deciduous tree/shrub species at varying densities, as well as isolated specimens/small pockets of evergreens, predominantly red cedar. These disturbed areas will be restored by re-planting; vegetation will predominantly consist of shrub/tree species both within the 100-foot Adjacent Area limit (~0.6-acres) and bordering upland area (~0.3-acres). Some additional areas within a 1.8-acre portion of the Adjacent Area that are not currently wooded will be selectively replanted as shown on the attached Sheets and Plates.

The Plan specifies replanting with native shrubs and/or trees, except where not suitable from a site security and operations standpoint. For example and as shown on Sheet 3, areas immediately proximate to bioretention basin outlets will be stabilized and planted with native grasses and ground cover plants. Plates 1 and 2 illustrate a box culvert design consisting of erosion control matting seeded with a conservation mix and planted with shrubs transitioning to a naturally designed revetment consisting of logs and rootwads (tree trunk with roots attached) to be secured with boulders. In this instance within the Adjacent Area, the culvert outlet area includes a two-foot deep plunge pool that flows through a boulder lined overflow area prior to entering the wetland. The slopes on either side of both the plunge pool and overflow area will be stabilized with erosion control matting and both seeded with a conservation mix and planted with shrubs. Additionally, at the interface of these slopes, a row consisting of a combination of logs, boulders and rootwads will be installed to function as revetment (Plate 2). As illustrated in the design for the box culvert, areas where woody species cannot be planted would be designed for planting with herbaceous species and stabilized with erosion matting and seeded at a rate of 15 pounds per acre. This approach will maximize erosion control and flow attenuation while also preventing the advancement of woody roots which could potentially compromise bioretention basin function or the integrity of the outlet structure.

Although not specifically depicted as part of this Plan, areas where visibility, safety, access and/or overhead clearances necessitate will be planted accordingly with species that are suitable from a height or crown cover perspective. This would include areas immediately proximate to developed areas that could potentially be damaged by advancing roots, broken limbs and fallen trees as well as impede security, maintenance, access/egress and structural function.

Likewise, advancing woody roots similarly could be an impediment to underground piping and electric banks if located too close to such installations. Tree limbs can also be a hindrance if located in the vicinity of plant fencing. Site security issues would include facilitating site access/egress to potential

trespassers via tree branches overhanging the fence line, impede maintenance/cleaning outside the perimeter fence thereby reducing line-of-sight to security personnel as well as increase potential damage to fencing itself resulting from fallen limbs and/or toppled trunks. To mitigate potential perimeter fencing security issues, shrubs and trees would be planted a minimum distance of 15 feet from the fence line. These areas would be planted and stabilized, however, with suitable ground cover species.

Adjacent Areas proximal to the limit of disturbance and located beyond both Area W2-A and temporary construction areas (~1.8 acres), will be targeted for selective re-planting to either mitigate unanticipated impacts resulting from site construction or, introduce new specimens to increase vegetative density (and thus wetlands protection) in areas of relative open canopy (Sheet 3).

For areas between the limits of development and non-jurisdictional Wetland 1, restoration will mimic that specified for Wetland 2. Similar to Wetland Restoration Work Area W2-A, grading of soils will be followed by application of an appropriate wetland seed mix at a rate of 15 pounds per acre to restore emergent area with native herbaceous species.

Planting Details – Species Types and Densities

Native tree/shrub species will be installed in the Adjacent Areas and bordering upland areas as designated at a density of 436 specimens per acre (Sheet 3). Achieving this density will be the result of spacing specimens proposed for planting within 10-feet of each other and orienting them on center. Table 3 summarizes candidate tree/shrub species proposed for planting. Others can be proposed if available and suitable for local site conditions or, to introduce additional diversity and wildlife values. To stabilize soil and promote native vegetative growth between specimens, areas will be broadcast seeded with an upland seed mix at a rate of 15 pounds per acre comprised of native herbaceous species.

It should be noted that species shown in Table 3 represent an example of specimens that could potentially be planted and by no means represents an exhaustive list of candidate shrub and trees to be included in the final planting plan. Although these species are commonly available in the native plant nursery market, circumstances beyond the control of the contractor performing this work could potentially exclude the selection of a particular species for restoration planting. Examples of such circumstances include, but are not limited to:

- Particular species out of regional stock from multiple nursery suppliers
- Particular species is in stock but plants are not of the size specified for planting
- Particular species is in stock but plants are not free of disease (e.g. cedar-apple rust afflicting red cedar) and, therefore, need to be rejected
- Planting work occurs in the fall and therefore precludes the use of Fall Transplant Hazard species (i.e., red cedar, white pine and gray birch).

Therefore, prior to completion of construction and in advance of initiating the planting component of restoration work, the list of species in Table 3, if necessary, can be expanded to replace species not accommodated by the scheduled planting season and/or if for whatever reason healthy specimens are not available from regional nursery supplier(s).

Adjacent Area Restoration – Former RASCO Parcel

Sheet 4 provides the detailed drawing illustrating restoration and enhancement measures proposed following cessation of required temporary construction worker parking and laydown areas. Included as part of this larger area is the 1.4-acre regulated Adjacent Area associated with NYSDEC Wetland D. The regulated Adjacent Area will be seeded with a New England roadside matrix upland seed mix at a rate of 35 pounds per acre and include grasses, wildflowers and shrubs species. A total of 150 shrubs representing two species will be planted within five select concentration areas shown on Sheet 4. Eighty-five speckled alder (*Alnus rugosa*) shrubs will be exclusively planted in three areas, while the remaining two areas will contain a total of 65 spicebush (*Lindera benzoin*) shrubs. A total of 45 trees representing five species will also be planted and somewhat evenly distributed throughout the regulated Adjacent Area. These tree species include 17 red maple (*Acer rubrum*), 15 eastern red cedar (*Juniperus virginiana*), 8 quaking aspen (*Populus tremula*), 3 blackgum (*Nyssa sylvatica*) and 2 black oak (*Quercus velutina*). The entirety of the former RASCO parcel, which includes the 1.4-acre regulated Adjacent Area, will not be used as part of the CVE project once it becomes operational.

Jurisdictional Wetlands Impacts

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Wetland Number	Jurisdictional Status	Total Wetland Area (acres)	Wetland Area Temporarily Disturbed and Restored (acres)	Wetland Area Permanently Altered (acres)	Wetland Area Permanently Lost (acres)	New Wetland Area Created (acres)	Total Wetland Net Loss (f) + (g)
Wetland 2	Federal and State	8.7	0.6	0.0	-0.05	0.05	0.0
Wetland 3B	Federal	.41	0.0	0.0	0.0	0.0	0.0
Drainage Swale (Intermittent Stream)	Federal	.04	.001	.003 (rip rap within stream) ¹	0.0	0.0	0.0
Wetland D (US 8)	Federal and State	6.08	0.0	0.0	0.0	0.0	0.0
Wetland F (US 4)	Federal	0.36	0.0	0.0	0.03	0.03	0.0

¹Plate 3 – Conceptual Subsurface Sewage Disposal System and Stormwater Management Plan

Total Adjacent Area Impacts (see Wetland Restoration/Creation Plan Sheets 1 through 3 and Sheet 4 Former Rasco Parcel On-site Construction Laydown and Parking Area: Preliminary Restoration and Landscape Plan)

(a)	(b)	(c)	(d)	(e)	(f)
NYSDEC-Regulated Resource	Adjacent Area Temporarily Disturbed/Restored Due to Facility Construction and Bioretention Areas ²	Adjacent Area Temporarily Disturbed /Restored due to Waste Excavation ³	Total Adjacent Area Temporary Disturbance/ Restoration (b)+(c)	Adjacent Area Permanently Lost (due to facility construction) ⁴	Adjacent Area selectively replanted outside of proposed limits of construction ⁵
Adjacent Area to Wetland 2	0.6	0.4	1.0	0.8	1.8
Adjacent Area to Wetland D (US 8)	0.0	1.4	1.4	0.0	0.0

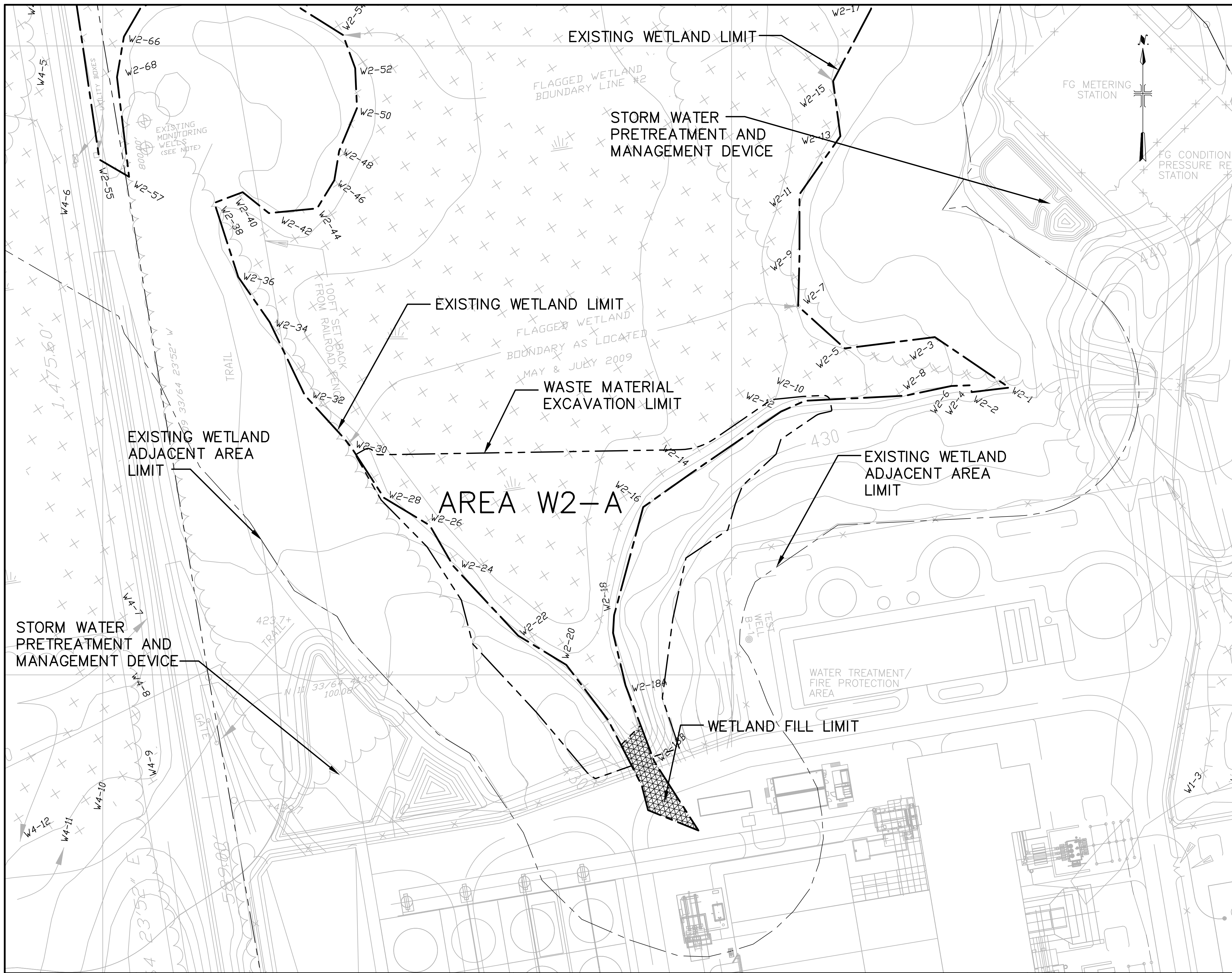
²See Wetland Restoration/Creation Plans Sheet 3, Note 4.

³See Wetland Restoration/Creation Plans Sheet 3, Note 5 and Sheet 4 Former Rasco Parcel On-site Construction Laydown and Parking Area: Preliminary Restoration and Landscape Plan

⁴Area within Existing Adjacent Area that will be filled due to plant construction

⁵See Wetland Restoration/Creation Plans Sheet 3, Note 3.

Table 3 Candidate Tree/Shrub Species for Area W2-A Wetland Restoration/Creation and Adjacent Area Restoration Plan							
Contour (feet)	Latin Name	Common Name	Regional Status	Ind.	National Status	Ind.	Vegetative Layer
424-438	<i>Betula populifolia</i>	gray birch	FAC		FAC		Tree
424-438	<i>Juniperus virginiana</i>	eastern red cedar	FACU		FACU-;FACU		Tree
424-438	<i>Prunus serotina</i>	black cherry	FACU		FACU		Tree
424-438	<i>Rhus typhina</i>	staghorn sumac	UPL		NI		Shrub
424-438	<i>Pinus strobus</i>	white pine	FACU		FACU		Tree
424-438	<i>Acer negundo</i>	box elder	FAC+		FAC, FACW		Tree
424-438	<i>Populus tremula</i>	quaking aspen	FACU		FACU, FAC+		Tree
424-438	<i>Acer rubrum</i>	red maple	FAC		FAC		Tree
424-438	<i>Gleditsia triacanthos</i>	honey locust	FAC-		FACU, FAC		Tree



Total Wetland Impacts

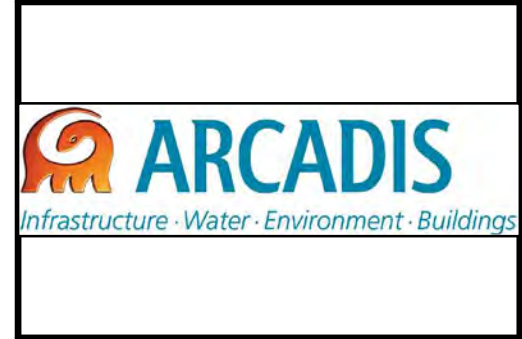
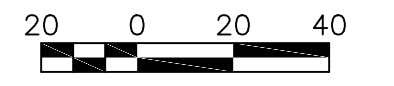
(a) Wetland Number and Jurisdictional Status	(b) Jurisdictional Status	(c) Total Wetland Area (acres)	(d) Wetland Area Temporarily Disturbed and Restored (acres)	(e) Wetland Area Permanently Altered (acres)	(f) Wetland Area Permanently Lost (acres)	(g) New Wetland Area Created (acres)	(h) Total Wetland Net Loss (f) + (g)
Wetland 2	Federal and State	8.7	0.6	0.0	-0.05	0.05	0.0
Wetland 3B	Federal	.41	-	-	-	-	-
Drainage Swale (Intermittent Stream)	Federal	.04	.001	.003 (rip rap within stream)	-	-	-
Wetland F (US 4)	Federal	0.36	0.0	0.0	0.03	0.03	0.0

Total Adjacent Area Impacts (see Wetland Restoration/Creation Plan Sheets 1 through 3 and Sheet 4 Former Rasco Parcel On-site Construction Laydown and Parking Area: Preliminary Restoration and Landscape Plan)

(a) NYSDEC-Regulated Resource	(b) Adjacent Area Temporarily Disturbed/Restored Due to Facility Construction and Bioretention Areas ²	(c) Adjacent Area Temporarily Disturbed /Restored due to Waste Excavation ³	(d) Total Adjacent Area Temporary Disturbance/Restoration (b)+(c)	(e) Adjacent Area Permanently Lost (due to facility construction) ⁴	(f) Adjacent Area selectively replanted outside of proposed limits of construction ⁵
Adjacent Area to Wetland 2	0.6	0.4	1.0	0.8	1.8
Adjacent Area to Wetland D (US 8)	0.0	1.4	1.4	0.0	0.0

¹See Plate 3 – Conceptual Subsurface Sewage Disposal System and Stormwater Management Plan.
²See Wetland Restoration/Creation Plans Sheet 3, Note 4.
³See Wetland Restoration/Creation Plans Sheet 3, Note 5 and Sheet 4 Former Rasco Parcel On-site Construction Laydown and Parking Area: Preliminary Restoration and Landscape Plan.
⁴Area within existing Adjacent Area that will be filled due to plant construction.
⁵See Wetland Restoration Creation Plan Sheet 3, Note 3.

- NOTES:
- BACKGROUND INFORMATION TAKEN FROM DRAWING TITLE "OVERALL GRADING PLAN", DRAWING NO. C140 DATED 10-06-09 WITH REVISION D DATED JULY 2010, PREPARED BY BURNS AND ROE ENTERPRISES, INC., ORADELL, NJ FOR CRICKET VALLEY ENERGY, LLC, TOWN OF DOVER DUTCHESS COUNTY, NEW YORK.



REVISIONS			
NO.	BY	DATE	REMARKS

DES: AMR
 DWN: CS
 CKD: DC

CRICKET VALLEY ENERGY, LLC
 TOWN OF DOVER, DUTCHESS COUNTY, NEW YORK
CRICKET VALLEY ENERGY

EXISTING WETLAND AND FUTURE WORK LIMITS

SCALE: 1" = 40'

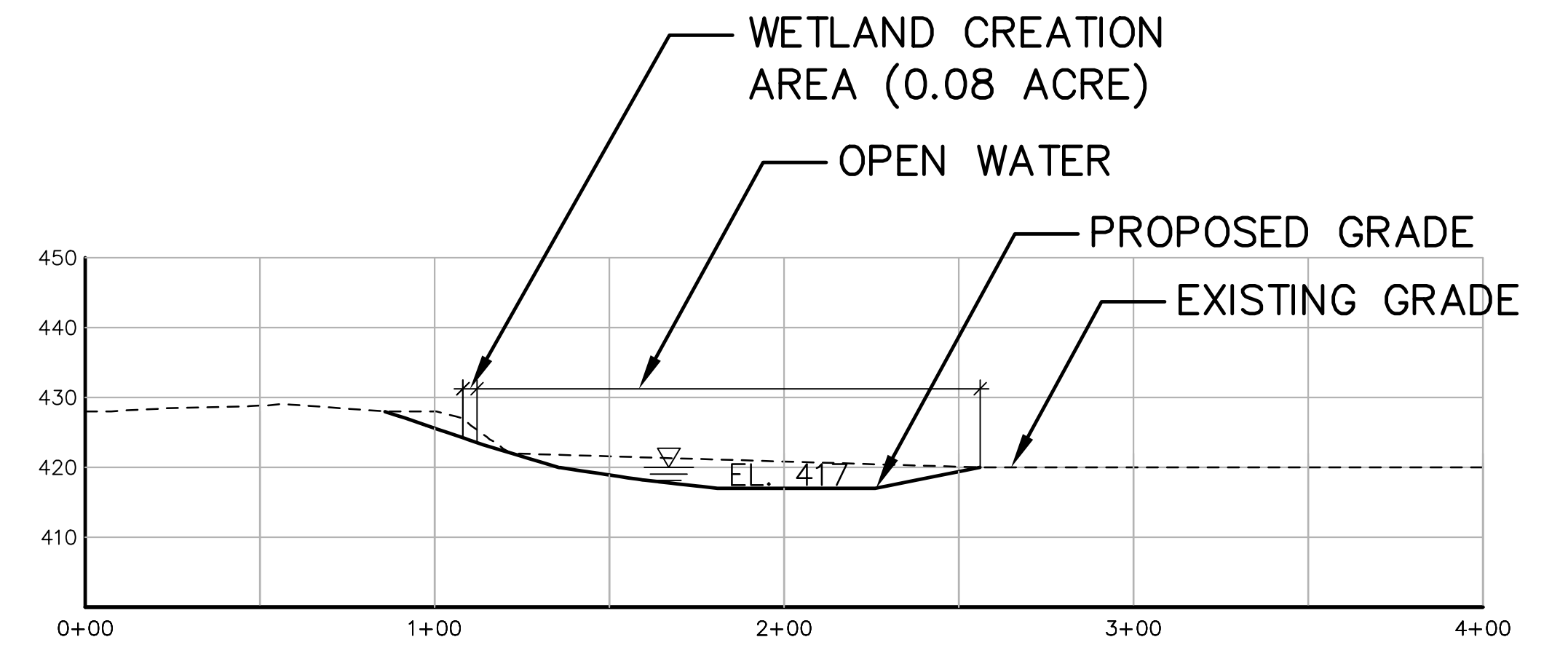
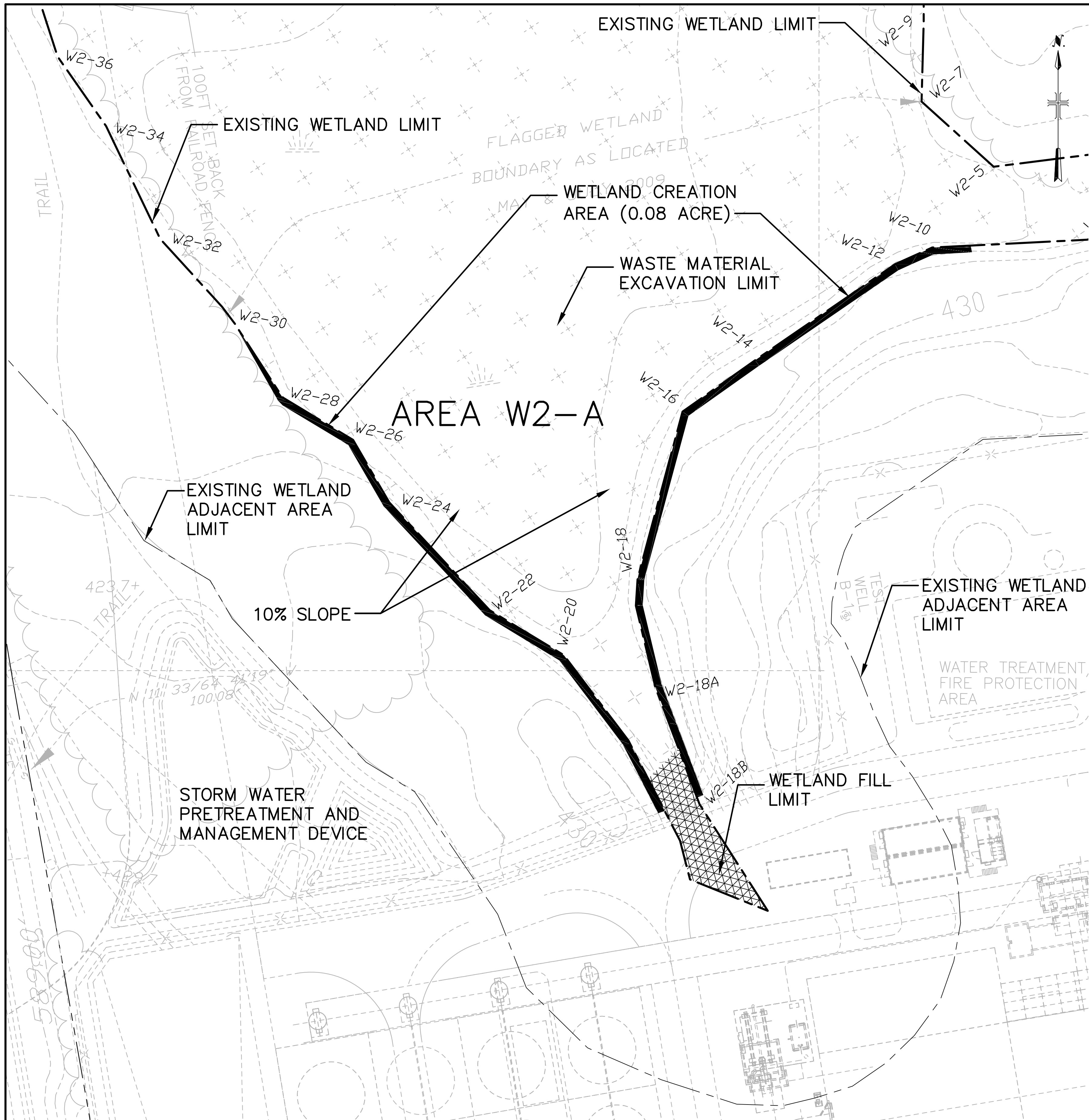
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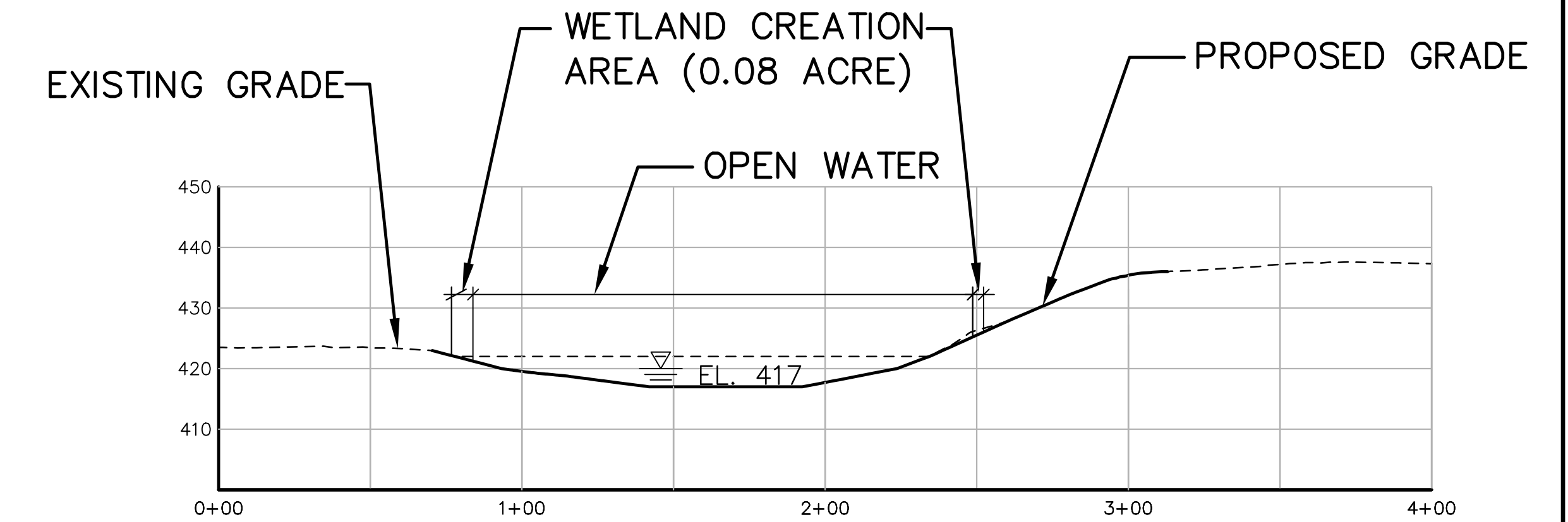
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VERT. 1" = 20'



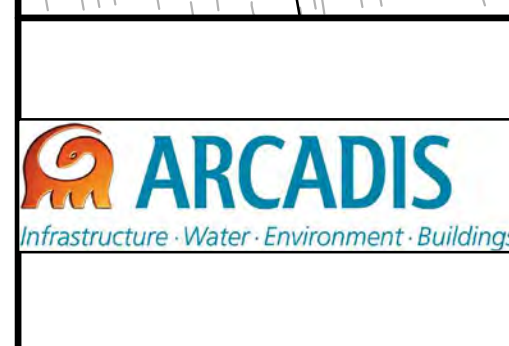
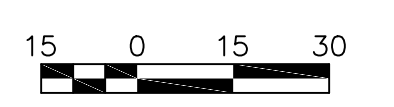
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VERT. 1" = 20'

LEGEND:

- X 417 PROPOSED SPOT ELEVATION
- PROPOSED 10' CONTOUR
- - - PROPOSED 1' AND 2' CONTOUR
- · - · - · EXISTING AND FUTURE FEATURES
- - - - - EXISTING WETLAND LIMIT

NOTES:

1. BACKGROUND INFORMATION TAKEN FROM DRAWING TITLE "OVERALL GRADING PLAN", DRAWING NO. C140 DATED 10-06-09 WITH REVISION D DATED JULY 2010, PREPARED BY BURNS AND ROE ENTERPRISES, INC., ORADELL, NJ FOR CRICKET VALLEY ENERGY, LLC, TOWN OF DOVER DUTCHESS COUNTY, NEW YORK.



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NO.	BY	DATE	REMARKS

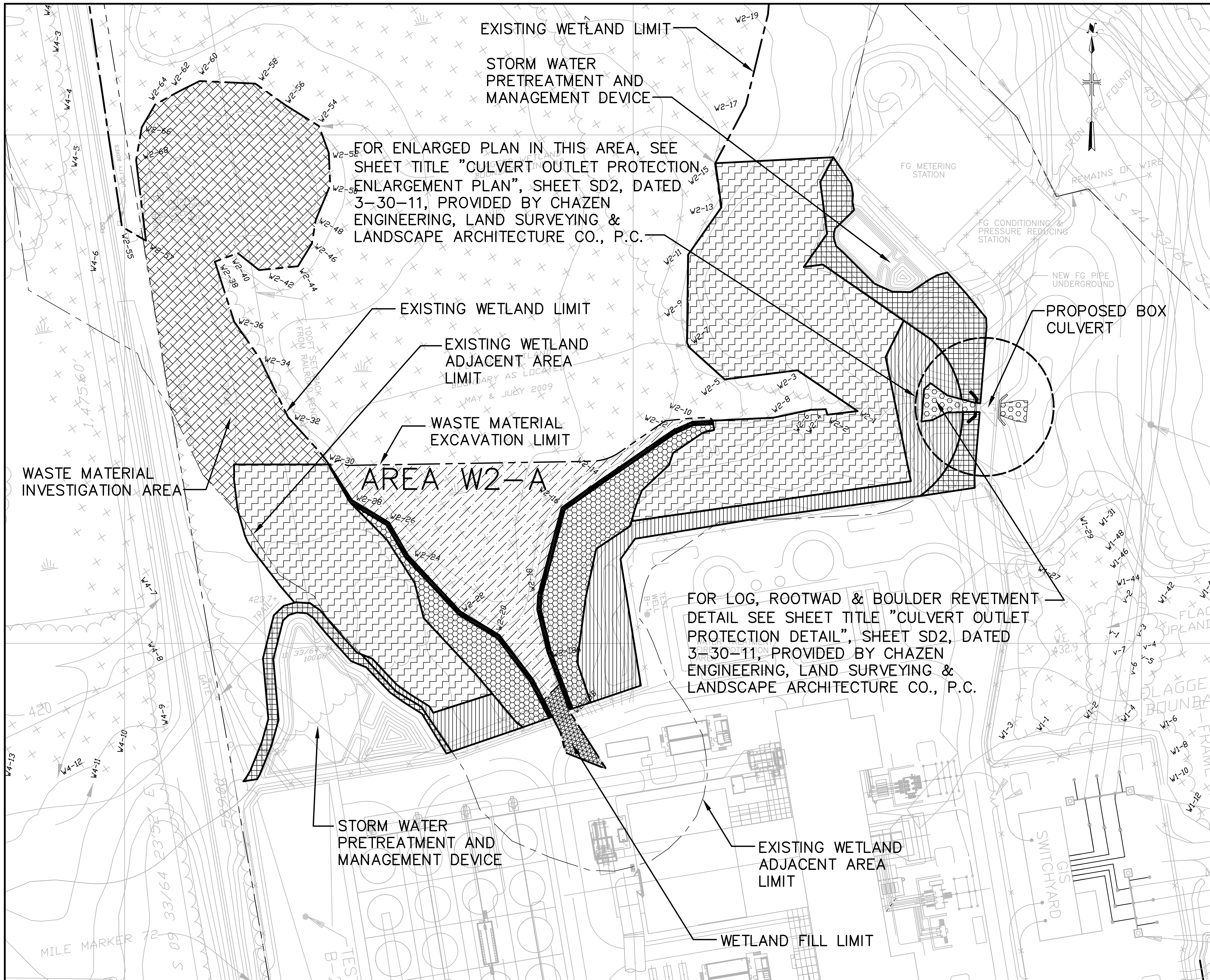
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CKD	DC

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TOWN OF DOVER, DUTCHESS COUNTY, NEW YORK
CRICKET VALLEY ENERGY

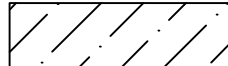

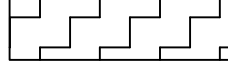

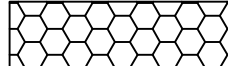



**WETLAND AREA W2-A
RESTORATION PLAN**
SCALE: 1" = 30'

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SHEET 2 OF 3
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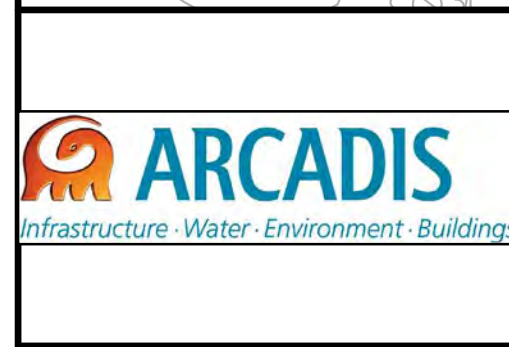
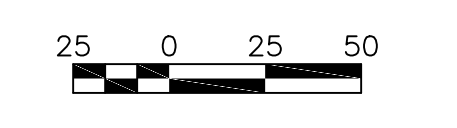
LEGEND

-  OPEN WATER (SEE NOTE 1)
-  WETLAND CREATION AREA (SEE NOTE 2)
-  WETLANDS ADJACENT AREA TO BE EVALUATED FOR SELECTIVE RESTORATION/REPLANTING (SEE NOTE 3)
-  WETLANDS ADJACENT AREA TO BE RESTORED/REPLANTED (SEE NOTE 4)
-  WETLANDS ADJACENT AREA TO BE RESTORED/REPLANTED DUE TO WASTE EXCAVATION (SEE NOTE 5)
-  WETLAND FILL AREA
-  BORDERING UPLAND AREA (SEE NOTE 4)
-  WASTE MATERIAL INVESTIGATION AREA (SEE NOTE 6)

- NOTES:**
1. **Open Water** (Refer to Sheet 2 of 3 for Cross-Section) : Open Water area to be created within Area W2-A by excavation of non-native sediment, approximately 0.6 acres in size. From approximately contour 420' - 424', area to be broadcast seeded with an appropriate wetland seed mix at a rate of 15 pounds per acre. Open Water area allowed to naturally revegetate.
 2. **Wetland Creation Area**: Total of 0.08 acres of emergent zone created along the perimeter of Area W2-A (from approximate Flag W2-10 to Flag W2-30) to be broadcast seeded with an appropriate wetland seed mix at a rate of 15 pounds per acre.
 3. **Wetlands Adjacent Area to be evaluated for Selective Restoration/Replanting** : Areas of existing shrub/tree cover on moderate slopes outside the proposed limits of construction ground disturbance (approximately 1.8 acres). Areas not currently densely vegetated will be selectively planted with appropriate tree/shrub species. Re-vegetation with appropriately sized native tree/shrub species would be completed at the rate of 436 specimens per acre (10' x 10' on center).
 4. **Wetlands Adjacent Area to be Restored/Replanted Due to Facility Construction**: Represents approximately 0.9 acres of both wetland Adjacent Area (0.6 acres) and bordering upland area (0.3 acres) immediately adjacent to areas proposed to be disturbed by facility construction as well as around proposed bioretention basins to be replanted/restored with native tree/shrub species at a rate of 436 specimens per acre (10' x 10' on center). Area within/around swales/outlet structures to be stabilized and seeded at a rate of 15 pounds per acre.
 5. **Wetlands Adjacent Area to be Restored/Replanted Due to Waste Excavation**: Represents approximately 0.4 acres of wetland Adjacent Area proposed to be restored by waste debris removal and excavation; to be replanted/restored with native tree/shrub species at a rate of 436 specimens per acre (10' x 10' on center).
 6. **WASTE MATERIAL INVESTIGATION AREA**: Represents existing area of suspected industrial material within the wetland adjacent area subject to future characterization.

NOTE:

1. BACKGROUND INFORMATION TAKEN FROM DRAWING TITLE "OVERALL GRADING PLAN", DRAWING NO. C140 DATED 10-06-09 WITH REVISION D DATED JULY 2010, PREPARED BY BURNS AND ROE ENTERPRISES, INC., ORADELL, NJ FOR CRICKET VALLEY ENERGY, LLC, TOWN OF DOVER DUTCHESS COUNTY, NEW YORK.



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DES AMR
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PLANTING AREA PLAN

SCALE: 1" = 50'

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SHEET 3 OF 3

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