

National Zoological Park Beaver Otter Raven Habitat Revitalization

3001 Connecticut Avenue NW, Washington, DC

Approval of Preliminary and Final Site Development Plans

Smithsonian Institution

Project Summary

Commission Meeting Date: June 4, 2026

NCPC Review Authority: 40 U.S.C. § 8722(b)(1) and (d)

Applicant Request: Approval of Preliminary and Final Site Development Plans

Session: Executive Director

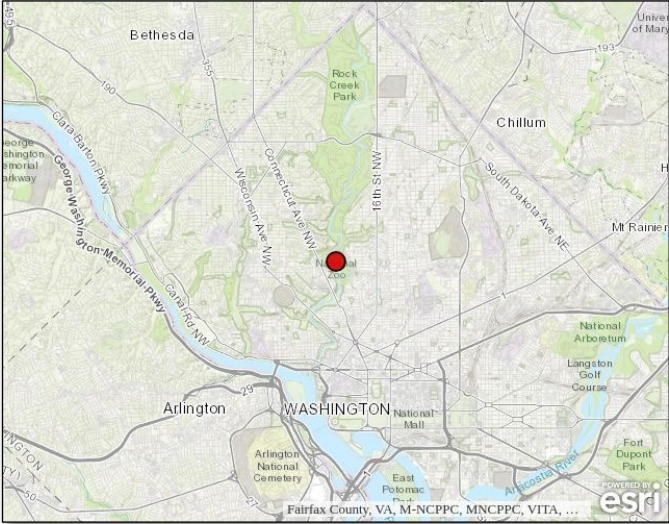
NCPC Review Officer: Lee Webb

NCPC File Number: 8782

Project Summary:

The Smithsonian Institution (SI) has submitted preliminary and final site development plans for the rehabilitation of the Beaver Otter Raven (BOR) Habitat at the National Zoological Park, located along Connecticut Avenue, in Northwest Washington, D.C. The habitat is located in the middle of the Zoo on the American Trail, a visitor pedestrian path and exhibit experience separate from Olmsted Walk. The BOR exhibit was constructed in 1979 and modified in 2012, and is a non-contributing element of the National Zoological Park Historic District. The BOR project will remove failing concrete rockwork from existing support buildings and modify the existing visitor path to improve accessibility. The Raven habitat is currently unoccupied and will be closed, including the portion of the visitor path in that part of the exhibit and will be converted to staff use only. The central Life Safety Support building will be clad with materials to match the appearance of other exhibit buildings on the American Trail.

Site Location

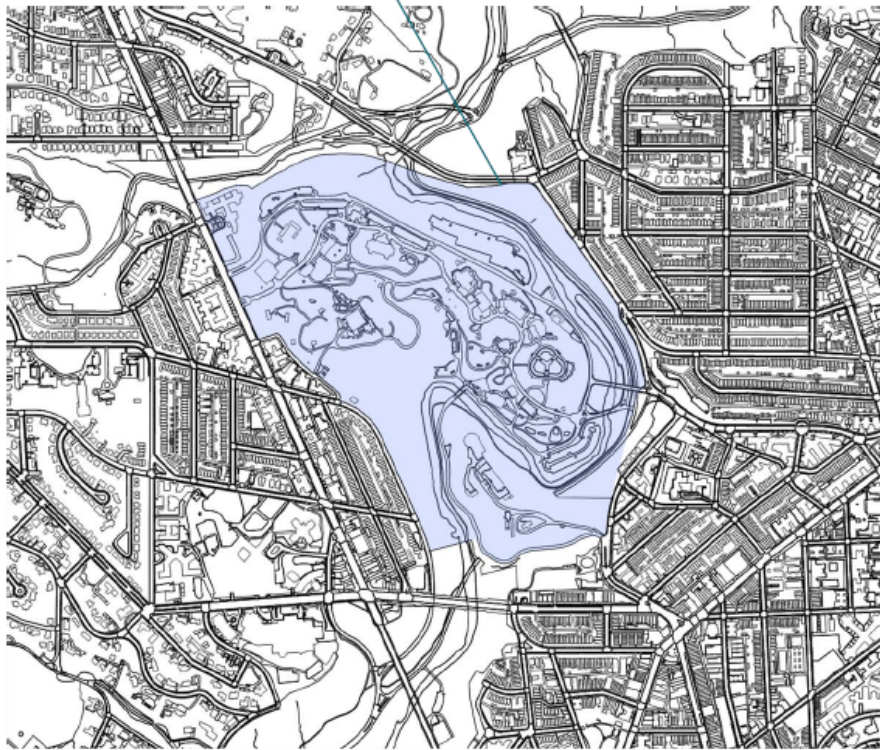


Location Map

Project Location

Project Location

NATIONAL ZOOLOGICAL
PARK AND CONSERVATION
BIOLOGY INSTITUTE



VICINITY MAP

NOT TO SCALE



CONTEXT MAP

Project Scope

Project Scope

Built in the 1970s, the Beaver, Otter, and Raven exhibits at the National Zoo are showing signs of aging, with deteriorating faux-rock structures posing safety risks for animals, keepers, and visitors. These exhibits are located on the American Trail, a separate pedestrian and exhibit path visible from Olmsted Walk. These thin concrete shells are cracking and cannot support weight in many areas.

The project consists of a comprehensive renovation including the complete removal of existing faux-rock (rockwork) from the site, architectural re-cladding of the existing Life Support Systems (LSS) and Raven holding buildings, replacement of the life support system (LSS) equipment which has reached its operational life expectancy, revitalization of the Otter and Beaver habitats including complete replacement of the leaking pools, regrading the south path along American Trail to provide accessible visitor walkways, and introduction of new visitor barrier/animal containment site walls with code compliant railings where the existing faux-rock has been removed.

The site work will be executed during a single period of construction to reduce disruptions for both animals and visitors.



Existing faux rock and site wall along Beaver habitat visitor path.

Project Goals and Requirements

Goals and Requirements

GOALS

- Improve **caretaker safety** and accessibility through exhibit design improvements.
- Improve **habitats for animals** – informed by Association of Zoos & Aquariums (AZA) standards.
- Improve habitat **viewing experience** for guests.
- Improve existing pathway **accessibility** for guests.

REQUIREMENTS

- Remove and replace all existing rockwork.
- Update metal guardrails and handrails to be code-compliant.
- Stop water-loss through leaks in animal exhibits.
- Replace LSS equipment to provide adequate support for habitat features.
- Clad exposed LSS and Raven buildings to thoughtfully integrate with existing surroundings.

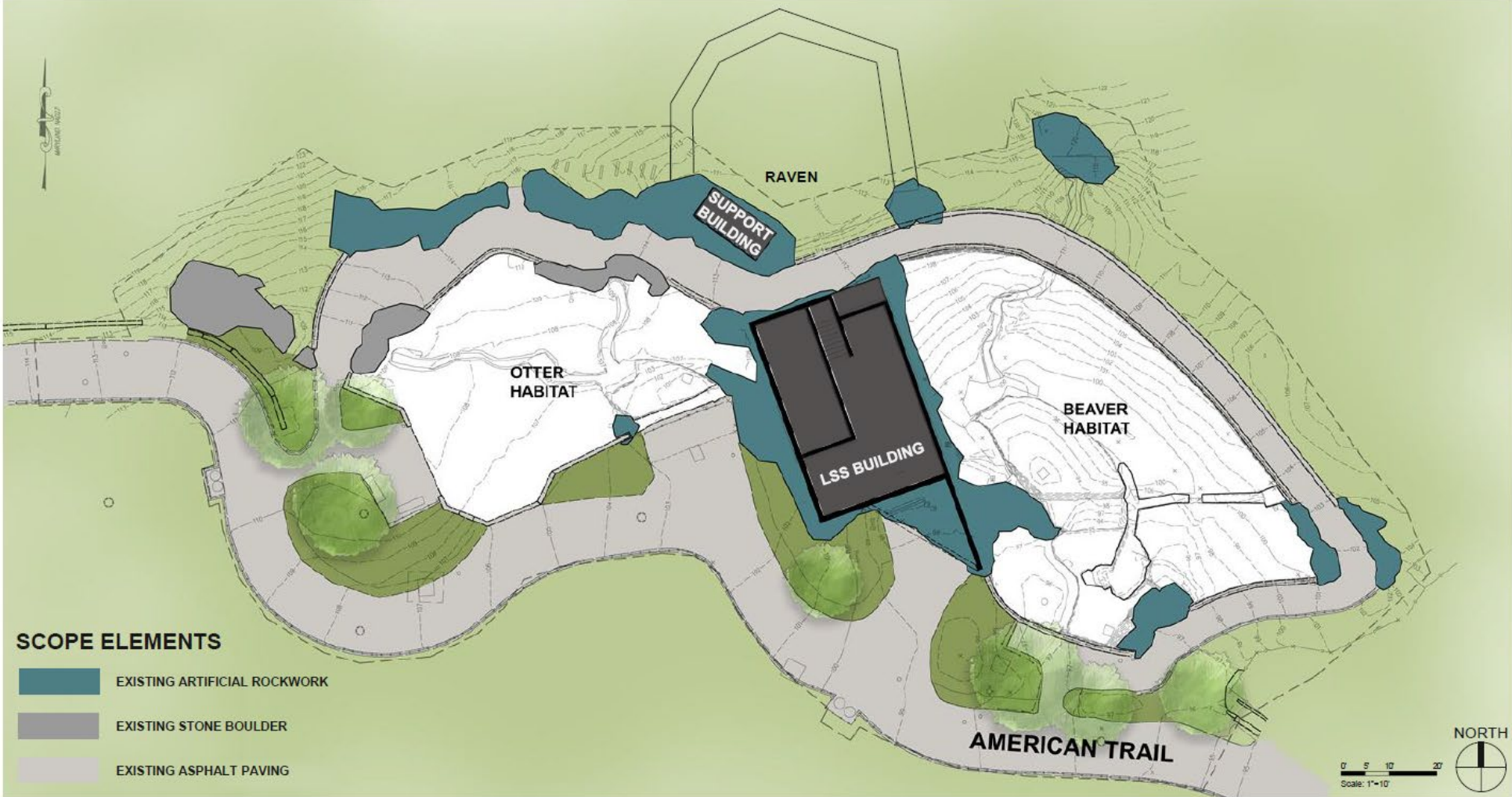


Existing Otter viewing canopy and faux rockwork.



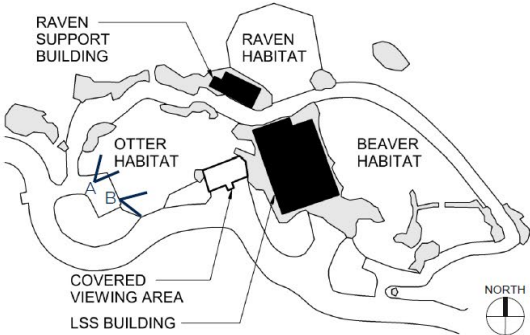
Existing Site Plan

Existing Site Plan



Site Images

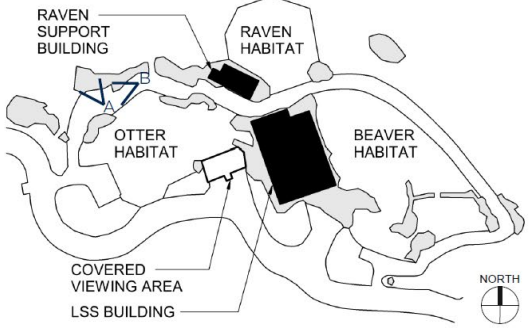
Site Images (1 of 10)



The following series of images follows the visitor experience from the northern entrance to this exhibit tracking clockwise around the site ending at the Otter underwater covered viewing location.



Site Images (2 of 10)

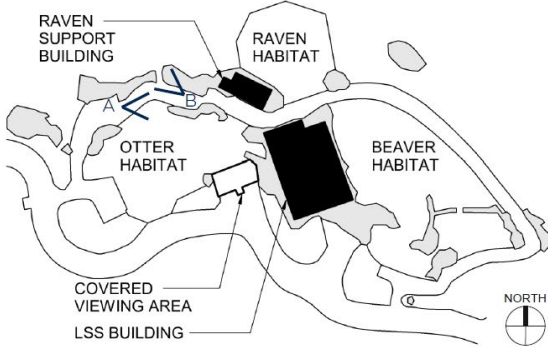


American Trail: Views from the upper trail

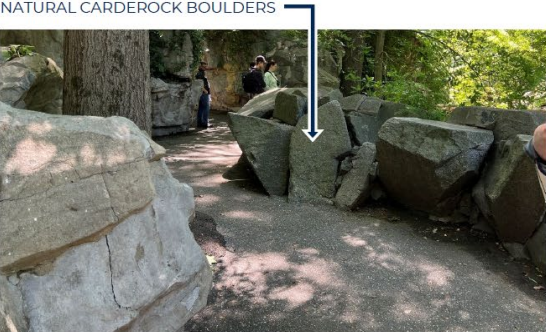


Site Images

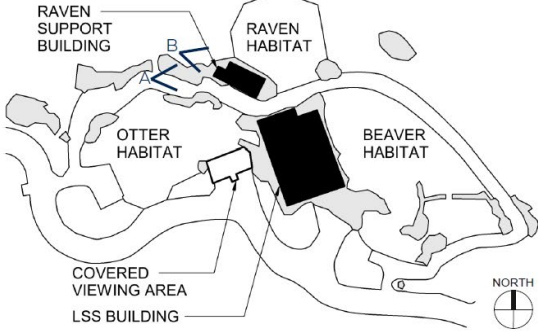
Site Images (3 of 10)



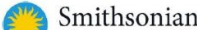
American Trail: Views from the upper trail



Site Images (4 of 10)

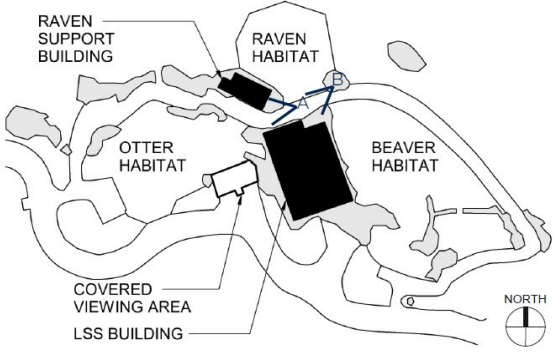


American Trail: Views from the upper trail

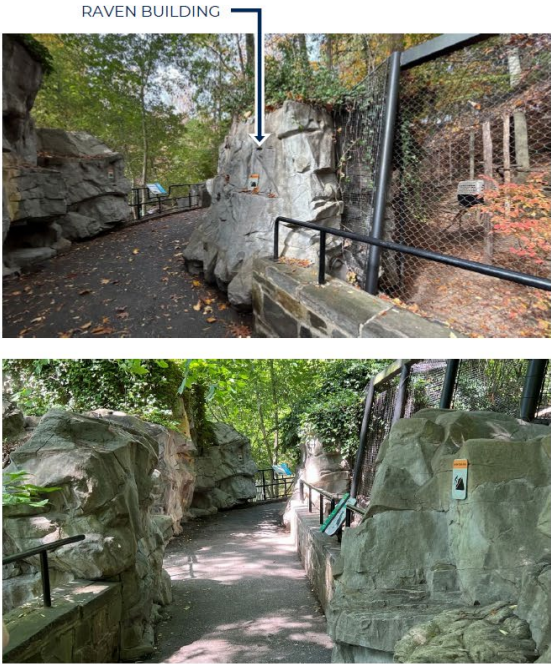


Site Images

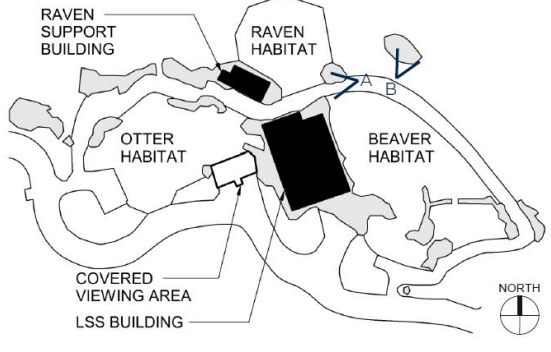
Site Images (5 of 10)



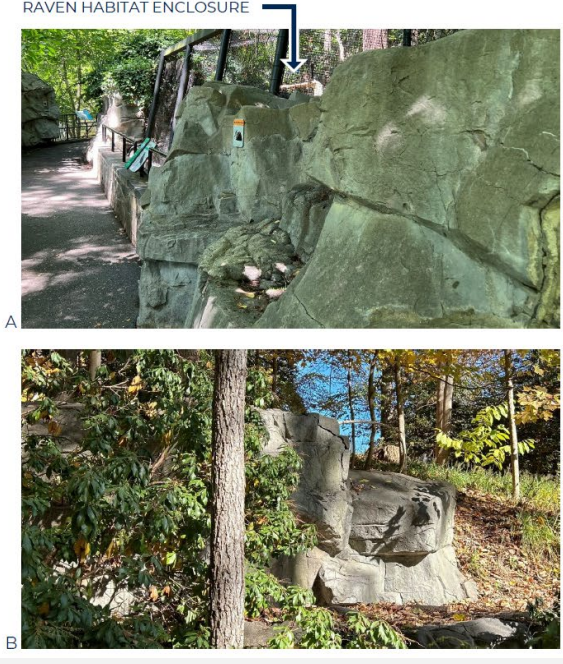
American Trail: Views from the upper trail



Site Images (6 of 10)

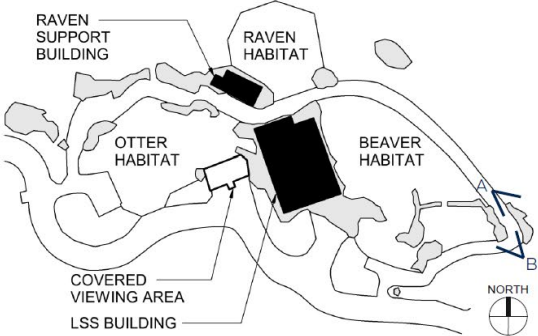


American Trail: Views from the upper trail



Site Images

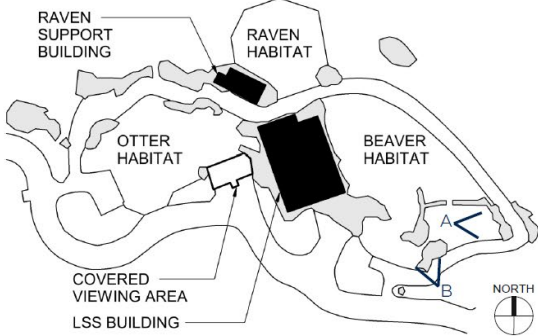
Site Images (7 of 10)



American Trail: Views from the upper trail



Site Images (8 of 10)

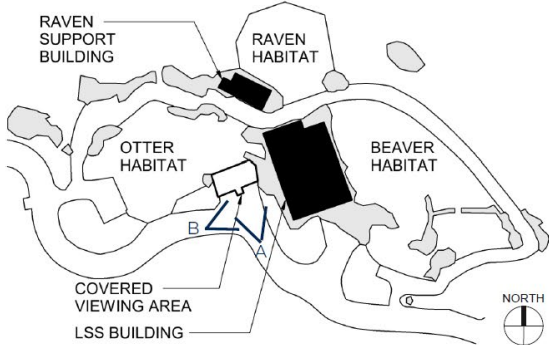


American Trail: Views along the trail

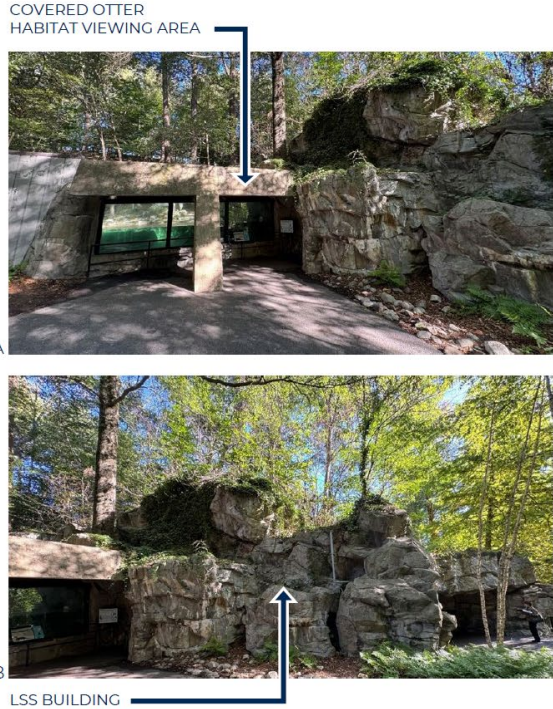


Site Images

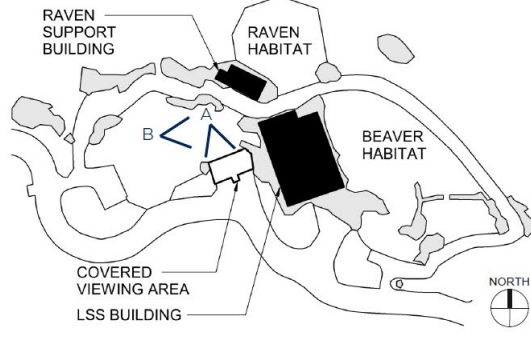
Site Images (9 of 10)



American Trail: Views of LSS Building rockwork and Otter canopy



Site Images (10 of 10)



American Trail: Views of rockwork from the Otter habitat



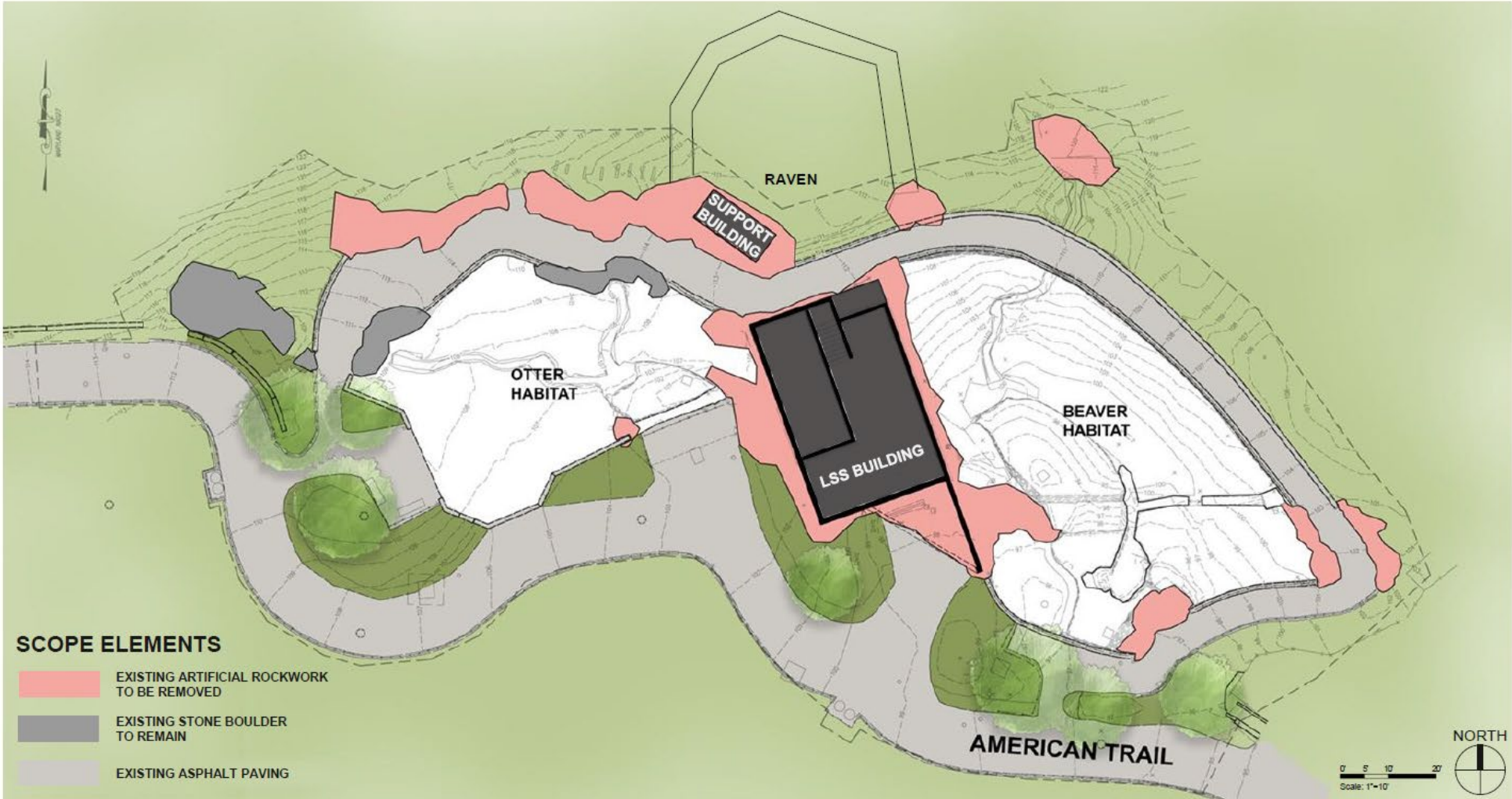
Failing Faux Rock Examples

Failing Faux Rock Examples



Faux Rock Demolition Plan





Faux Rock Demolition Plan

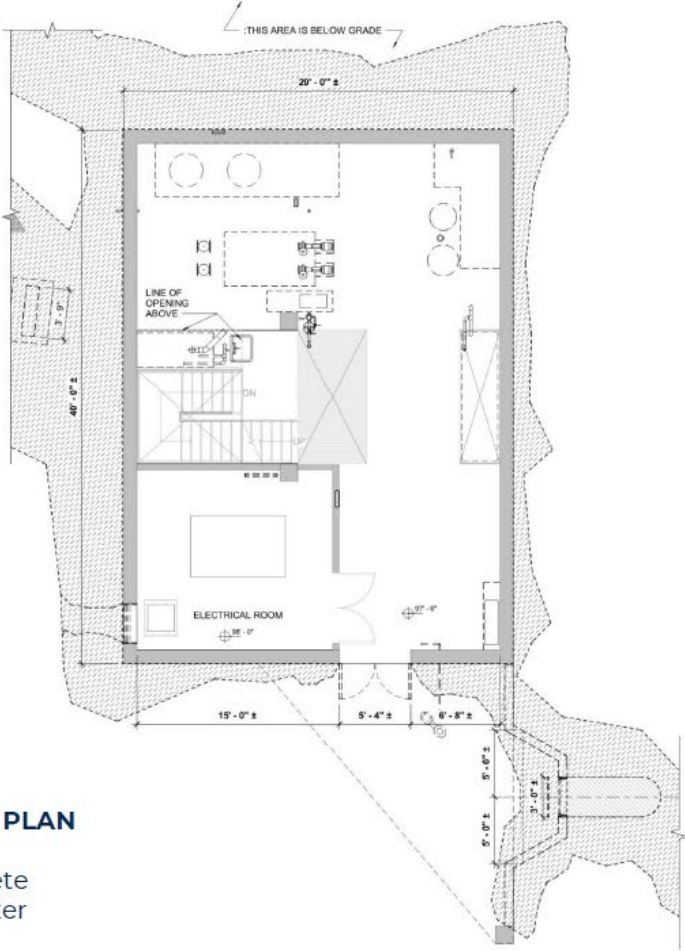
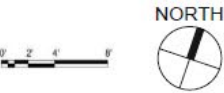


LSS Building Demolition Plan

Demolition Plan - LSS Building

LEGEND

-  EXISTING STRUCTURE TO REMAIN
-  ARTIFICIAL ROCKWORK TO BE REMOVED
-  ITEM TO BE REMOVED
-  EXISTING CONCRETE SLAB TO BE REMOVED

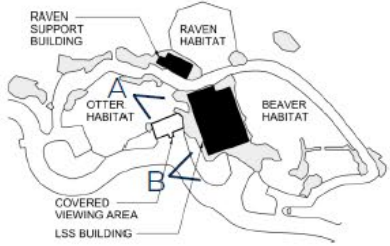


LSS BUILDING - MAIN LEVEL DEMO PLAN

Cast-in-place concrete building exposed after rockwork removal.



A



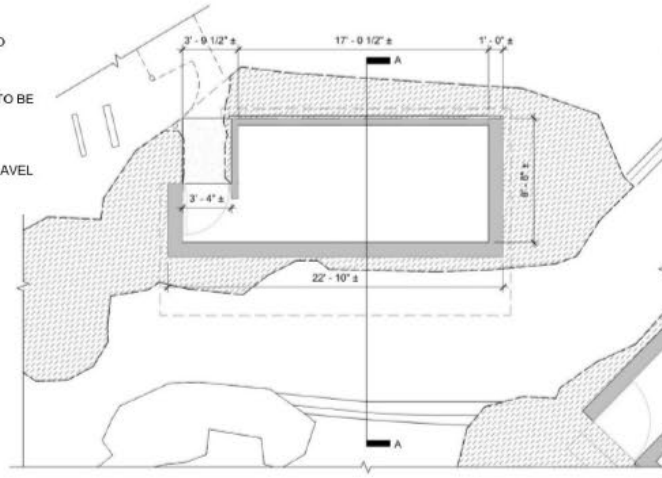
B

Raven Area Demolition Plan

Demolition Plan - Raven

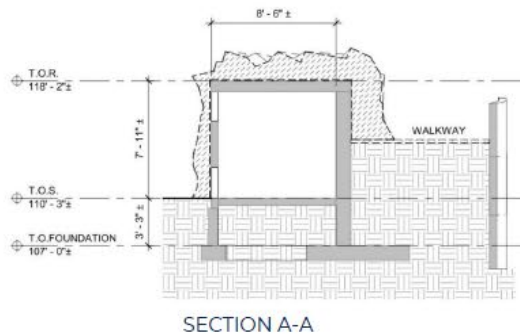
LEGEND

- EXISTING STRUCTURE TO REMAIN
- ARTIFICIAL ROCKWORK TO BE REMOVED
- ITEM TO BE REMOVED
- EXISTING EARTH FILL/GRAVEL TO REMAIN

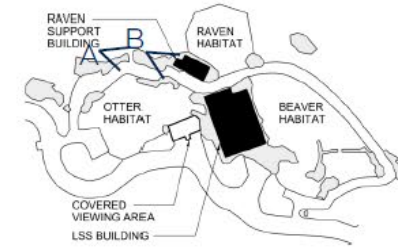


RAVEN SUPPORT - DEMO PLAN & SECTION

Cast-in-place concrete building exposed after rockwork removal.



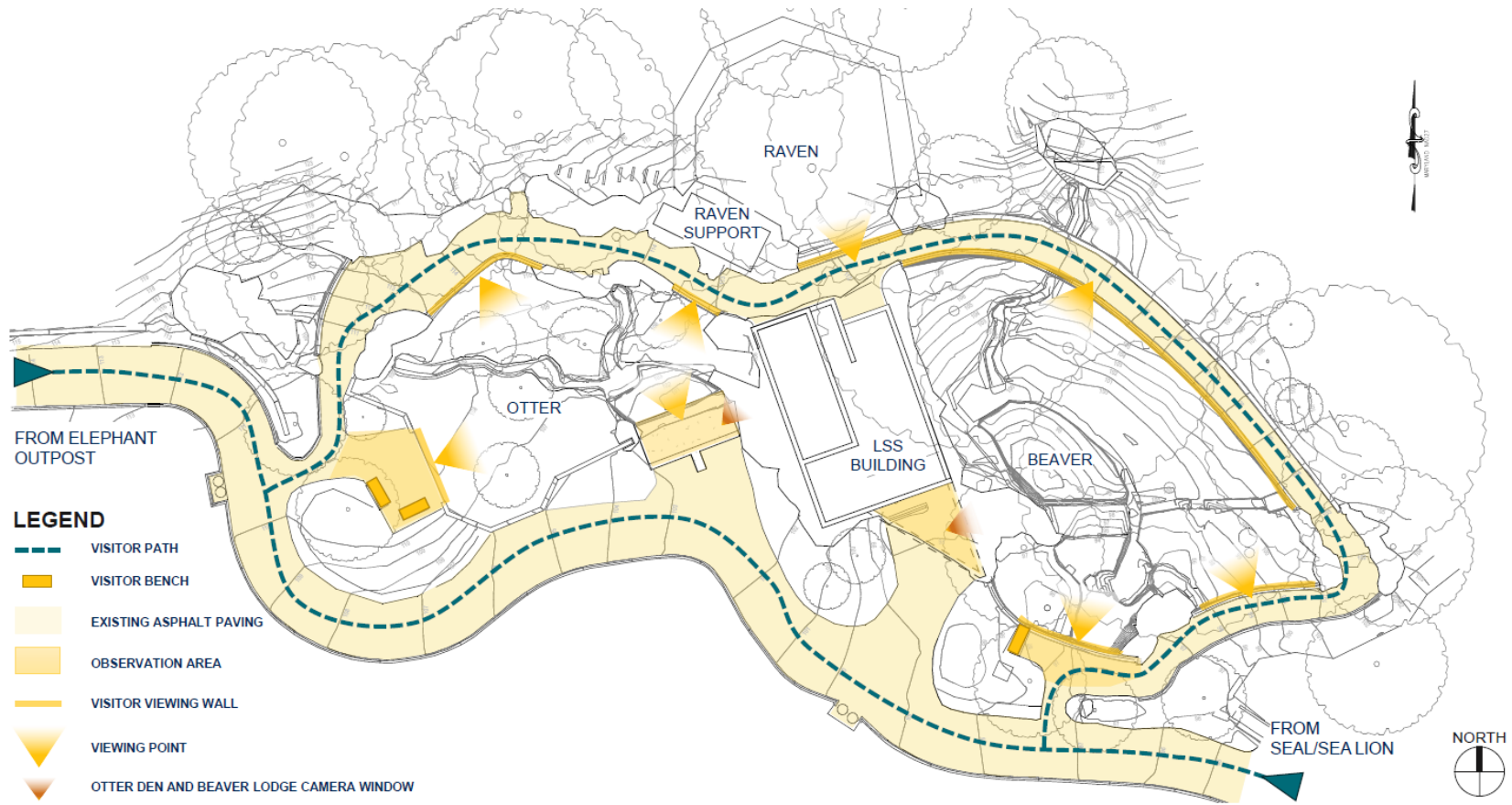
A



B

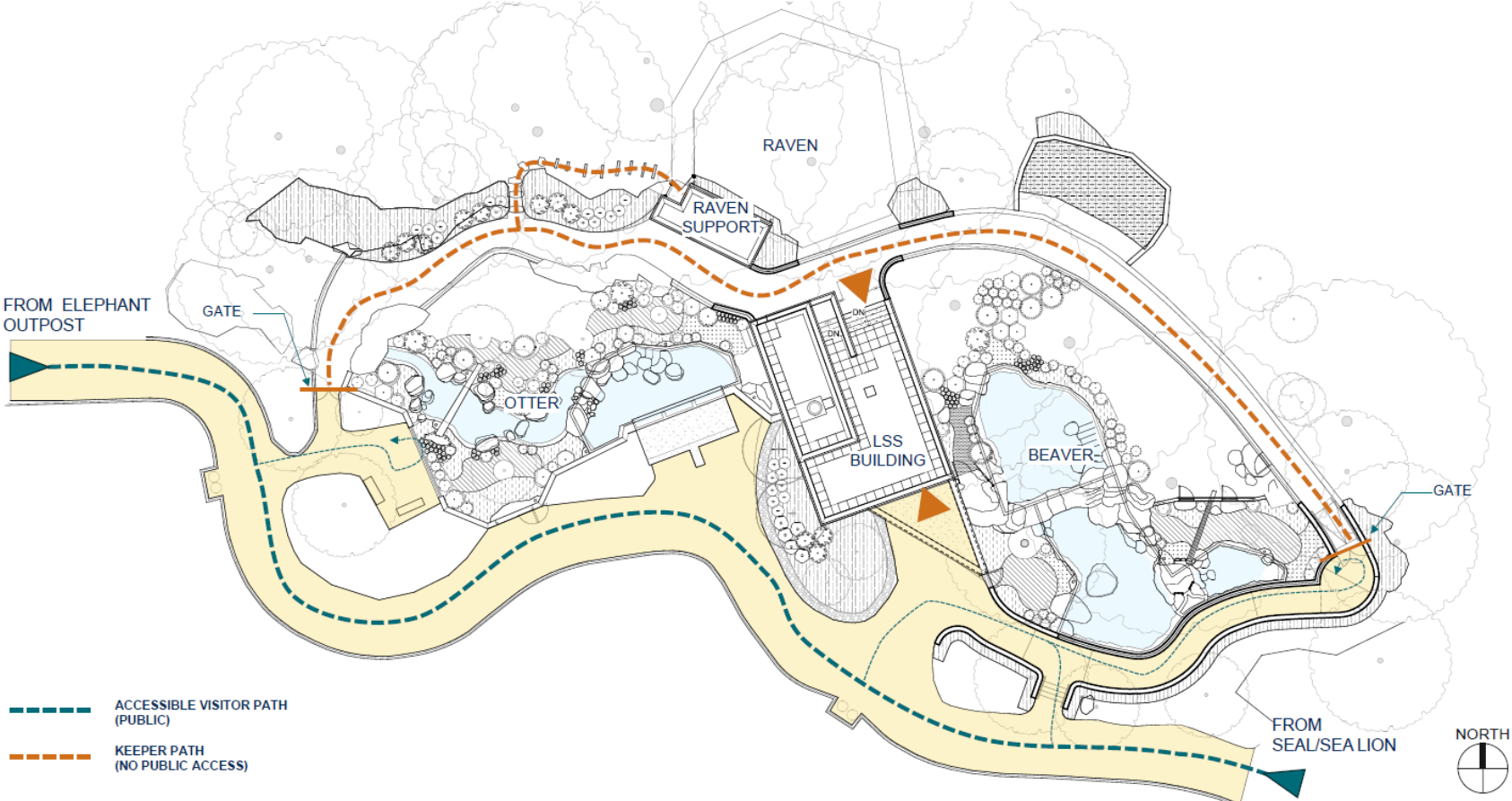
Existing Circulation and Habitat Viewing

Existing Circulation and Habitat Viewing



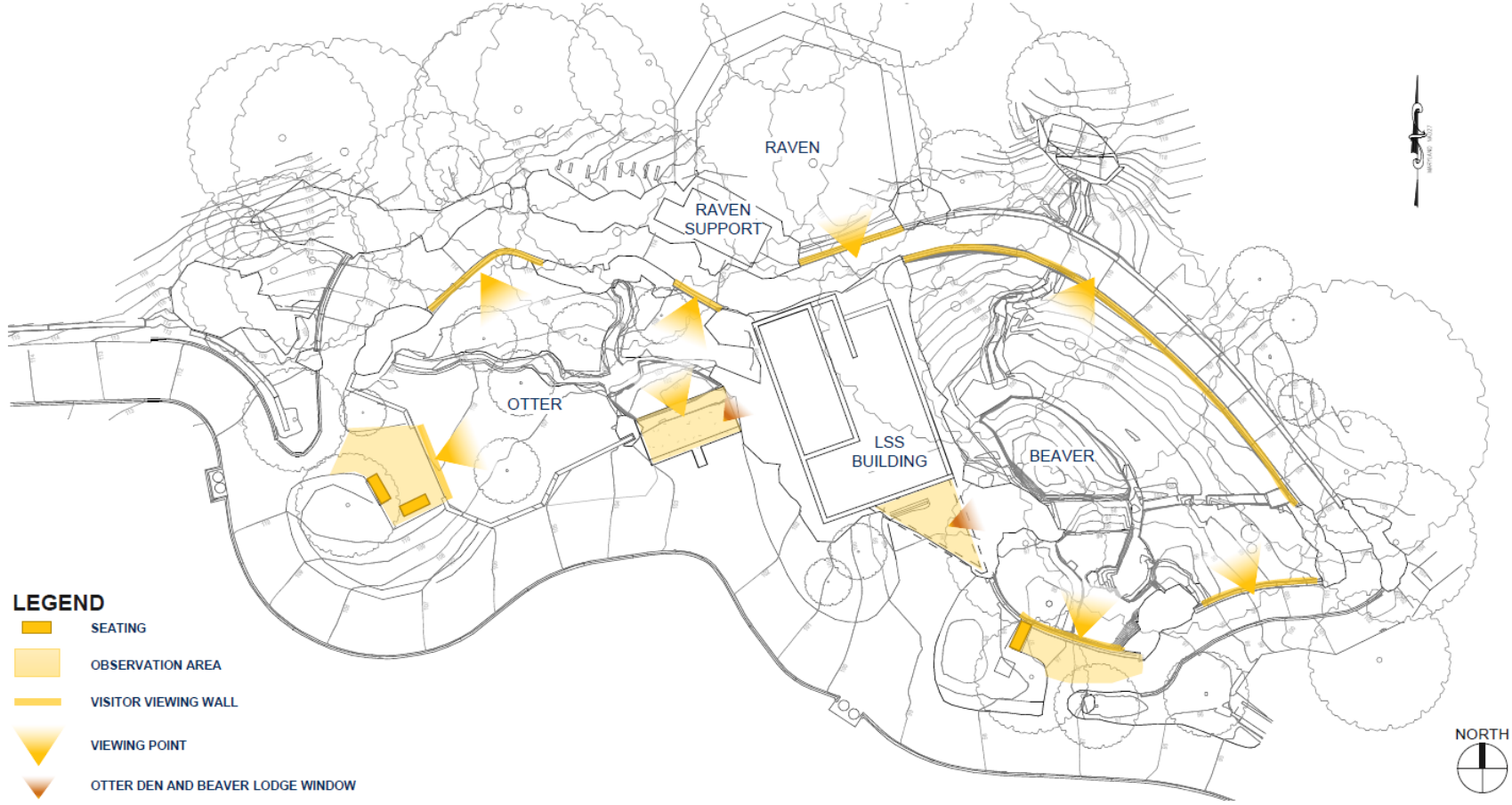
Site Circulation

Site Circulation



Existing Habitat Viewing

Existing Habitat Viewing



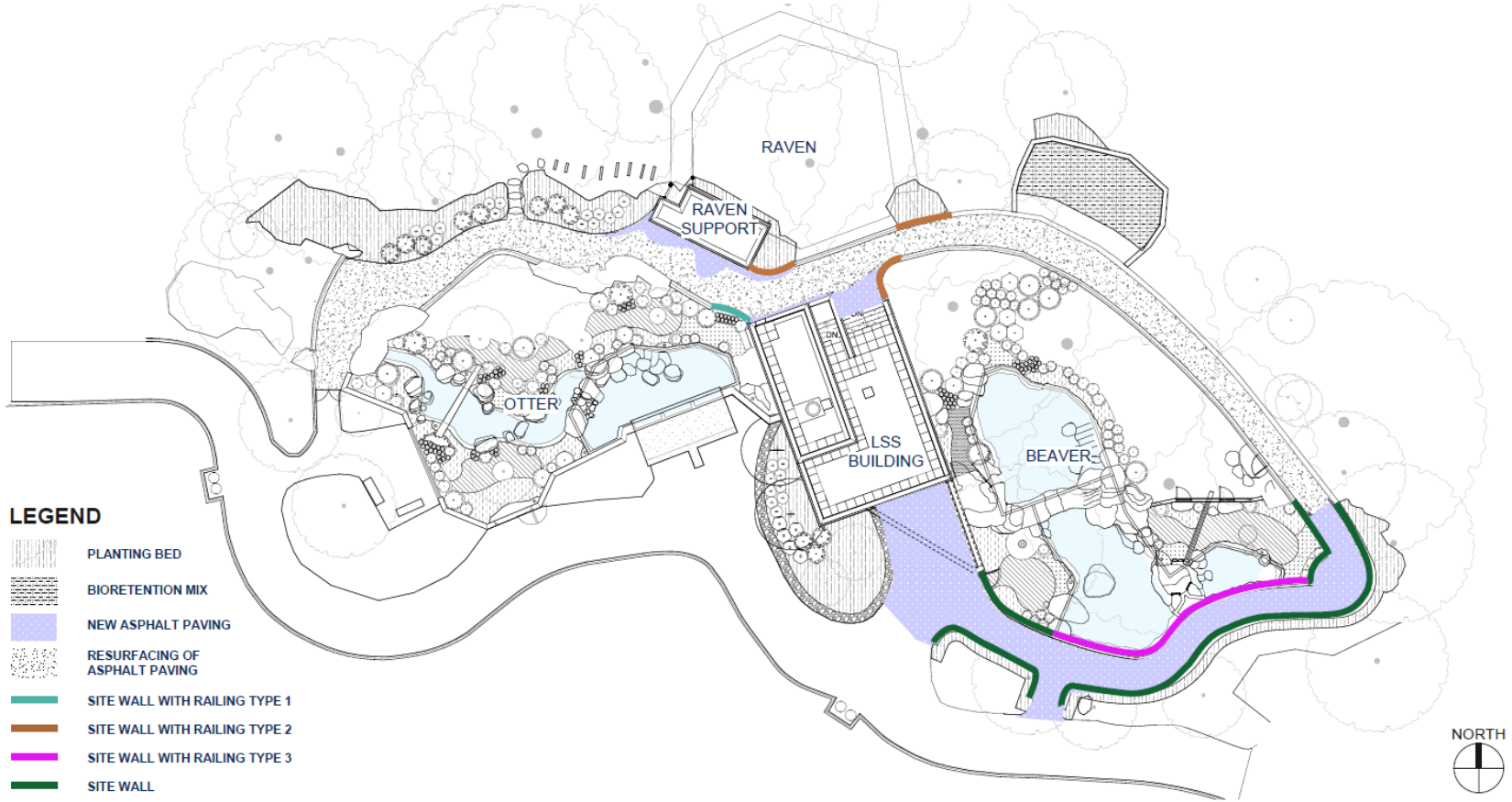
Proposed Habitat

Proposed Habitat



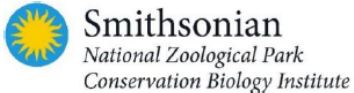
Site Plan

Site Plan



LEGEND

- PLANTING BED
- BIORETENTION MIX
- NEW ASPHALT PAVING
- RESURFACING OF ASPHALT PAVING
- SITE WALL WITH RAILING TYPE 1
- SITE WALL WITH RAILING TYPE 2
- SITE WALL WITH RAILING TYPE 3
- SITE WALL



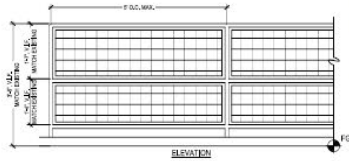
Railings

Railings



SITE WALL WITH RAILING TYPE 1

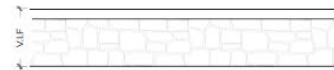
The proposed rail infill in the non-public zone will match existing tube and mesh rail.



REFERENCE IMAGE FOR PROPOSED RAILING TYPE 1: Existing stone clad retaining wall with steel mesh netting guardrail at Otter

SITE WALL

The proposed retaining walls will be designed to match existing stone clad walls on site. Top of wall elevations will vary depending on animal containment and visitor barrier requirements.

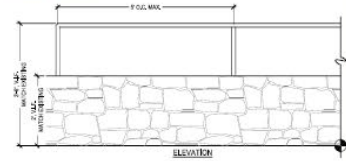


REFERENCE IMAGE FOR PROPOSED SITE WALL: Existing stone clad retaining wall



SITE WALL WITH RAILING TYPE 2

The proposed rail infill in the non-public zone will match the existing stone clad walls and steel tube rails.

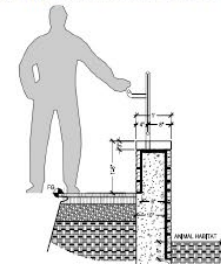
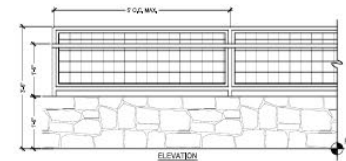


REFERENCE IMAGE FOR PROPOSED RAILING TYPE 2: Existing stone clad retaining wall with steel tube handrail at beaver



SITE WALL WITH RAILING TYPE 3

The proposed visitor rail at Beaver introduces a new design that meets animal containment requirements while drawing from the site's existing rail vocabulary. Welded wire mesh panels are set between painted black steel posts, to preserve visibility while discouraging visitor trespass. An integrated handrail enhances usability and comfort, exceeding ADA baseline provisions for sloped walkways.



Preferred Design Approach for LSS Building

Preferred Approach



Proposed Material Palette

Proposed Material Palette



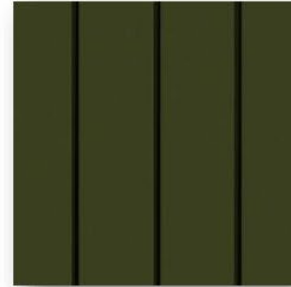
STONE VENEER

Bucks County
70% Southern Ledgestone
30% Dressed Fieldstone
(as new building wainscot)



STONE VENEER

Champlain Stone 1763 Granite
(for new infill site walls to match existing)



FIBER CEMENT BOARD

Hardie Trim, 12" wide
Color: Mountain Sage



METAL COPING

Copper

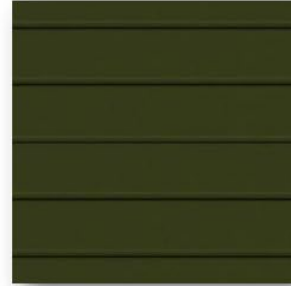


LOUVERS



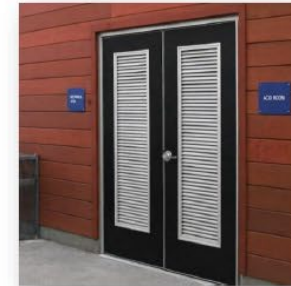
CONCRETE

Parged Exterior



FIBER CEMENT BOARD

Hardie Artisan Siding, 9" wide
Color: Mountain Sage
(at entrance overhang)



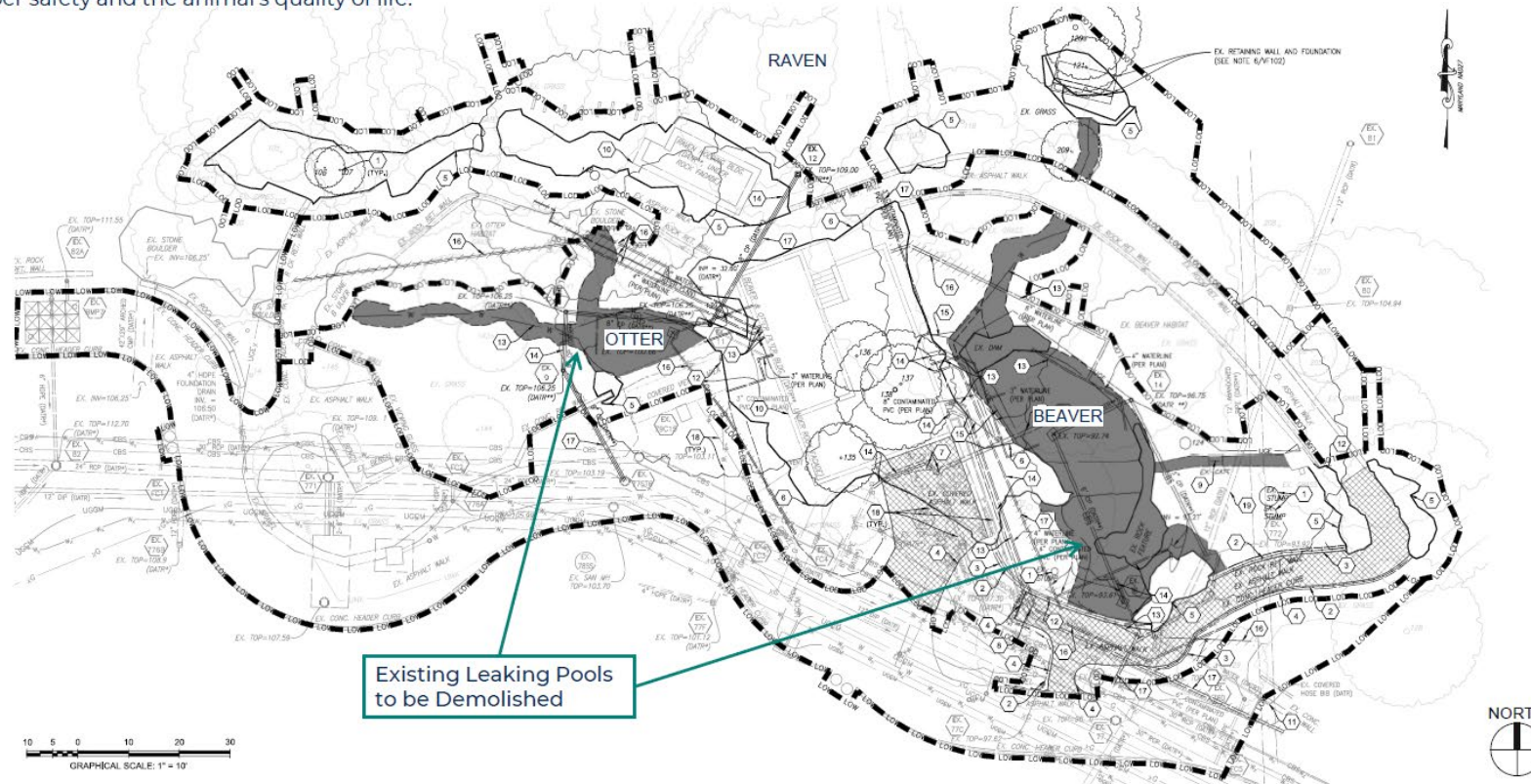
FIBER REINFORCED POLYMER (FRP) DOORS & FRAMES

Special-Lite
SL-17 Pebble Grain Hybrid FRP Door

Demolition Site Plan

Demolition Site Plan

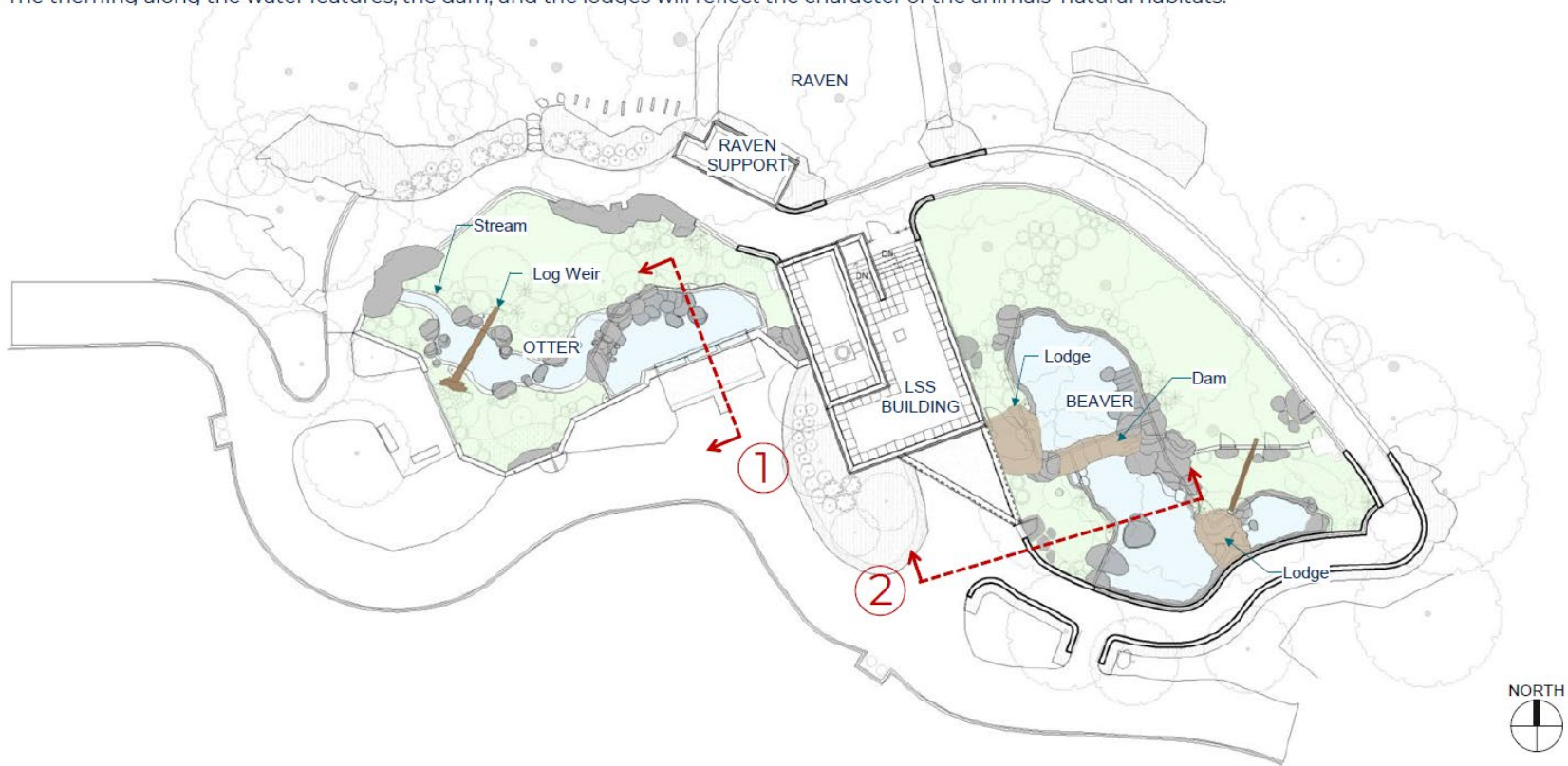
The existing pools in both habitats are leaking and need to be replaced. The new pools will be enlarged to meet current animal care standards including recommended water surface areas. The replacement of the pools create opportunities for reimagining the habitats in ways that will support greater keeper safety and the animal's quality of life.



Site Plan Habitat Improvements

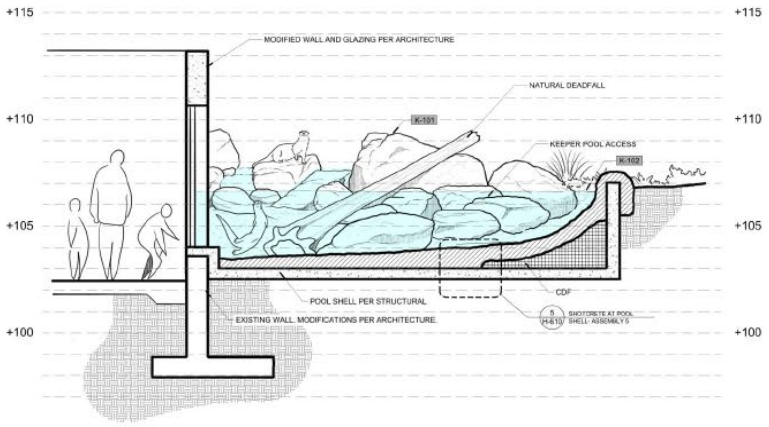
Site Plan - Habitat Improvements

At Otter, a new stream with a log weir and natural deadfall will encourage the animals to swim, slide, and play in groups. At Beaver, an improved introduction area with an additional pool, a small Beaver lodge, and land shift will create more areas for animal enrichment and enhanced visitor viewing. The theming along the water features, the dam, and the lodges will reflect the character of the animals' natural habitats.



Habitat Improvements for Otter

Habitat Improvements - Otter



Section 1 - Underwater Viewing and Pool



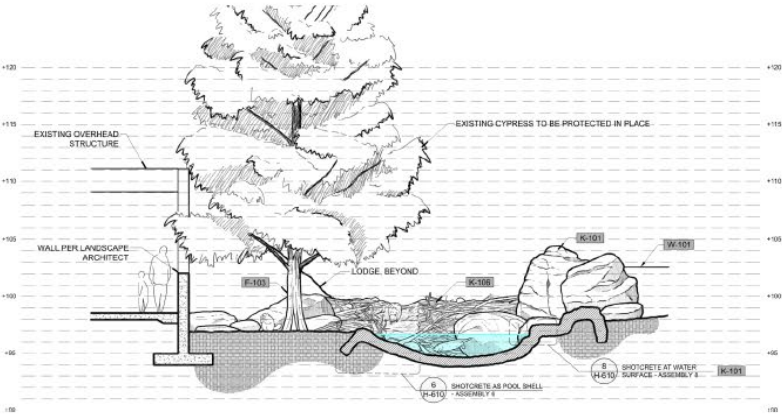
Character of Otter Log Weir



Character of Otter Pool Stream

Habitat Improvements Beaver

Habitat Improvements - Beaver



Section 2 - Beaver Viewing, Pool and Dam



Character of Beaver Lodge

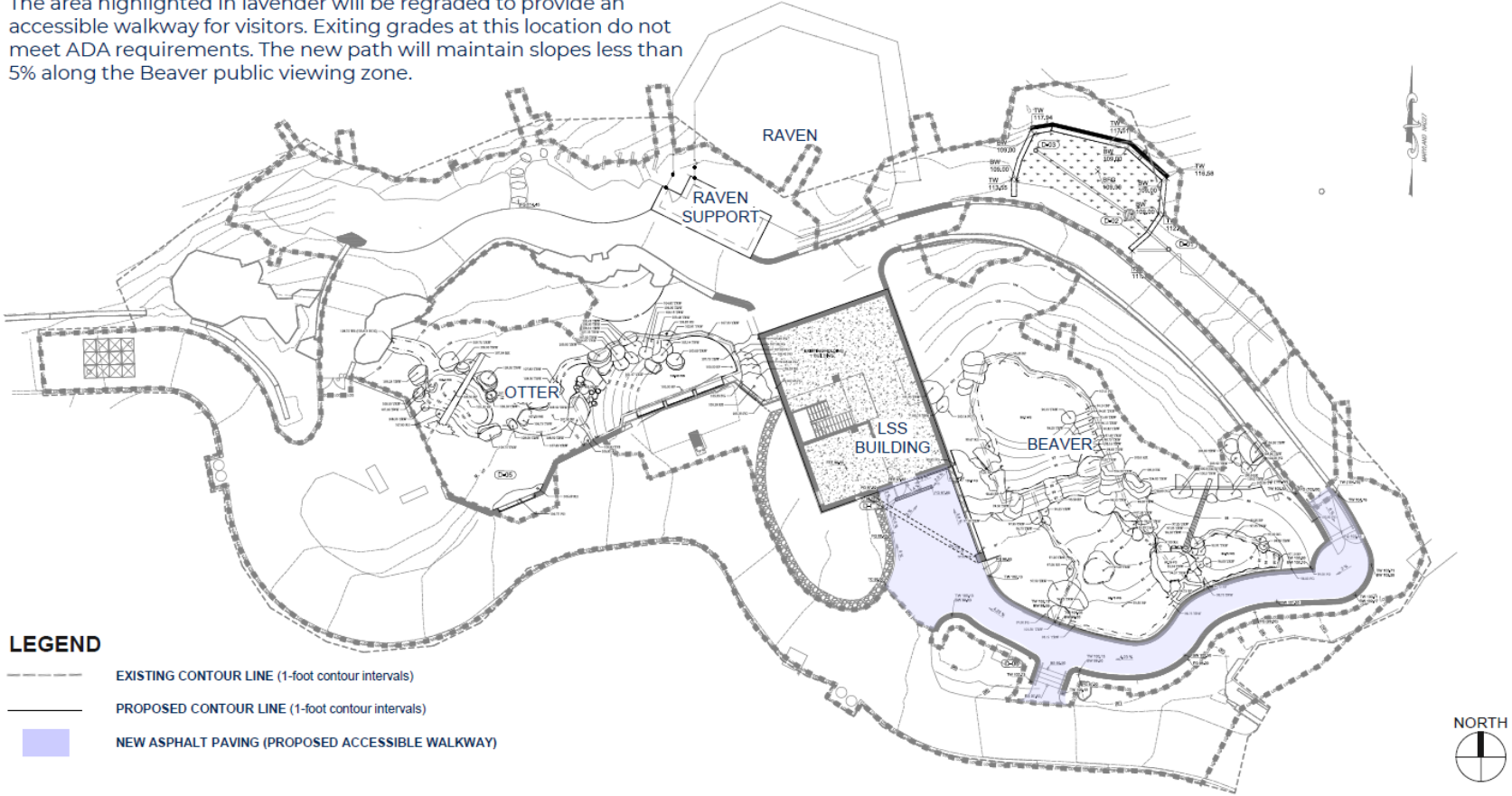


Character of Beaver Dam

Grading Plan

Grading Plan

The area highlighted in lavender will be regraded to provide an accessible walkway for visitors. Exiting grades at this location do not meet ADA requirements. The new path will maintain slopes less than 5% along the Beaver public viewing zone.



Existing Tree Removal

Existing Tree Removal



#106, 107: AMERICAN HOLLY

These trees to be removed are located within the construction zone, embedded in the faux-rock features to be demolished.



#139: WILLOW OAK

The exposed roots pose safety hazards for keepers. The tree is located between exhibit features to be demolished which renders its preservation unfeasible.



#135, 136, 137: SIBERIAN ELM; #138: BLACK WALLNUT

These invasive and/or volunteer trees are located on the existing LSS building's green roof which will be replaced with a new green roof.

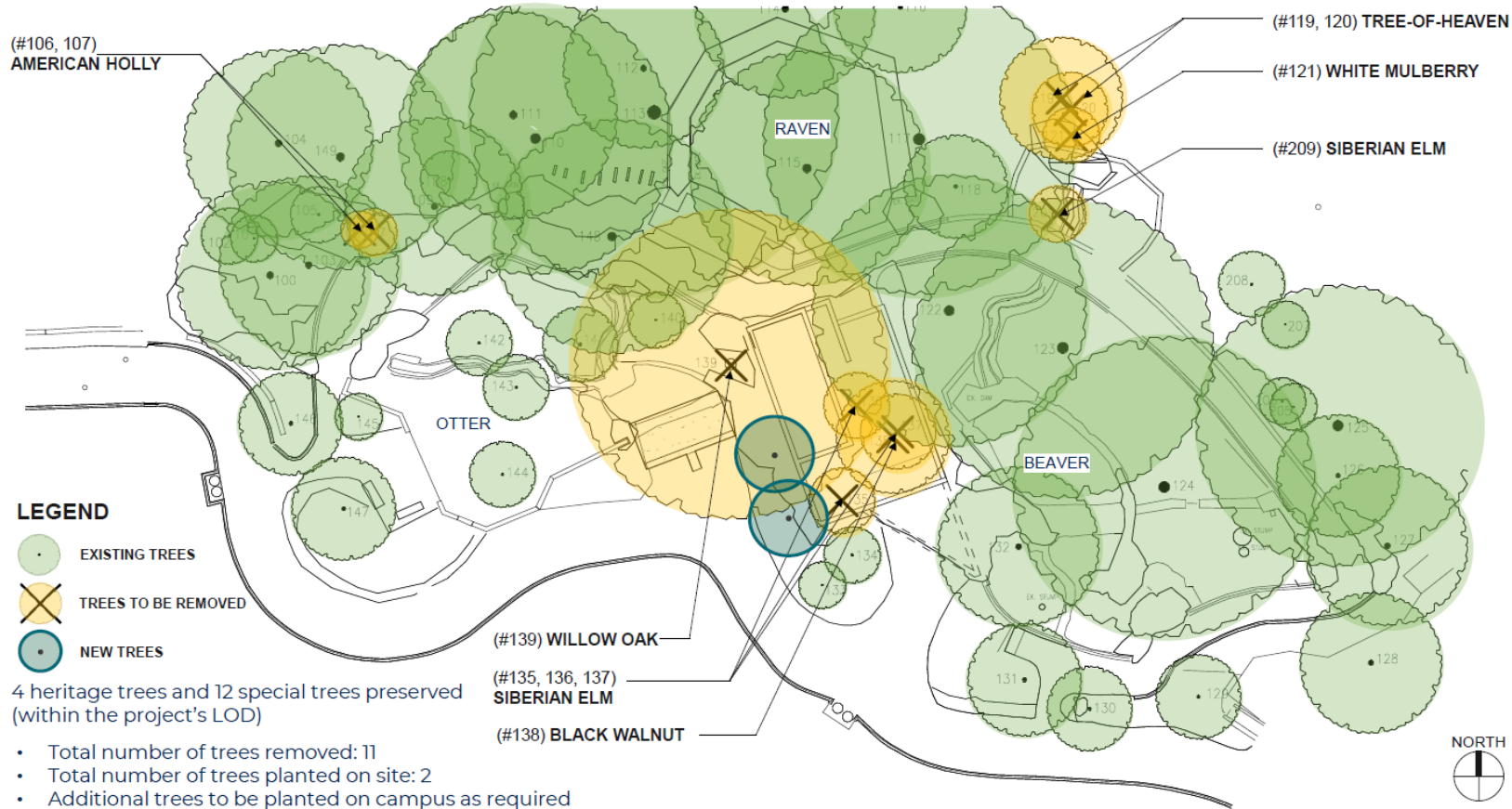


#119, 120: TREE-OF-HEAVEN; #121: WHITE MULBERRY

These invasive and/or volunteer species are located within failing faux-rock features to be demolished. Some are poorly formed and infested with spotted lanternflies.

Existing Tree Impact Plan

Existing Tree Impact Plan



Tree Inventory

Tree Inventory

Tree #	Botanical Name	Common Name	Size (DBH)	Critical Root Zone (CRZ)	Species Rating	Condition%	Action	Notes
100	<i>Taxodium distichum</i>	Baldcypress	20"	20'	85%	81%		No tag
101	<i>Ilex opaca</i>	American holly	6"	8'	85%	94%		Tag #2556
102	<i>Ilex opaca</i>	American holly	5"	8'	85%	81%		Tag #2555
103	<i>Taxodium distichum</i>	Baldcypress	19"	19'	85%	81%		Tag #2557; Near wall
104	<i>Fagus grandifolia</i>	American beech	20"	20'	85%	78%		Tag #2547; On steep hill; girdling root
105	<i>Ilex opaca</i>	American holly	6"	8'	85%	81%		Tag #2550; Multi-trunk (5",3",2")
106	<i>Ilex opaca</i>	American holly	4"	8'	85%	81%		Tag #2552; On rocks
107	<i>Ilex opaca</i>	American holly	5"	8'	85%	78%		No tag (possibly #2551)
108	<i>Acer saccharum</i>	Sugar maple	6"	8'	85%	78%		No tag
109	<i>Acer saccharum</i>	Sugar maple	19"	19'	85%	78%		No tag
110	<i>Liriodendron tulipifera</i>	Tulip poplar	29"	29'	80%	72%		Minor deadwood; Little canopy; No tag
111	<i>Liriodendron tulipifera</i>	Tulip poplar	22"	22'	80%	78%		Little canopy; No tag
112	<i>Quercus rubra</i>	Northern red oak	17"	17'	85%	72%		Little canopy at top; Minor deadwood; No tag
113	<i>Liriodendron tulipifera</i>	Tulip poplar	39"	39'	80%	81%		Broken limb in canopy; Strings embedded in trunk
114	<i>Liriodendron tulipifera</i>	Tulip poplar	19"	19'	80%	84%		Tag #2532
115	<i>Liriodendron tulipifera</i>	Tulip poplar	25"	25'	80%	0%		Estimated DBH; Within eagle enclosure; Major deadwood at top; Thinner canopy
116	<i>Acer platanoides</i>	Norway maple	14"	14'	70%	81%		Tag #2527
117	<i>Quercus rubra</i>	Northern red oak	33"	33'	85%	81%		No tag; Next to fence
118	<i>Fagus grandifolia</i>	American beech	11"	11'	85%	84%		Tag #2506
119	<i>Ailanthus altissima</i>	Tree-of-heaven	13"	20'	25%	75%		Spotted Lanternfly on trunk; No tag
120	<i>Ailanthus altissima</i>	Tree-of-heaven	8"	12'	25%	72%		Spotted Lanternfly on trunk; No tag
121	<i>Morus alba</i>	White mulberry	6"	9'	30%	59%		Leaning; Poor form
122	<i>Metasequoia glyptostroboides</i>	Dawn redwood	29"	44'	85%	81%		Good form and structure; No tag
123	<i>Metasequoia glyptostroboides</i>	Dawn redwood	32"	48'	85%	84%		Tag #2834; Vines 10%
124	<i>Metasequoia glyptostroboides</i>	Dawn redwood	32"	48'	85%	87%		Tag #2432; Specimen; Near walls
125	<i>Myrica sylvatica</i>	Blackgum	30"	45'	85%	78%		Good form and structure; No tag
126	<i>Acer platanoides</i>	Norway maple	13"	20'	30%	75%		Tag #2324; Adjacent to path
127	<i>Acer platanoides</i>	Norway maple	17"	26'	30%	75%		Next to stones
128	<i>Metasequoia glyptostroboides</i>	Dawn redwood	15"	23'	85%	81%		Estimated DBH; Within wolf enclosure
129	<i>Betula nigra</i>	River birch	9"	14'	80%	81%		No tag; Multi-trunk (7",6",3")
130	<i>Betula nigra</i>	River birch	9"	14'	80%	78%		No tag; Multi-trunk (6",6",5")
131	<i>Betula nigra</i>	River birch	12"	18'	80%	81%		No tag; Multi-trunk (8",7",6")
132	<i>Taxodium distichum</i>	Baldcypress	17"	25'	85%	81%		Tag buried in trunk
133	<i>Betula nigra</i>	River birch	5"	8'	80%	81%		No tag; Multi-trunk (3",3",3")
134	<i>Betula nigra</i>	River birch	6"	9'	80%	84%		No tag; Multi-trunk (4",3",3")
135	<i>Ulmus pumila</i>	Siberian elm	7"	11'	40%	68%		Poor form and structure
136	<i>Ulmus pumila</i>	Siberian elm	7"	11'	40%	66%		On top of structure; Vines 25%
137	<i>Ulmus pumila</i>	Siberian elm	8"	12'	40%	63%		On top of structure; Vines 30%
138	<i>Juglans nigra</i>	Black walnut	12"	18'	80%	72%		On top of structure; Vines 10%
139	<i>Quercus phellos</i>	Willow oak	33"	50'	80%	84%		Specimen; Next to Otter enclosure wall
140	<i>Magnolia virginiana</i>	Sweetbay magnolia	6"	9'	85%	78%		Good form and structure
141	<i>Magnolia virginiana</i>	Sweetbay magnolia	8"	12'	85%	81%		Good form and structure
142	<i>Magnolia virginiana</i>	Sweetbay magnolia	7"	11'	85%	82%		Tag #2419; Good form and structure
143	<i>Magnolia virginiana</i>	Sweetbay magnolia	7"	11'	85%	78%		Good form and structure
144	<i>Betula nigra</i>	River birch	7"	11'	80%	72%		Multi-trunk (6",3",3")
145	<i>Chionanthus virginicus</i>	Fringetree	5"	8'	85%	75%		Multi-trunk (3",2",2",2"); Broken leader
146	<i>Betula nigra</i>	River birch	11"	17'	80%	78%		Multi-trunk (8",5",5",4",3")
147	<i>Betula nigra</i>	River birch	11"	17'	80%	81%		Multi-trunk (7",6",6")
148	<i>Quercus phellos</i>	Willow oak	25"	38'	80%	78%		Good form and structure
149	<i>Fagus grandifolia</i>	American beech	24"	36'	85%	75%		Narrow form
205	<i>Ilex opaca</i>	American holly	5"	8'	85%	81%		Near path
206	<i>Morus rubra</i>	Red mulberry	5"	8'	40%	78%		Near path
207	<i>Morus rubra</i>	Red mulberry	5"	8'	40%	75%		
208	<i>Liriodendron tulipifera</i>	Tulip poplar	7"	11'	80%	72%		Curved lower trunk
209	<i>Ulmus pumila</i>	Siberian elm	6"	9'	40%	72%		Next to water channel

LEGEND

TREES TO BE REMOVED

Note, while most trees are part of the NZCBI campus' living collection, those without tags are volunteer and not part of the tree collection.



Plating Plan Beaver

Planting Plan - Beaver

PLANT SCHEDULE

SYMBOL CODE BOTANICAL / COMMON NAME

TREES

BN BETULA NIGRA 'DURA HEAT' / DURA HEAT RIVER BIRCH

SHRUBS

- CR CORNUS SERICEA / RED TWIG DOGWOOD
- DL DIERVILLA LONICERA / BUSH HONEYSUCKLE
- FG FOTHERGILLA GARDENII / DWARF FOTHERGILLA
- IV ITEA VIRGINICA / VIRGINIA SWEETSPIRE
- JE JUNCUS EFFUSUS / SOFT RUSH
- LB LINDERA BENZOIN / SPICEBUSH
- MR MITCHELLA REPENS / PARTRIDGEBERRY
- CS CORNUS SERICEA 'FLAVIRAMEA' / YELLOW TWIG DOGWOOD
- MP MORELLA PENNSYLVANICA / NORTHERN BAYBERRY

GROUND COVERS

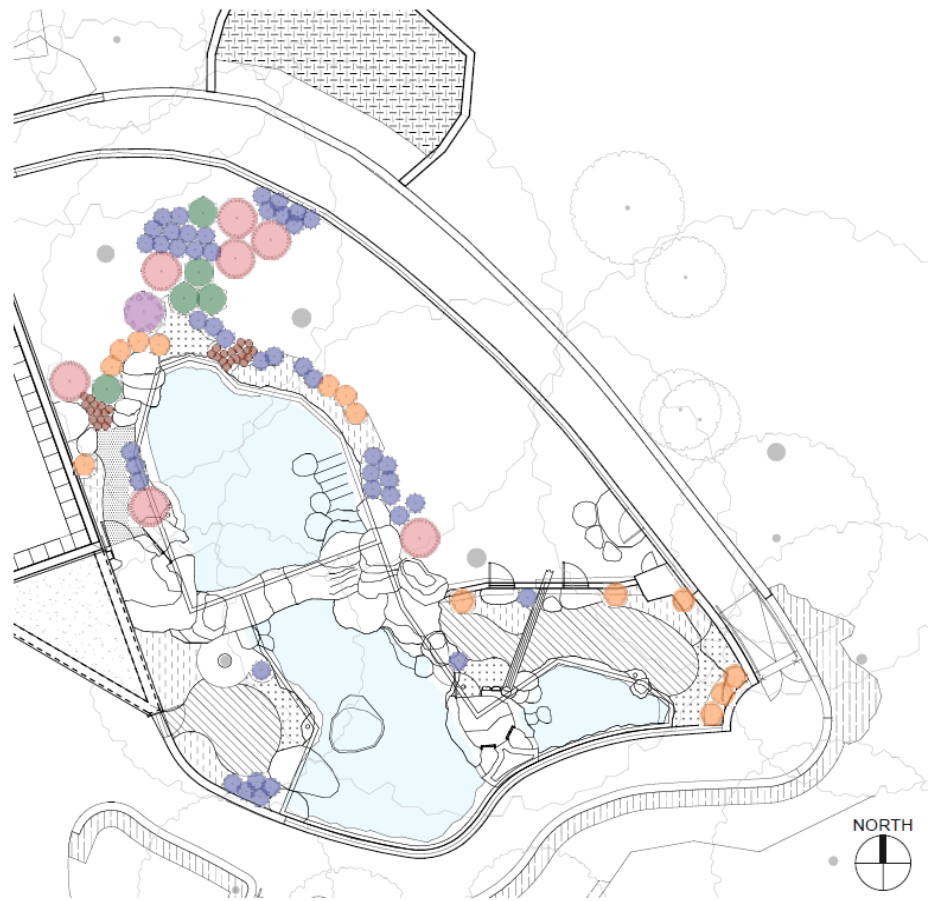
- CG CAREX GRAYI / GRAY'S SEDGE
- CW CAREX WOODII / PRETTY SEDGE
- EV ELYMUS VIRGINICUS / VIRGINIA WILD RYE

GROUND COVER MIX

- CAREX PENNSYLVANICA / PENNSYLVANIA SEDGE
- DRYOPTERIS ERYTHROSORA 'BRILLIANCE' / BRILLIANCE AUTUMN FERN
- ELYMUS HYSTRIX / BOTTLEBRUSH GRASS
- THELYPTERIS NOVEBORACENSIS / NEW YORK FERN
- HEUCHERA VILLOSA 'AUTUMN BRIDE' / AUTUMN BRIDE HAIRY ALUMROOT

BIORETENTION MIX

- CAREX STRICTA / TUSsock SEDGE
- CHELONE GLABRA / WHITE TURTLEHEAD
- JUNCUS EFFUSUS / SOFT RUSH
- OSMUNDASTRUM CINNAMOMEUM / CINNAMON FERN
- ELYMUS HYSTRIX / BOTTLEBRUSH GRASS



Habitat Planting Palette

Habitat Planting Palette

All plantings within the NZCBI are coordinated and reviewed with Animal Care, Horticulture, and Integrated Pest Management team for animal safety and maintenance requirements. Plants to be incorporated within the habitats will prioritize native, non-toxic species that safely accommodate the natural behaviors of the resident beavers, otters, and ravens. Red Twig Dogwood (*Cornus sericea*) provides safe structural elements and natural forage. Plant selections have been made based on character, native status, support of pollinators, appropriateness for animals and alignment with the NCPC Pollinator Best Practices. Virginia Sweetspire (*Itea virginica*) offers necessary nectar for native bees and butterflies while remaining non-toxic. Additionally, planting Soft Rush (*Juncus effusus*) along the aquatic margins establishes a resilient water transition zone.

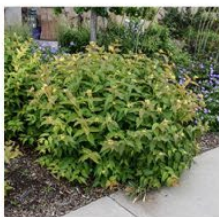
SHRUBS



JUNCUS EFFUSUS
SOFT RUSH



CORNUS SERICEA
RED TWIG DOGWOOD



DIERVILLA LONICERA
BUSH HONEYSUCKLE



FOTHERGILLA GARDENII
DWARF FOTHERGILLA



MITCHELLA REPENS
PARTRIDGEBERRY



ITEA VIRGINICA
VIRGINIA SWEETSPIRE



LINDERA BENZOIN
SPICEBUSH

GROUND COVERS



CAREX GRAYI
GRAY'S SEDGE



CAREX WOODII
PRETTY SEDGE



ELYMUS VIRGINICUS
VIRGINIA WILD RYE

Site Planting Palette

Site Planting Palette

The landscaping establishes a resilient perimeter using native, deer-resistant plants that offer ecological value for pollinators. Spicebush serves as a foundational shrub, providing aromatic foliage that naturally deters deer while supporting local pollinators. To create a robust, layered ecological buffer, the design incorporates a bioretention mix featuring White Turtlehead, Soft Rush, and Cinnamon Fern. Supplementing this area with diverse, moisture-tolerant groundcovers like New York Fern adds visual interest and essential habitat structure without attracting local deer populations.

TREES



BETULA NIGRA 'DURA HEAT'
DURA HEAT RIVER BIRCH

SHRUBS



CORNUS SERICEA FLAVIRAMEA
YELLOW TWIG DOGWOOD



MORELLA PENNSYLVANICA
NORTHERN BAYBERRY



LINDERA BENZOIN
SPICEBUSH

Site Planting Palette (continued)

GROUND COVERS



THELYPTERIS NOVEBORACENSIS
NEW YORK FERN



CAREX PENNSYLVANICA
PENNSYLVANIA SEDG



HEUCHERA VILLOSA 'AUTUMN BRIDE'
AUTUMN BRIDE HAIRY ALUMROOT



DRYOPTERIS ERYTHROSORA
'BRILLIANCE'
BRILLIANCE AUTUMN FERN



ELYMUS HYSTRIX
BOTTLEBRUSH GRASS

BIORETENTION MIX



CAREX STRICTA
TUSSOCK SEDG



CHELONE GLABRA
WHITE TURTLEHEAD



ELYMUS HYSTRIX
BOTTLEBRUSH GRASS



JUNCUS EFFUSUS
SOFT RUSH



OSMUNDASTRUM CINNAMOMEUM
CINNAMON FERN

