

# Urban Wildlife Meadow at Providence Station Park

Adjacent to the Providence train station, Station Park is a public plaza delineated by a series of undulating raised beds situated atop the station's parking garage.

Developed as a public space, the planting beds were designed to facilitate vehicular and pedestrian

transitions. The plants were specified based on their ornamental qualities and resilience in more conventional landscapes. However, the restraints of the roof's infrastructure and the limitations of maintenance routines

PROJECT TITLE **Urban Wildlife Meadow at Providence Station Park**

LOCATION **Providence, Rhode Island**

YEAR COMPLETED **Ongoing, Began Fall 2022**

PROJECT SIZE **14,600 Square Feet**

BUDGET **< 10,000 USD**

SUBMITTER ROLE **Lead Designer**

proved to be inadequate to support this vegetation. The subsequent decline of these plants provided an opportunity to re-envision the use of Station Park as an urban wildlife habitat.

The transformation that followed was a collaboration with a federal agency, local communities and volunteers, that turned the roughly 14,600 square foot green-roof into an urban wildlife meadow.

In tandem with creating a wildlife habitat, cultivating a meadow allowed us to address the limitations of the existing infrastructure and institute

feasible maintenance routines, all while addressing some of the challenges attributed to climate change.

In the heart of downtown Providence, situated to the southeast of the train station and the State House, **Station Park is a public plaza defined by 14,600 square feet of undulating beds that facilitate transitions between vehicular and pedestrian circulation.** The limitations and challenges that are unique to the plaza's anthropogenic origin along with limitations in maintenance routines, and the ever-increasing effects of climate change have led to the space being re-imagined as an Urban Wildlife Meadow, part of Providence's ongoing participation as an Urban Bird Treaty City.

The plaza, a massive green roof capping the station's public parking garage, was developed to meet the requirements for public greenspace. The beds themselves were originally conceived of housing ornamental greenery meant to soften the otherwise abrasive edges of humanity's concrete dominion over nature, with the plant palette consisting of a ubiquitous selection of woody and herbaceous ornamental species typically specified for their adaptability to a wide range of environmental conditions, including poor soils, urban pollution, drought tolerance, and low maintenance needs. The construction of the garage and roof was finalized with the installation of the plants in 2018. Within a couple of years of completion, most of the specified plants were gone; the resilience that made them ubiquitous elsewhere proved inadequate at Station Park.

This loss of otherwise resilient plants was pointing to some of the common issues ever present in the field of landscape architecture: (1) While greater attempts are being made to design and build new infrastructure that is better adapted to climate change, older, existing infrastructure remains overlooked. (2) Although plants that provide greater ecological benefits have begun to receive more attention, many **designers still specify plants based on ornamental values alone or treat plants as "materials," rather than as key living components of green infrastructure and the greater matrix of the biomass capable**

**of working in tandem with human-made infrastructure.** (3) Capital improvements and subsequent design and critical thinking behind it still predominantly focus on the project's end goal, without conscientiously considering the possibilities of future change as well as economically feasible and sustainable maintenance routines.

Observations of Station Park in 2021 showed mostly barren beds with the remaining woody plants such as junipers and cherry trees, slowly dying, while **spontaneous vegetation thrived alongside a monotony of ornamental lilies, floppy stands of little bluestem, interrupted here and there by recently added native grasses and forbs.** Paradoxically, the cherries appeared to be suffering from drought, while the junipers (as inspection below ground revealed) were succumbing to root rot.

The decline of these plants afforded the opportunity to rethink the use of plants at Station Park and the successive role of this landscape as an urban wildlife habitat. In 2020, with support from a federal agency, new plants were introduced, this time focusing on species that would provide ecological benefits, particularly for birds. **As one of 30 Urban Bird Treaty Cities nationwide, Providence Station Park was designated Urban Bird Habitat.** At the heart of the current urban wildlife meadow project this mission remains, however the initiative undertaken in 2020 addressed only parts of the plaza, leaving the limitations of the infrastructure and maintenance largely unresolved.

Fueled by the research and work on spontaneous vegetation and urban ecology, the design team began brainstorming the logistics of urban meadow making. Onsite studies of soils, drainage patterns, and micro-climates were carried out to gain a greater understanding of the cultural parameters within which we would operate.

Comparing original plans against onsite findings revealed that **the green-roof-raised-beds performed like a series of gigantic bathtubs.** Delineated by massive granite curbs around the perimeter, the colossal stone planters are continuous on all sides, save for some stress joints and drains that permeate their corpora. These drains are too small to adequately drain large volumes of water, and during periods of heavy precipitation the beds become inundated. Most plants that have evolved in dry conditions cannot tolerate inundation. Conversely, the restricted soil column limits the



volume of groundwater, while the shallow depth impedes deep root establishment. In a system without irrigation, a finite soil column and drainage, and minimal maintenance, conventional cultivation of plants is challenging.

Research into the planting mix uncovered two main components: expanded aggregate and organic matter. Expanded aggregate is used in applications where load bearing capacities must be considered, including green roofs. Typically made from clay or

shale, the rock is heated in a rotary kiln causing it to expand to double its volume. The process turns the rock into a highly durable, **porous ceramic aggregate that maintains structural integrity, while its pores serve as vital capillary networks through which air, water and microbiota move, facilitating excellent drainage, physical and biological filtration, and healthy plant establishment.**

Organic matter is one of the most important factors in plant cultivation, however there can be too much of it. A consulting botanist pointed out that the floppy little bluestem described earlier was indicative of very rich soil. It was later discovered that inputs of organic matter took place annually through generous applications of mulch. The meadow plants that were being cultivated prefer soil of low to moderate fertility, whereas soil heavy in organic matter is a magnet for spontaneous vegetation, particularly self-seeded annuals that can choke out perennials.

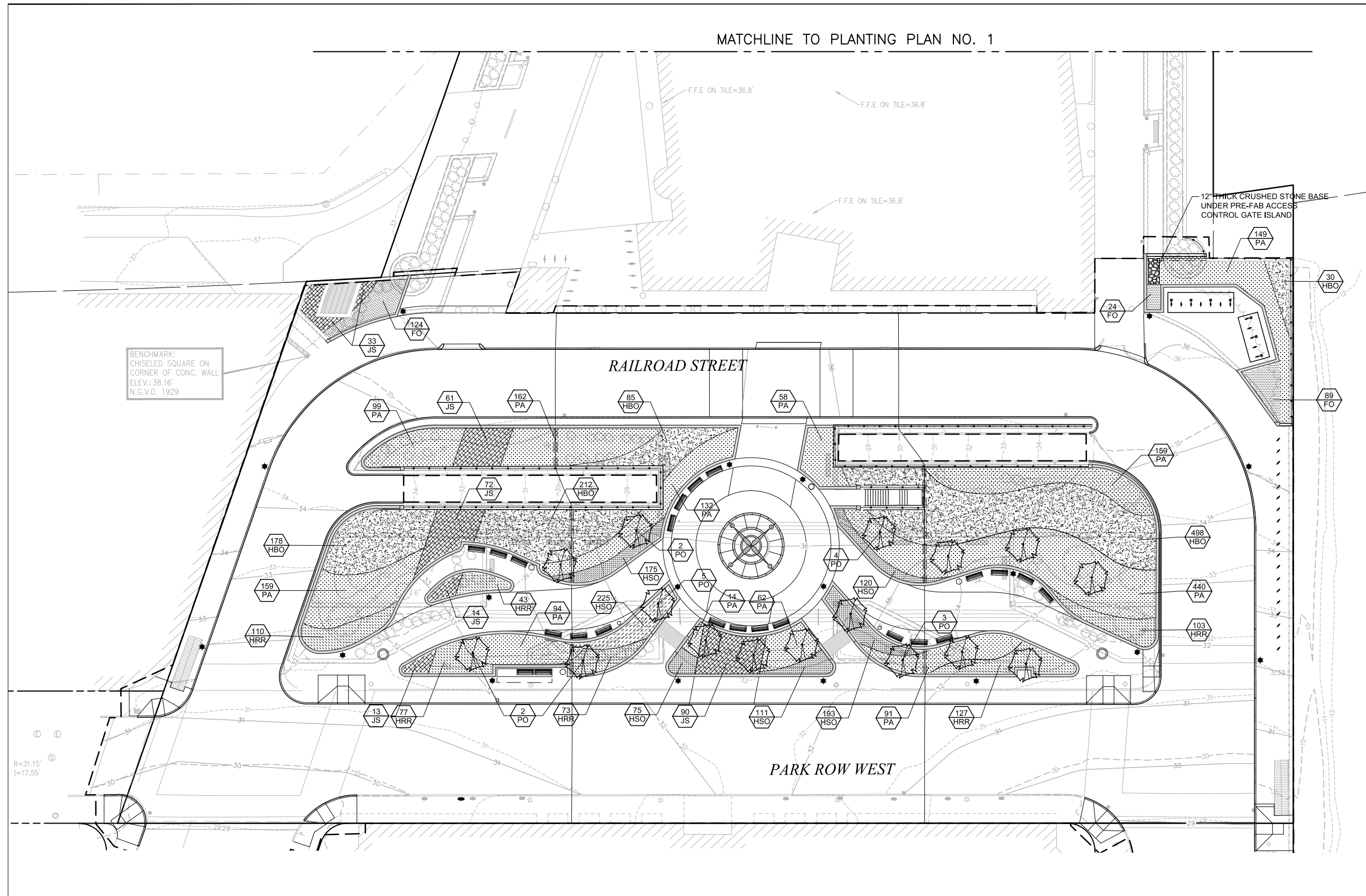
Part of the current initiative's goal is to amend the maintenance routine to strike a long-term balance between sustaining a meadow and limiting material and labor inputs. **Perhaps unintuitively, mowing is the single most important aspect of maintaining a meadow.** The removal of cut vegetation helps keep soil fertility at ideal levels and is also imperative to control ecological succession, a natural phenomenon of change where earlier species are superseded by latter. Mowing particularly deters the colonization of woody species, which if left unchecked would outcompete herbaceous plants. Cut to a height of about 6 to 8 inches, herbaceous vegetation is preserved, while woody plants are deterred. **Greater diversity is achieved by cultivating herbaceous plants, as many more species can coexist within the same footprint in the absence of trees and shrubs.**

This diversity of plants means that meadows are highly productive in generating large volumes of nectar, pollen, and seed, which are vital to sustaining

pollinators, insects, and birds. Once established, meadows need only be mowed once or twice a year and require minimal time and material inputs. Beyond the apparent, visible values, meadow plants also successfully intercept stormwater, aiding in slowing down and caching water while absorbing and breaking down pollutants, and mitigating urban heat-island effect. And many meadow plants are equally well suited to periods of inundation and drought.

**In overcoming budgetary challenges and to ensure success of the meadow, the team focused on using seed and plugs in lieu of containerized plants. Seed is not only economical, but direct seeding also encourages greater resiliency, with plants adapting to their environment from the start.** Beginning in 2022, the team planted 7,000+ plant plugs, featuring dozens of Rhode Island ecotypes, sowed approximately nine pounds of New England native wildflower and grass seed along with locally collected wild seed. In tandem with seeding, over 10,000 spring blooming bulbs were installed. Currently, with the help of volunteers, we are editing the meadow's vegetation to ensure greater diversity. This fall, we are installing another 2,000 donated plant plugs.

The long-term aim is to position Station Park as a pilot meadow project, as well as a repository of ecotypic plant seed and propagation stock for use across other public places, parks, and cemeteries. Being an initiative largely supported by local communities and volunteers, this aim runs parallel with **our goal for ongoing public engagement through which we hope to encourage inclusivity and stewardship that strengthen our communities, while providing a foundation for learning, exploration, inspiration, and application in everyday life.**



PLANT SCHEDULE PLANTING PLAN NO. 2

FLOWERING TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
PO	16	<i>Prunus incisa</i> 'Okame'	Okame Cherry (single stem)	3 - 3 1/2" CAL.

SHRUB AREAS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
FO	237	<i>Festuca ovata</i> 'Elijah Blue'	Elijah Blue Fescue	#1 Cont.	16" o.c.
HBO	1,256	<i>Helictotrichon sempervirens</i>	Blue Oat Grass	#2 cont.	24" o.c.
HRR	631	<i>Hemerocallis</i> x 'Rosy Returns'	Rosy Returns Daylily	#1 Cont.	18" o.c.
HSC	1,319	<i>Hemerocallis</i> x 'Stella de Oro'	Stella de Oro Daylily	#1 Cont.	12" o.c.
JS	283	<i>Juniperus chinensis sargentii</i>	Sargent Juniper	15-18" Cont.	24" o.c.
PA	1,735	<i>Pennisetum alopecuroides</i> 'Hameln'	Hameln Dwarf Fountain Grass	#2 cont.	24" o.c.



The RIDOT Planting Plan with a plant schedule (enlarged) consisting of 5,477 woody and herbaceous plants. Of the above plants, only lilies (*Hemerocallis* sp.) can sustain both periods of drought and inundation. All others require well-drained soils.

Above: May 18, 2018. Newly installed plants are being watered in by hand.  
Below: August 15, 2018. Blue oat grass, *Helictotrichon sempervirens*, has grown in.

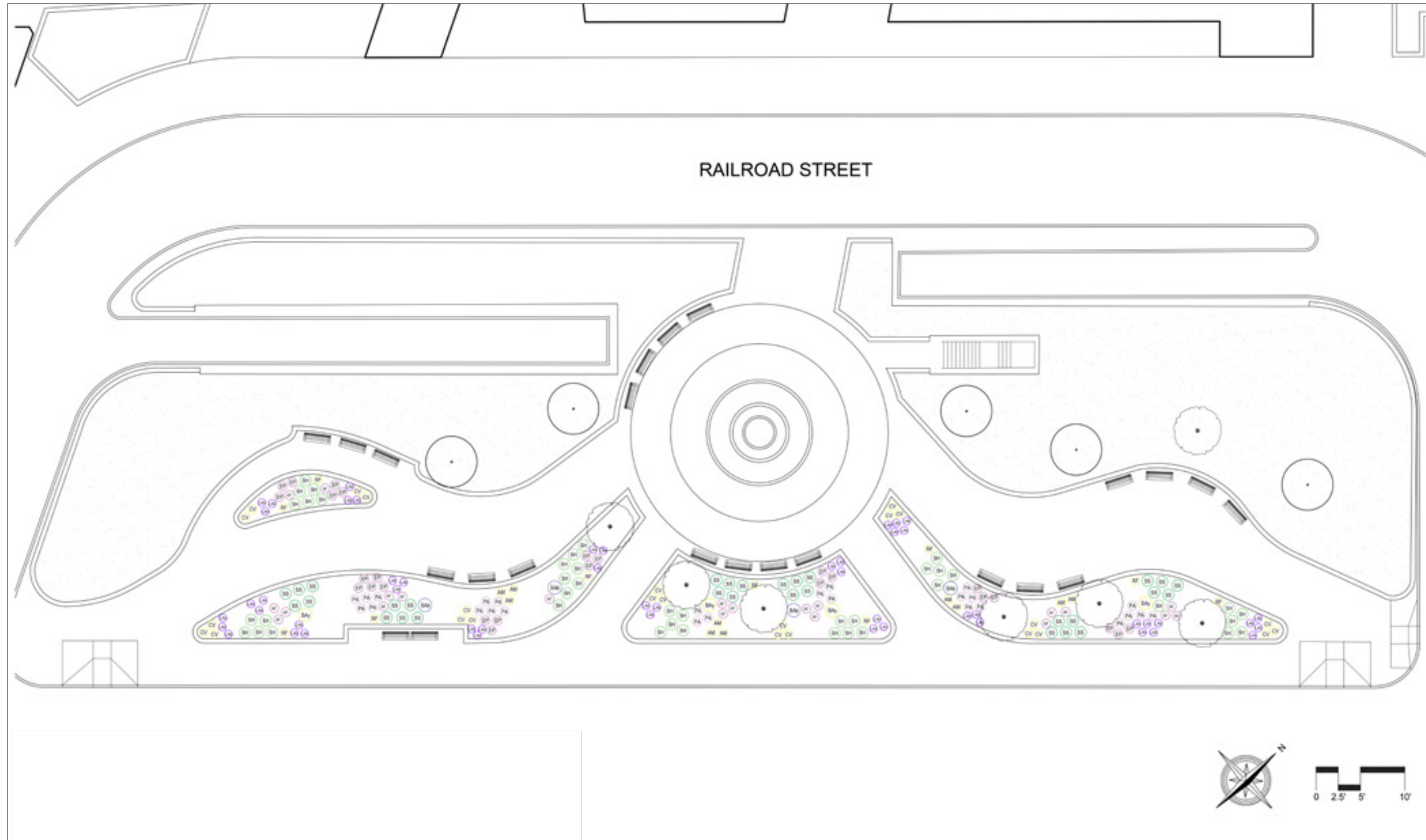


Mulch, mulch and more mulch. Mulch is too often used as a “band-aid” for barren landscapes, where the limitations of public municipality maintenance routine become apparent. Thus, it becomes easy to blame the demise of such landscapes on lack of maintenance.

The maintenance that would be required to support such a landscape would not equate to a sustainable, low-input outcome that is increasingly becoming imperative as we encounter the challenges of climate change and the need for resource conservation.



Within three years of installation, most of the specified vegetation is gone and remaining plants, with the exception of lilies (*Hemerocallis* sp.), are in decline.



BAY	4	Baptisia sphaerocarpa 'Screamin Yellow'	Yellow Wild Indigo	24-36"	Yellow	April-May
BAb	4	Baptisia australis	False Indigo	24-36"	Blue	May-June
Lah	50	Hidcote Lavender	Hidcote Lavender	12-18"	Pale purple	June-August
CV	25	Coreopsis verticillata 'Moonbeam'	Moonbeam Coreopsis	18-24"	Pale yellow	June-August
AF	21	Agastache foeniculum	Anise Hyssop	24-48"	Pale purple	June-September
AM	10	Achillea 'Moonshine'	Moonshine' Yarrow	12-24"	Yellow	June-September
EP	26	Echinacea purpurea	Purple Coneflower	36-48"	Purple	July-September
PA	26	Perovskia atriplicifolia	Russian Sage	24-48"	Purple	July-October
RF	10	Rudbeckia fulgida 'Goldsturm'	Black-eyed Susan	24-36"	Yellow	August-November
AL		Aster laevis 'Bluebird'	Smooth Aster	30-36"	Pale blue/purple	September-October
Swm		Solidago 'Witchita Mountains'	Witchita Mountains' Goldenrod	24-36"	Yellow	September-October
SH	40	Sporobolus heterolepis	Prairie Dropseed	24-36"	Pink/brown	August-October
SS	30	Schizachyrium scoparium	Little Bluestem	24-48"	Purplish-bronze	August-February
WK	5	Crataegus viridis 'Winter King'	Hawthorn 'Winter King'	1.25-15"		

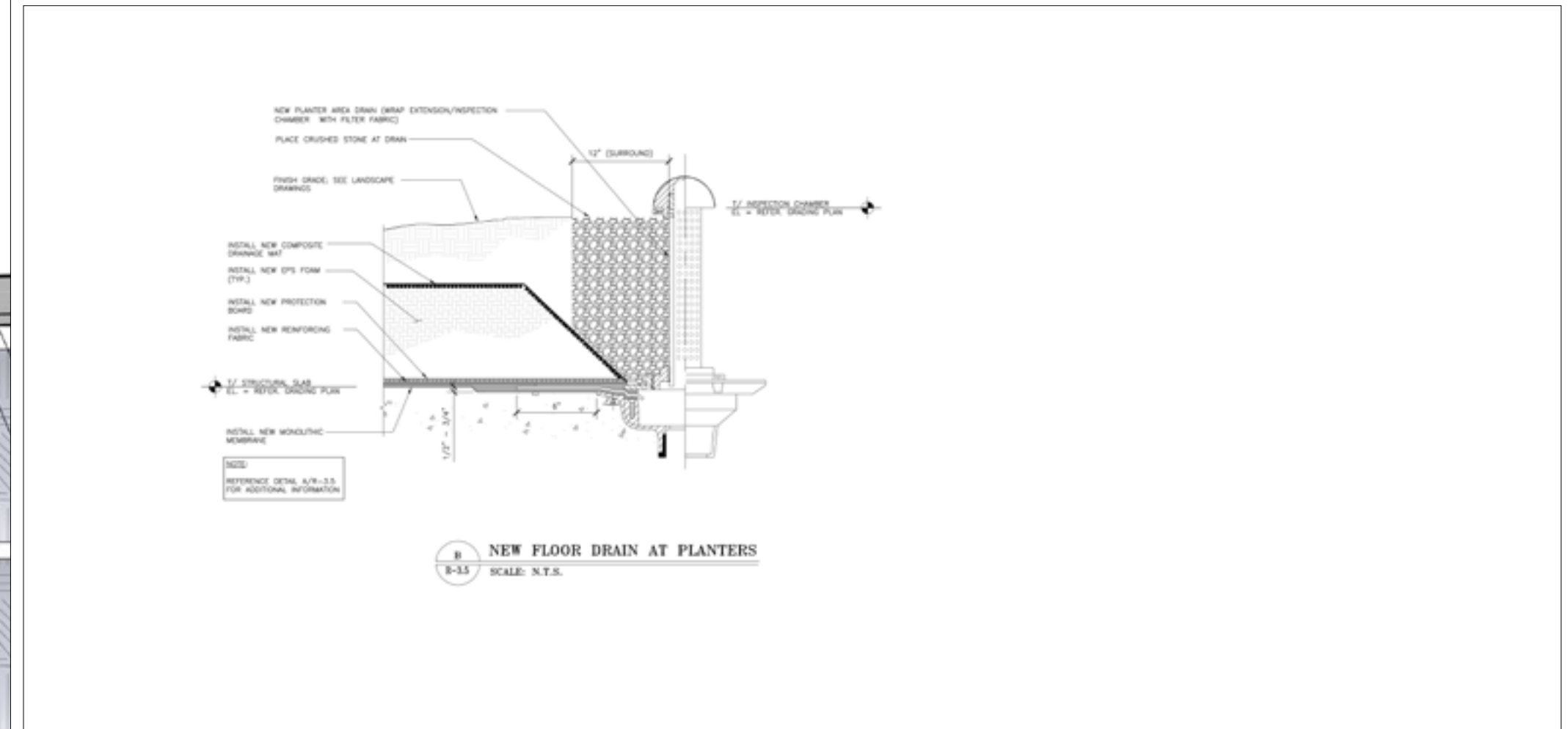
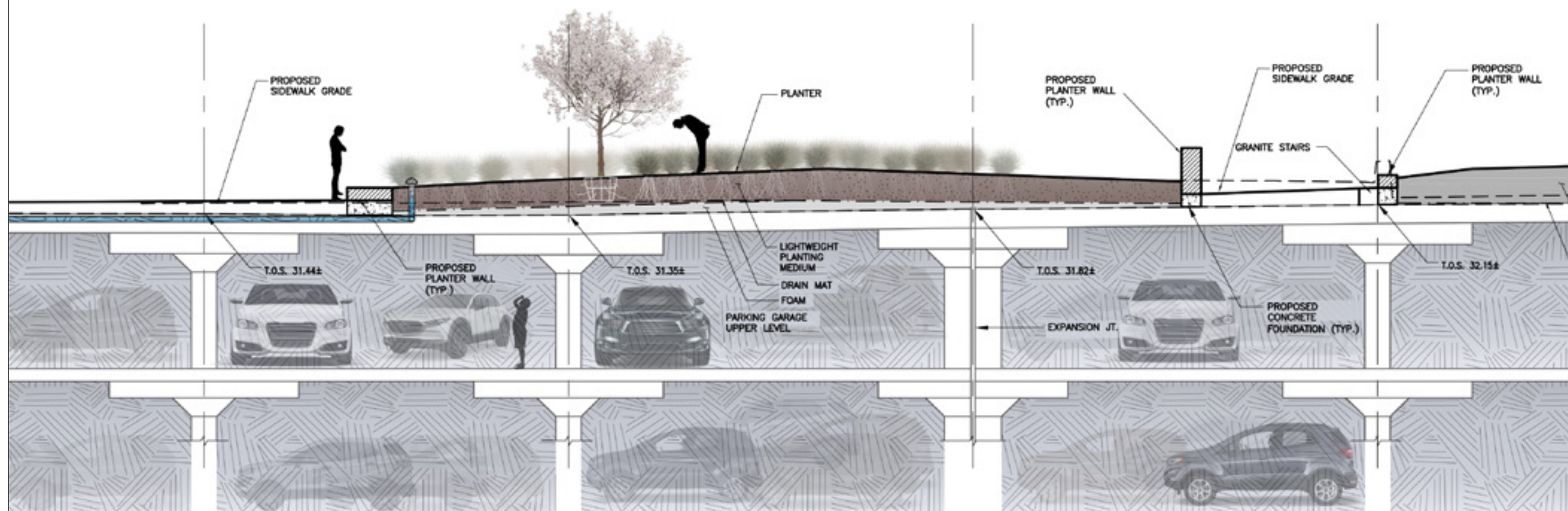
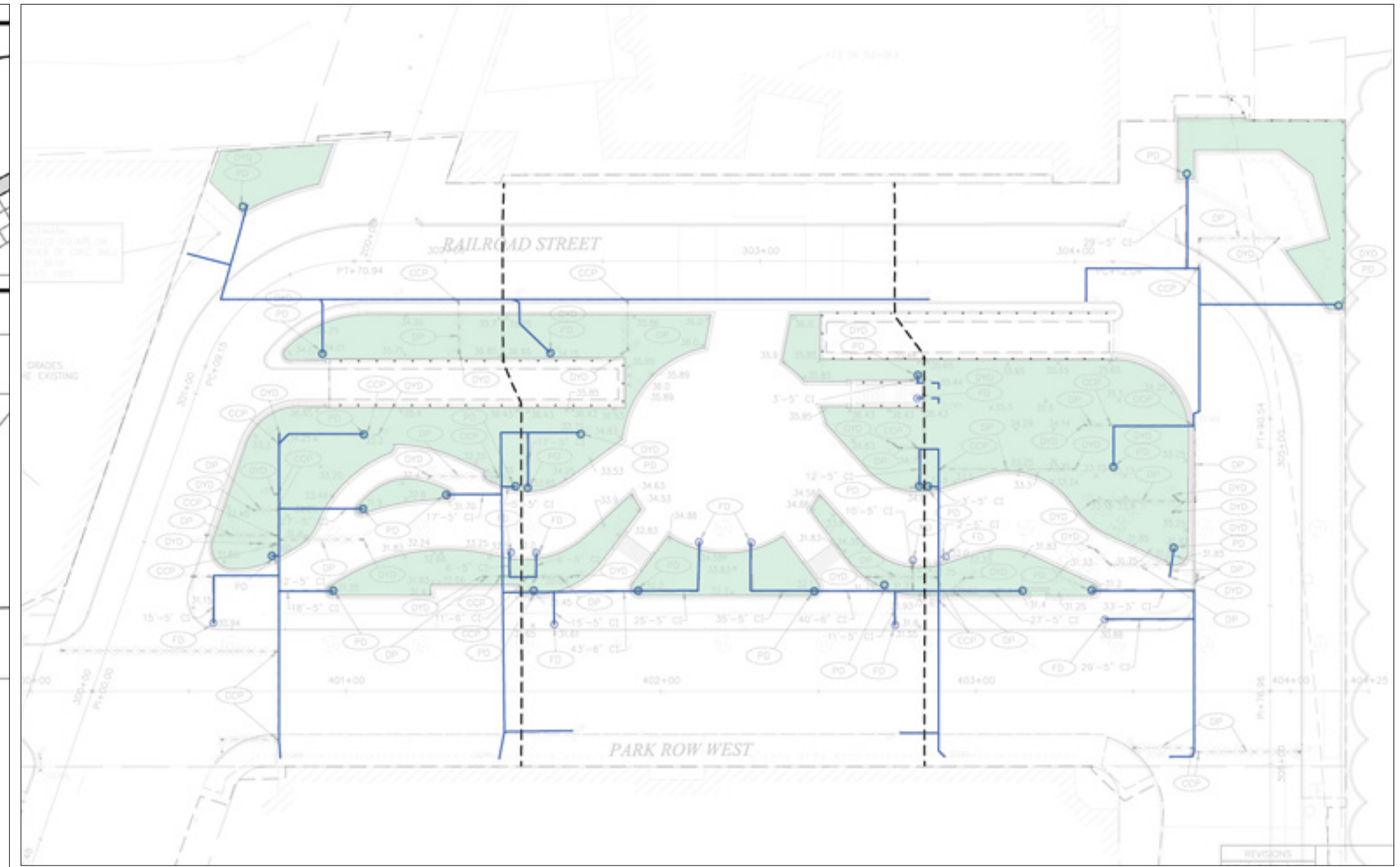
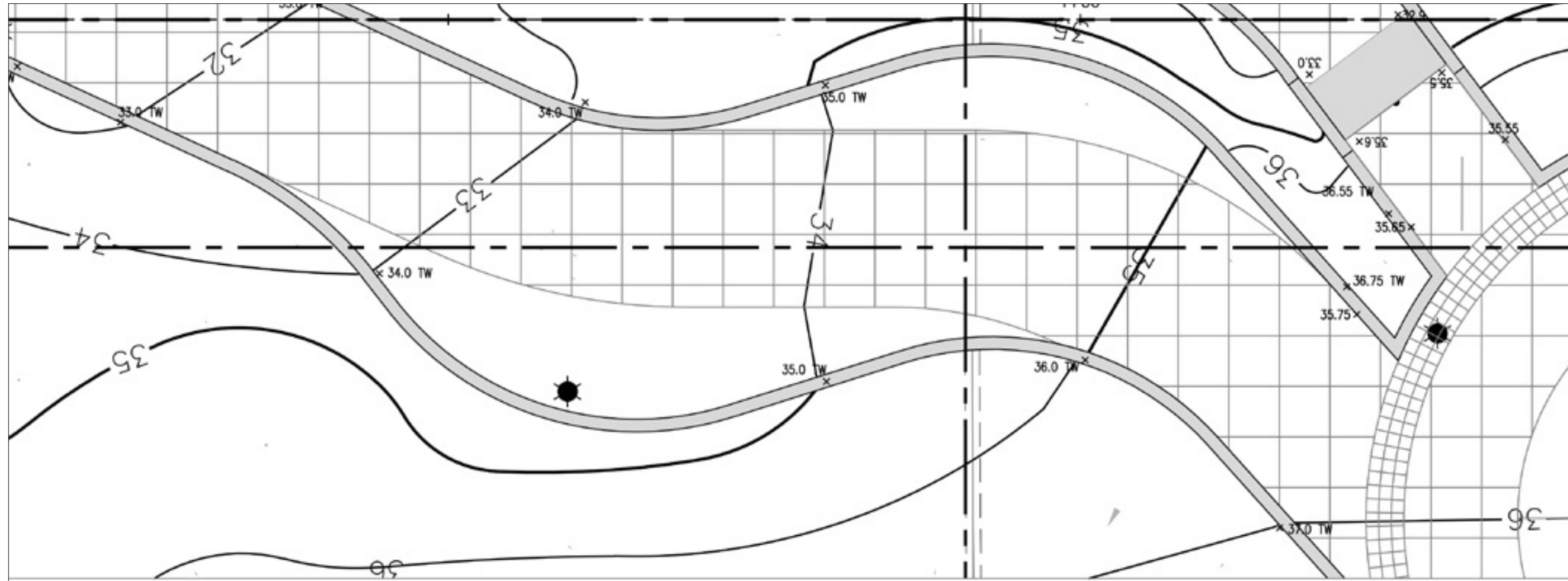
A planting plan from 2/21/2020, shows a change in the utilization of plants. With grant funding and support from a federal agency, Station Park becomes designated an Urban Bird Habitat, part of the *Urban Bird Treaty City*.

Day of installation, 9/27/2021. While plant implementation improved, budget limitations meant only the lower beds could be planted with containerized plants. Additionally, the ongoing maintenance routine was not well considered.



Conditions prior to this project's mobilization revealed a largely barren landscape. Until thorough site analysis and research were carried out, the initial observations were perplexing: the soil looked rich, airy and adequately moist, seemingly perfect for plants.

Later, it became apparent that the soil was too rich, as exemplified by the floppy little bluestem. Heavy mulching resulted in excess of organic matter and precipitated the boost of annual weeds. In an effort to stymie weeds, a preemergent herbicide was used. Specified plants, including trees, continued to die.



An illustrative section detail of the green roof and below-grade garage showing the planter walls, planter depth, layers and a drainpipe (blue). Note the size of the tree root-ball. The limitation of the drainpipes and soil column led to the demise of otherwise resilient plants.

Above: an illustrative drainage plan showing drains and drainlines (blue), as well as stress joints (black dashed line) within beds at Station Park. Below: design detail of the drainage pipe.

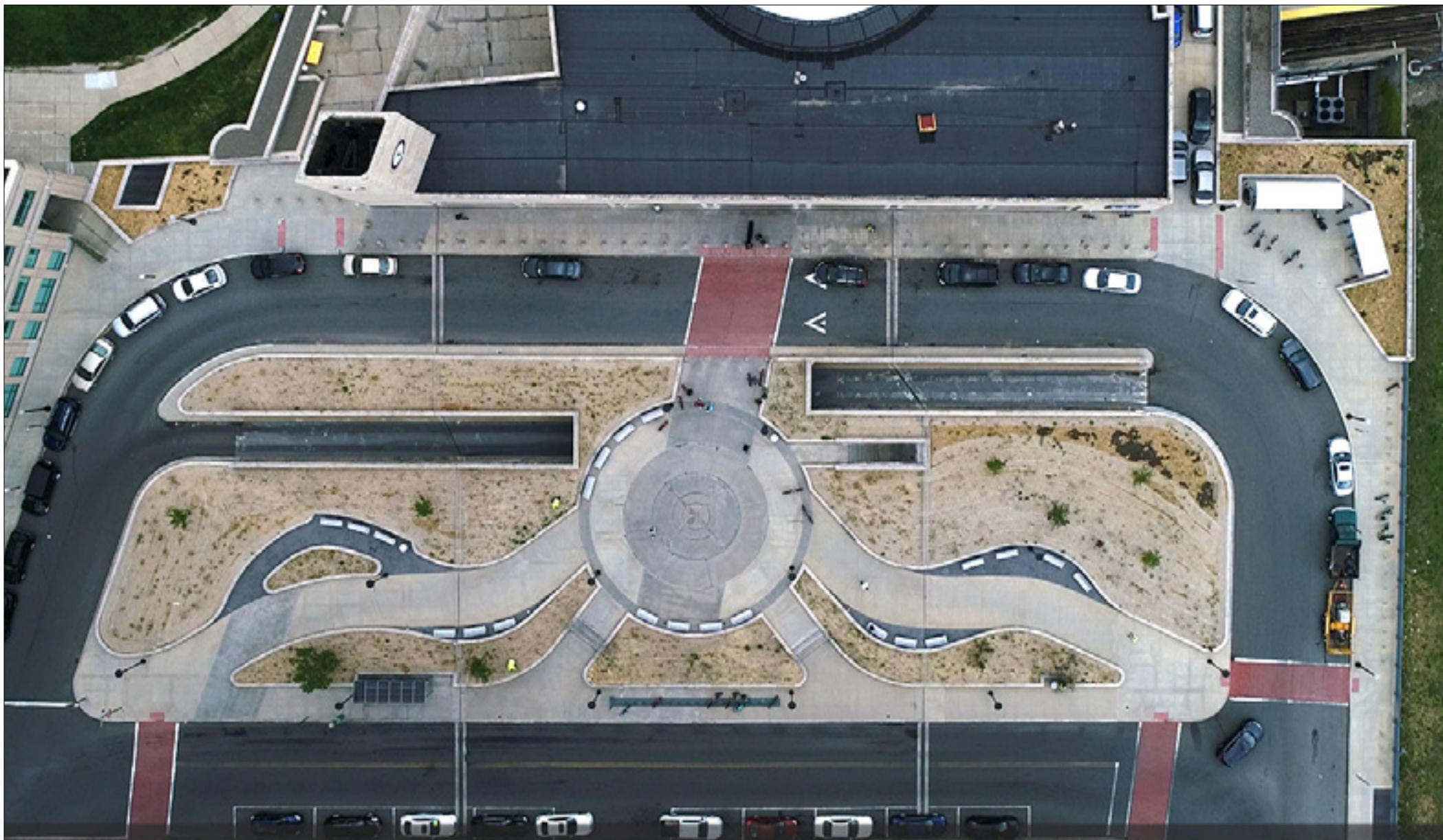




Over 7,000 plants encompassing dozens of Rhode Island ecotypes are being sorted and prepared for planting.



Aggressive vegetation was removed prior to planting and introduced species were spread out among all beds.



Installation of plant plugs was followed by bulb planting and seed sowing. To ensure good disprution, seed was mixed with sand and spread by hand. Hay mulch was laid thereafter and secured with jute mesh to prevent it from being blown away.

Hay protects the seed and soil from being displaced by wind and water, it also offers some deterrant from foragers. Additionally, it insulates – keeing soil cool and moist – an ideal environment for root setting and seed germination.



The heralds of spring were slow to emerge - a common occurrence when bulbs are first planted. When they did emerge, they pressed against the jute so significantly that the folks cutting the jute would often exclaim, “you are free!”

Above: the early arrival of flora triggered a response by the fauna; a sleepy bumble-bee hung onto the daffodil until it could feed on its nectar. Below: this happy native columbine (*Aquilegia canadensis*) was one among the many early ephemerals at Station Park.



A mixture of fragrant narcissi came up in late April and by mid-May was joined by scores of Indian hyacinth (*Camassia* sp.), and other ephemerals.

Clockwise from left: natives of the western U.S., *Brodiaea laxa* 'Silver Queen,' *B. californica* 'Babylon,' and *B. laxa coccinea*.



The excess organic matter precipitated by layers of mulch, along with a consistent spring rains, resulted in an explosion of growth.

Above: native pennstemon thriving amidst Stella D'Oro lilies and a slew of other intentional and unintentional vegetation. Below: wild-collected lupine seed from Nova-Scotia produced tons of seedlings and the native meadow rue made its debut.



The growing season continued to surprise with an astounding array of diversity and beauty. Although all plants have their merits, some of the most gratifying plants to witness were those that came up from wild-collected seed, as well as rare plants.



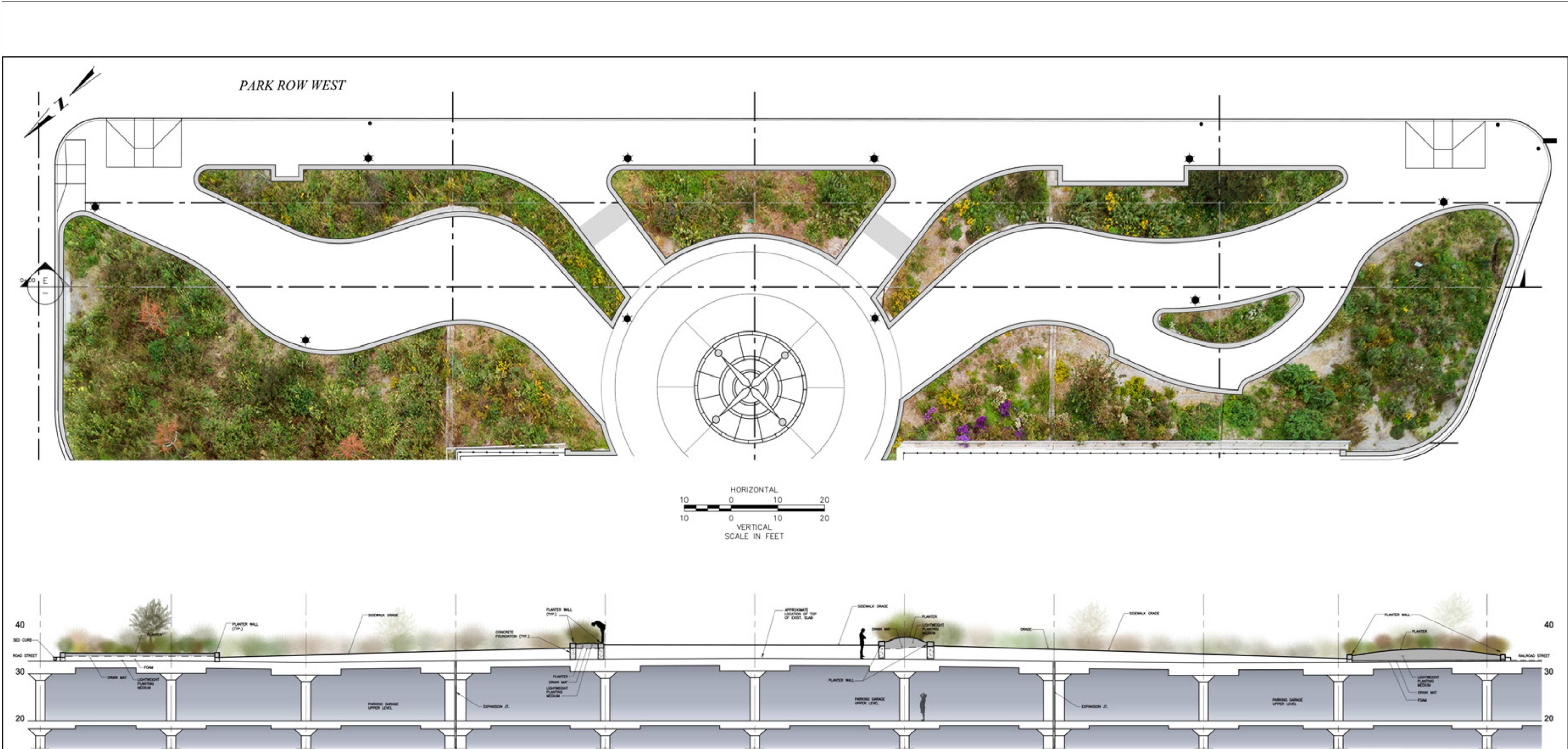
Clockwise from the top: native verbena (*Verbena hastata*) amidst black-eyed Susan (*Rudbeckia* sp.), bee balm (*Monarda* sp.), swamp milkweed (*Asclepias incarnata*), and a rare native meadowsweet (*Spirea alba*).



As the summer blossoms fade, the spent plant remains provide a bounty of seed for birds and overwintering places for insects; they are Mother Nature's original "insect hotels."

Amidst the intentionally planted plants, such as the verberna in the background and asters in the foreground, are scores of volunteered vegetation. In editing the meadow, the goal is never total control or eradication, but rather inclusivity and diversity.





A plan with superimposed drone imagery and an illustrative section were developed in hopes that we do not lose sight of what's beneath our feet. As we continue to develop and exploit the earth for our means, we must endeavor to return natural systems to balanced, pre-anthropocene conditions, as much as possible. And a lot is possible.