TOWNSHIP OF
MAPLEWOOD

ASSOCIATION OF NEW JERSEY
ENVIRONMENTAL COMMISSIONS

PREPARED BY:
EDGEWATER DESIGN LLC.

JUNE 2010

RAHWAY RIVER CORRIDOR STUDY

Source: BING maps

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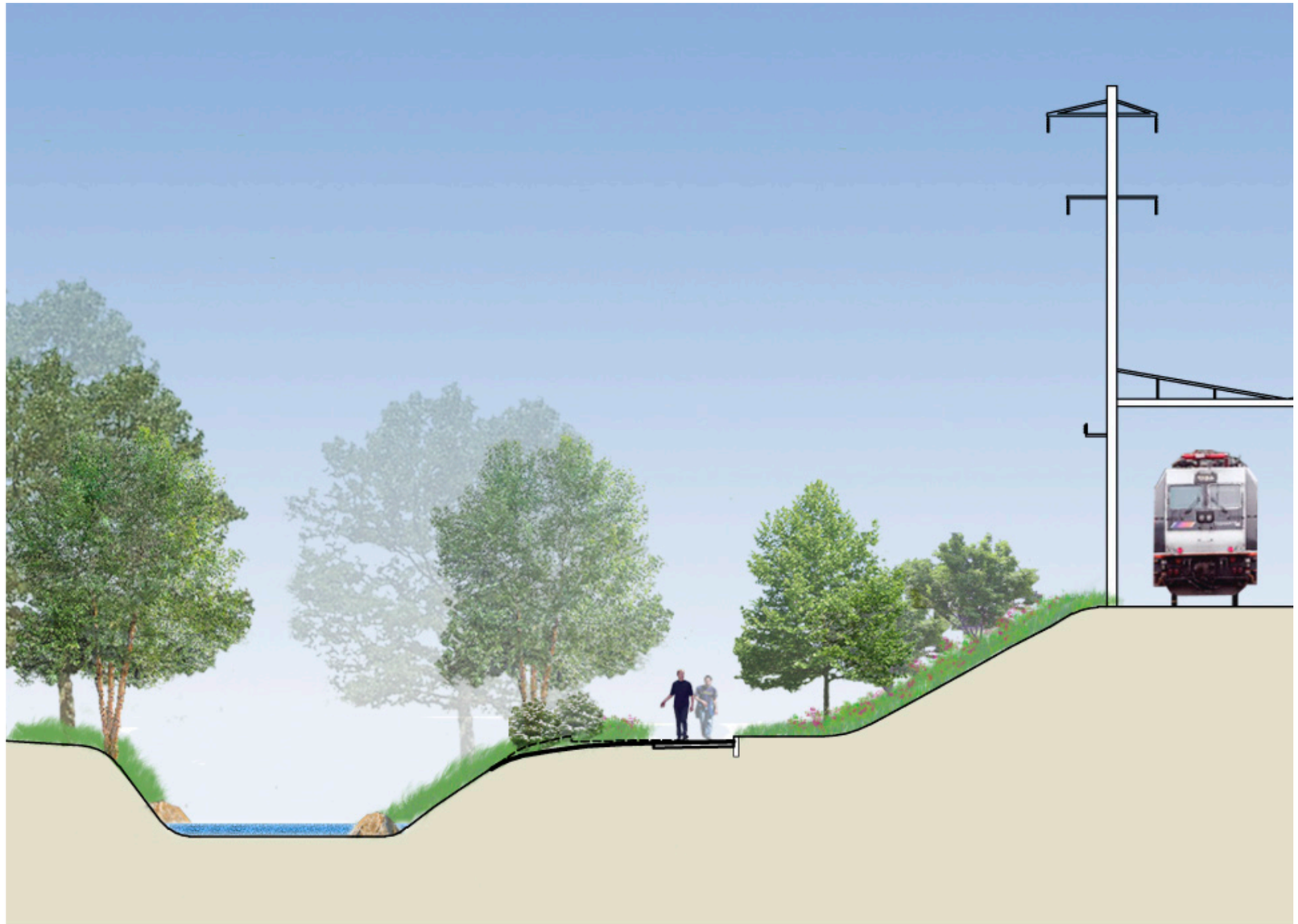
TABLE of CONTENTS



SITE ANALYSIS SUMMARY

The area for the Rahway River Corridor Study resides within a vibrant community setting consisting of traditional neighborhood homes and the Valley Street commercial district of Maplewood, New Jersey. The Rahway River is mostly hidden in this area behind homes, commercial buildings, parking lots and playfields and is directly bisected by the NJ Transit rail line. In many places their are opportunistic and invasive plant species and degraded river banks, steep slopes and overall ecological imbalance. Surface stormwater drains directly from nearby roofs and parking lots into the river without proper treatment.

A one block stretch between Oakland Road and Jefferson Avenue is mostly cut off from public use do to private property abutting the river. However, there are also a few under-utillized spaces directly adjacent to the river with direct public access including Chyzowych Field and the Board of Education parking lots and bus parking lots. This current condition creates a discontuous path or link between Maplewood's Memorial Park to the south and South Orange Waterlands Park and downtown district to the north.

PART I - SITE ANALYSIS

1.1 STUDY AREA DESCRIPTION

The Rahway River Corridor Study Area is roughly 38 acres in size. it is borded by Valley Street on the east and the NJ Transit Line and Dunnell Road to the west. To the north is the border with South Orange and to the south is Oakland Road and Memorial Park.

Source: BING maps

LEGEND

- Area of Study
- River
- Town Border
- NJ Transit Station
- NJ Transit Rail

1.2 HISTORY and CONTEXT

BEFORE MEMORIAL PARK, THERE WAS THE 'GLEN"

Long before the marshy pastureland that became Memorial Park was set apart by the town fathers as a suburban park, designed by Olmstead Brothers, there was another place of extraordinary beauty, to which Maplewood citizens gravitated for recreation and renewal. The locals called it "the Glen," It was a place to swim, fish, boat, paint or simply enjoy the solitude of nature.

A "glen" is a long valley between mountains formed by a waterway. Where was Maplewood's "Glen"? What did it look like?. The area is now changed beyond recognition. The heart of what was "the Glen" is the low point on Parker Avenue to the west of Valley Street through which the East Branch of the Rahway River flows south. Today this is the location of the Columbia High School parking lots and Gleason's Laundry. The mill ponds have long been drained. The river's volume has been reduced and its banks strewn with concrete. The stately trees are gone.

In the anecdotal history "Maplewood Past and Present" early Maplewood resident Daniel Nelson Beach (b. 1848) vividly describes this beloved local natural feature as it appeared in its full glory in the mid-19th century:

"The bases for the beauty of the Glen (was) first, the …Rahway River which paralleled Valley Street, drawing rather near to it on the west as we reached Parker Avenue… (T)oward the west were ridge and mountains, with the mountain's picturesque termination, while on our side east of the river there rose a very considerable abrupt ridge…. which made our skyline to the east.

To complete the perfection of the scene, only a few feet north of Parker Avenue the river was dammed and a picturesque bridge was just below the apron of the dam. The water thus impounded was led by a race-way, skillfully engineered, for perhaps a third of a mile along the roadway which it turned and paralleled, around an abrupt hill, and then to what in our time was a paper mill….

This race-way left the pond perhaps fifty feet to the west and it also had a bridge, below which there was a small pond with only slightly sloping banks where wagons could be driven for wetting their felloes (wagon wheel rims) and watering their horses. To this smaller pond were brought, particularly in the summer time, appreciable herds of cattle which were found in the neighborhood.

It was the larger pond which gave an indescribable grace to the whole landscape. There would be low water and high, but the stream was sufficient always to leave a good amount of water in the pond and race-way, and in freshets huge volumes of water would pour thundering over its dam; and the substantial bridge just below it, with its heavy timber railing, was a glorious spot from which to see the rush of the waters and to listen to their great roar. In this pond there was a bit of island with huge trees upon it, and beyond this toward the north the pond stretched on and on again, bending off soon toward the left and extending under the railroad bridge far to the north, partly pond, partly wooded islands. (NOW PROBABLY WATERLANDS PARK) It was a veritable voyage of discovery to pass under the railroad bridge in a boat and pick one's way through the rambling and often partly divided courses of the pond.)

This pond was of no great depth, not much of it over the head of a reasonably tall man, but it was the center of no end of pleasure for children and for grown-ups as well. There in summer one could swim, or fish, or "bob" for eels; and as for boating on it, it was superlative. Below the bridge there was a considerable stretch of land once used as a pasture through which the stream had wandered, and perhaps five hundred feet farther south there were the remains of a somewhat extended earlier dam that now existed only as broken hillocks. One wondered about the builders of that ancient dam, and to what purpose its powers had been applied. (Note: Probably a grist mill)….

Parker Avenue crossed the bridge, and the second and smaller bridge, and then, turning south, it skirted the race-way for a considerable distance, till the race-way turned to the left to be engineered around a hill which the road skirted to its right. Just beyond the pond was the old Stone House (22 Jefferson Avenue). This was an ancient structure and at the front of it was a platform constructed of masonry and earth, at which trains of the Morris and Essex Rail Road stopped in the earlier days.

….The whole Glen seemed ensphered within the sky above, the river beneath, and the scene of natural beauty always enthralled me….To the east was the ridge. Over it would rise the sun, and the great full moon. North and south was the beauty of farm and wooded pond, and when the foliage disappeared, in the winter time with the sun toward Turkey Mountain running very low, there was an indescribable splendor about the old home.[1]

[1] Courtesy of Maplewood Historic Preservation Commission

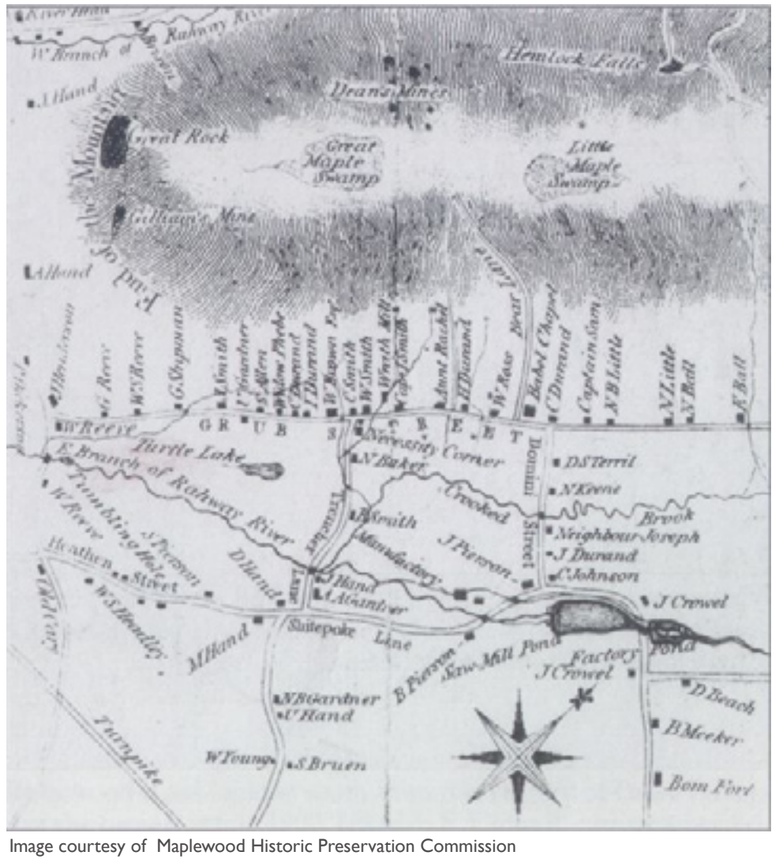


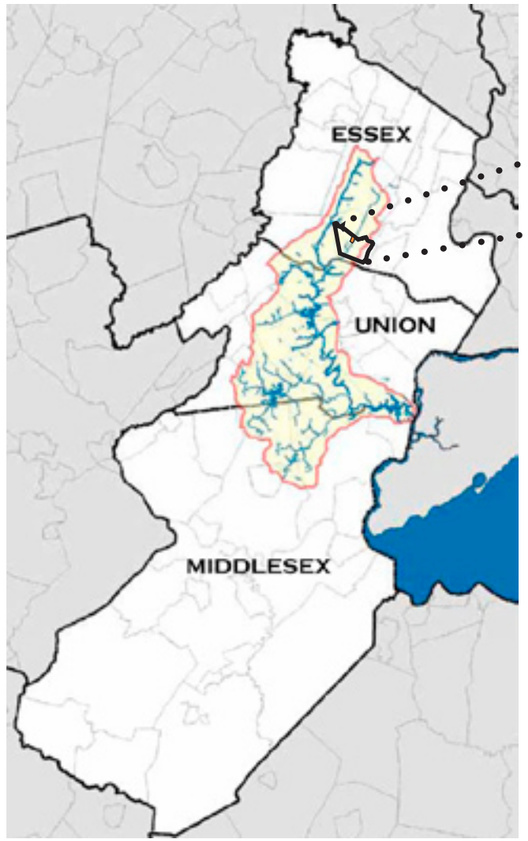
Image courtesy of Maplewood Historic Preservation Commission

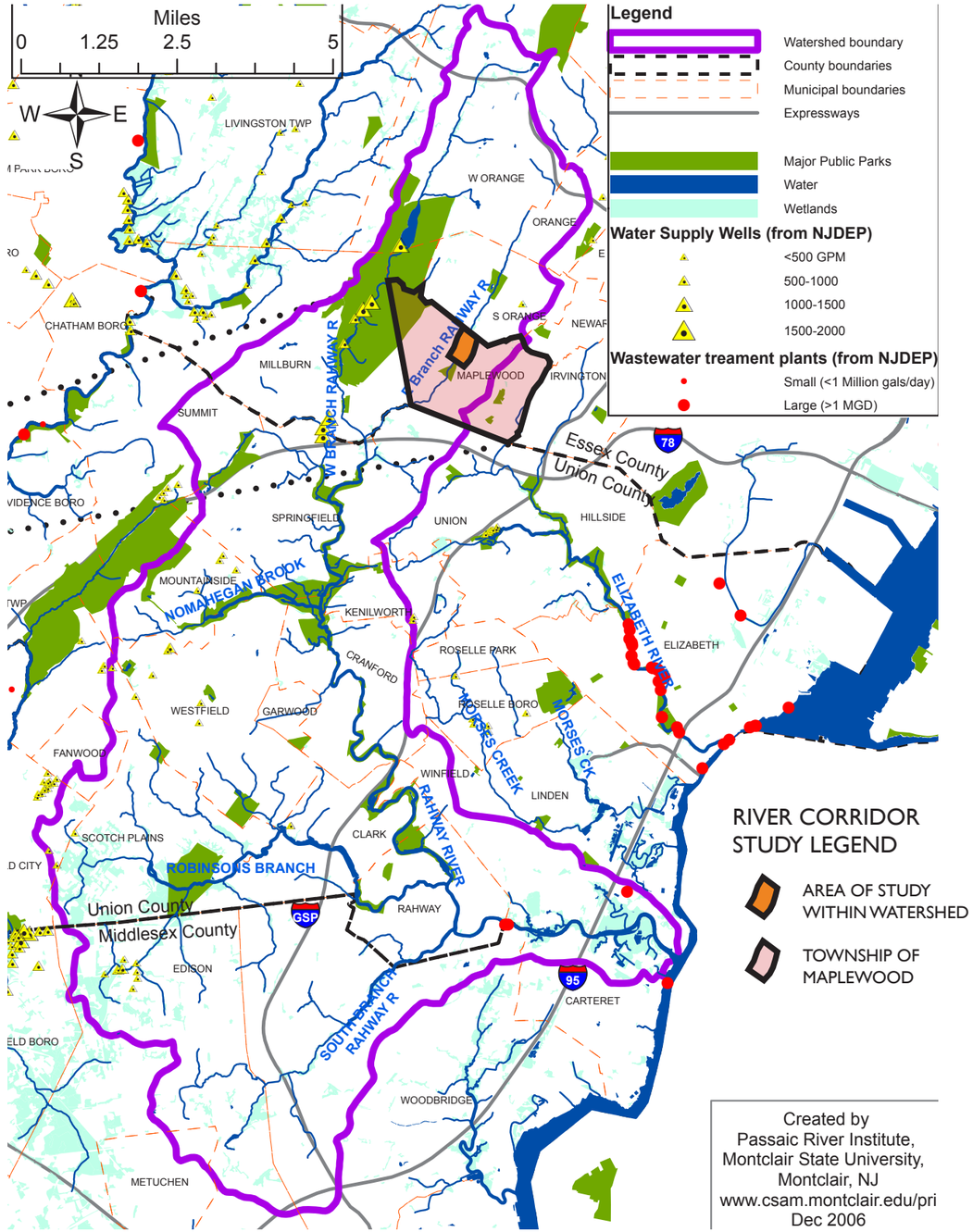
1.3 RAHWAY RIVER WATERSHED - ESSEX, UNION and MIDDLESEX, NJ

ABOUT THE RAHWAY RIVER WATERSHED

The land within the watershed is predominantly residential with concentrations of commercial, industrial and brownfields and greyfields interspersed, all of which offer both opportunities and obstacles of their own in creating one unified greenway along the Rahway River. Even though the Rahway River suffers from the effects of its past industrial use and neglect, the River and its watershed are still home to an abundance of flora and fauna, with habitats that support all types of wildlife. While invasive species and over-population of select species continue to be a problem, there is still time to act to bring the watershed back to a more natural state with a cooperative effort of community stakeholders across the watershed.

Many challenges exist as well in bringing this vision into fruition. The watershed is home to many contaminated sites and the River itself is severely polluted in several stretches – a consequence of its industrial past and present neglect. In addition, the River is prone to destructive flooding, a result of over-development within its watershed and a lack of green space within its watershed boundary to absorb storm runoff. [2]





[2] Courtesy of Rahway River Greenway Plan prepared by Rutgers Edward J. Bloustein School of Planning and Public Policy, Fall 2008.

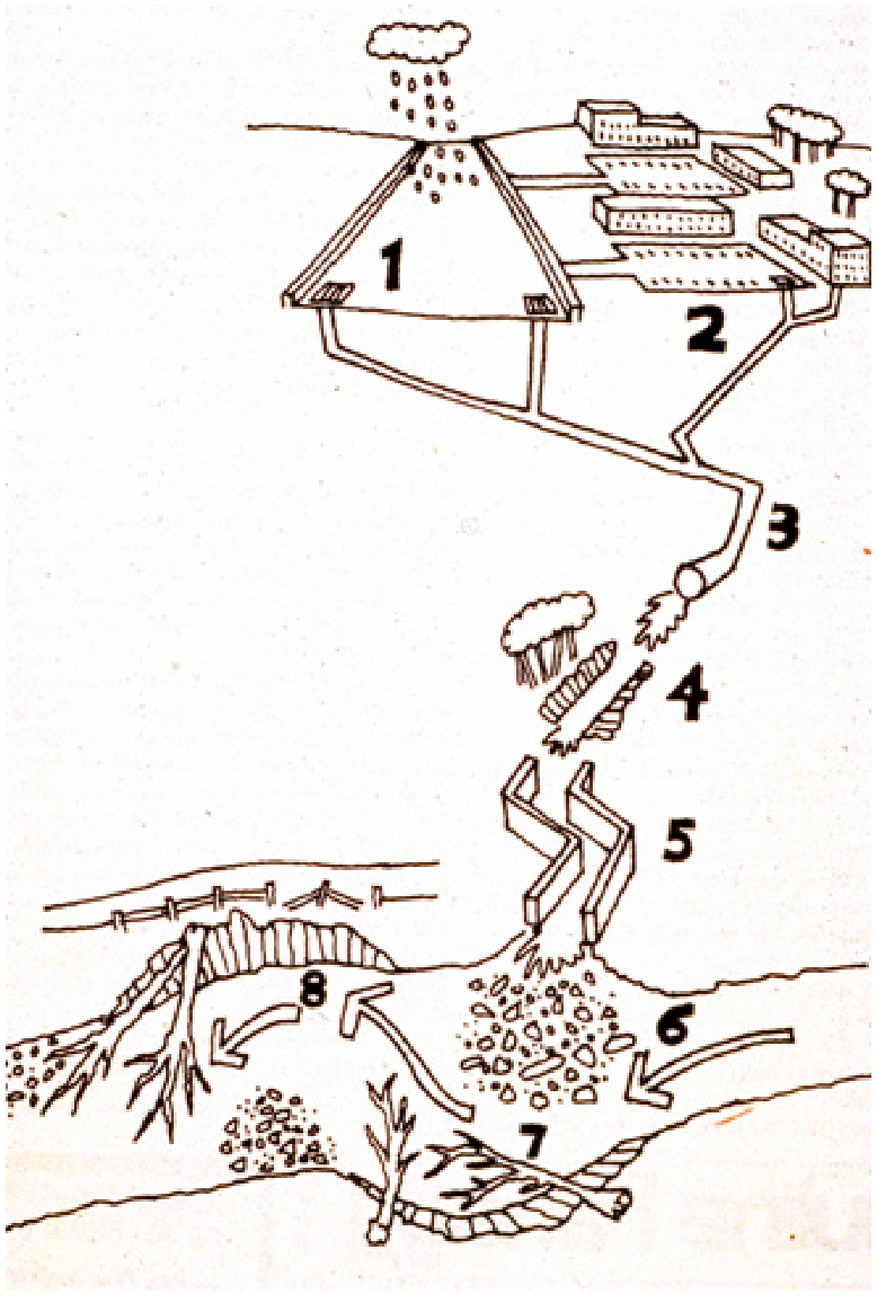
1.4 RAHWAY RIVER WATERSHED

OVER DEVELOPMENT OF THE WATERSHED

"The watershed is home to many contaminated sites and the River itself is severely polluted in several stretches – a consequence of its industrial past and present neglect. In addition, the River is prone to destructive flooding, a result of over-development within its watershed and a lack of green space within its watershed boundary to absorb storm runoff."[3]

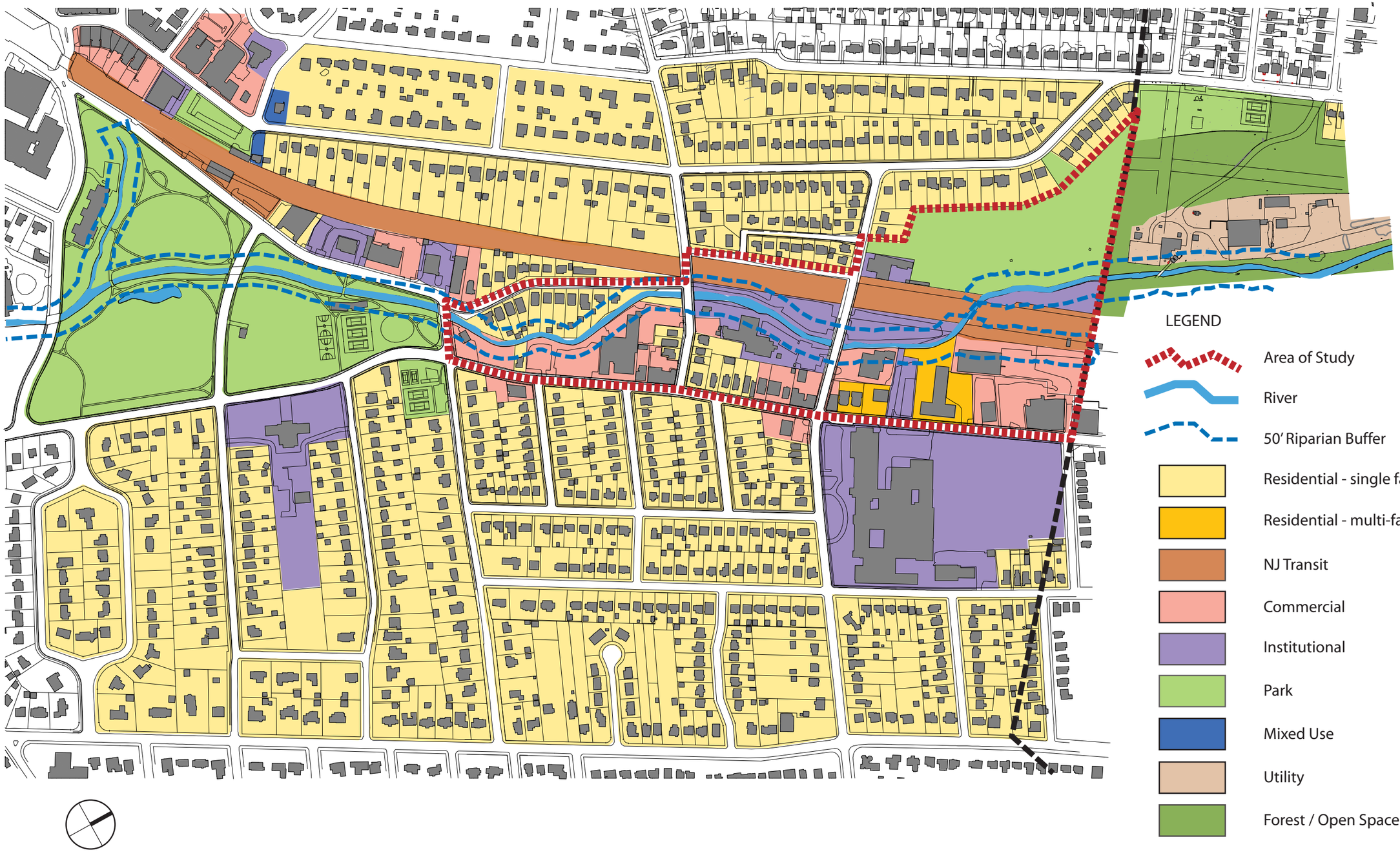
The river corridor is degraded as a result of channelization, filling and the construction of stone retaining walls. The riparian zone is degraded due to the loss of vegetation and proximity of structures, including buildings and asphalt surfaces, some of which are at the top of bank.

IMAGE OF DEGRADED WATERWAY

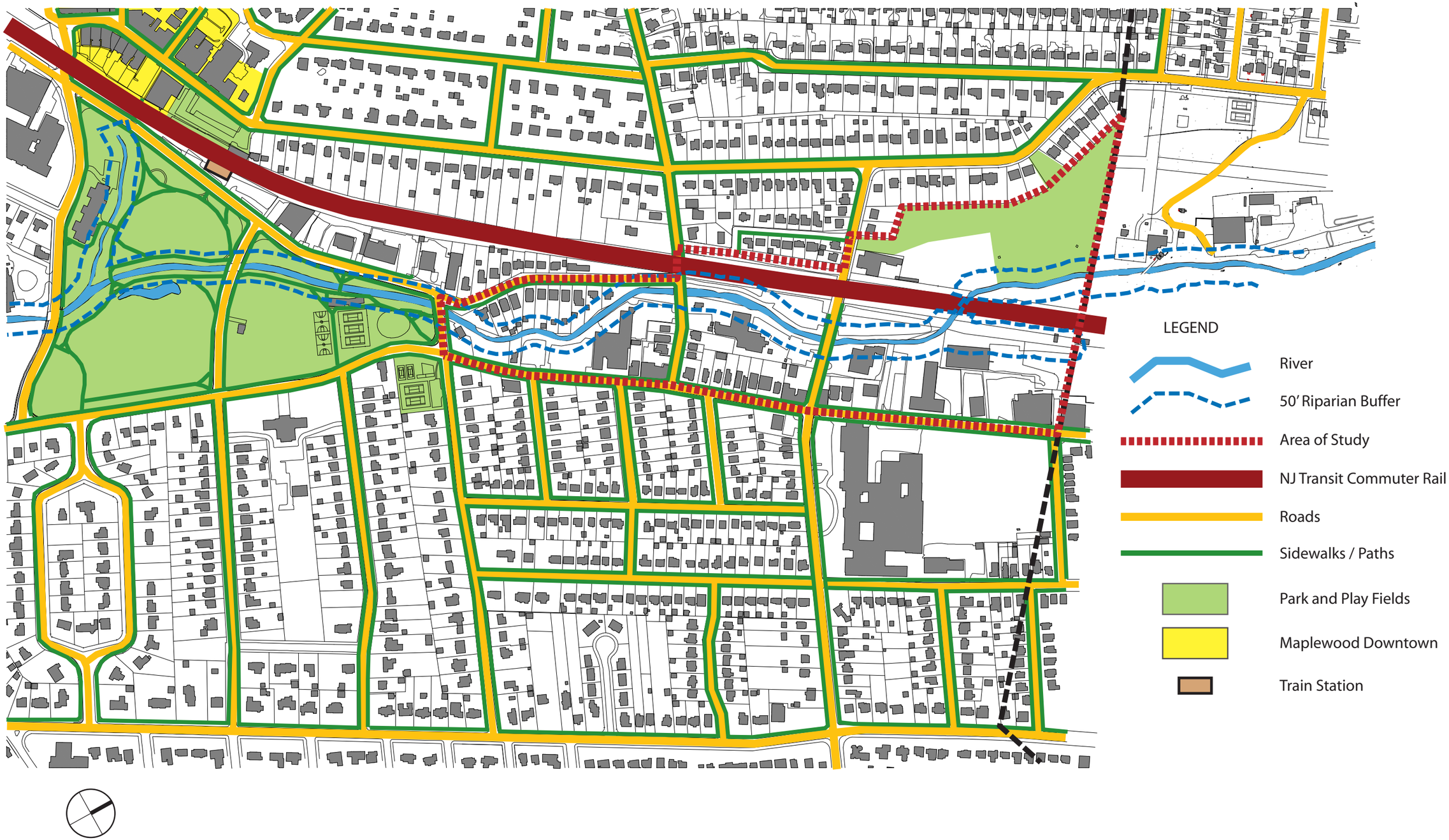


[3] Courtesy of Rahway River Greenway Plan prepared by Rutgers Edward J. Bloustein School of Planning and Public Policy, Fall

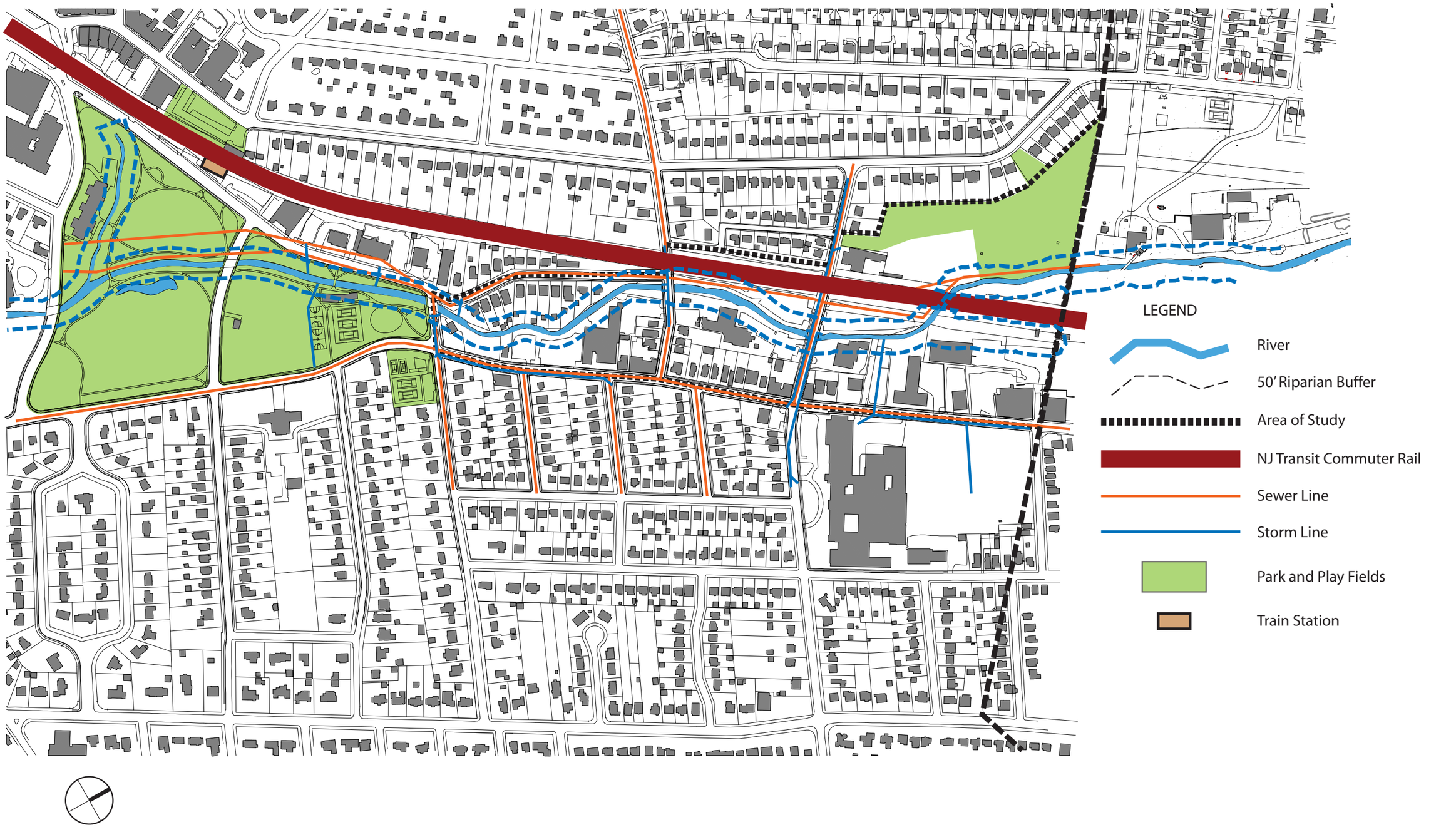
1.4 LAND USE and CONTEXT



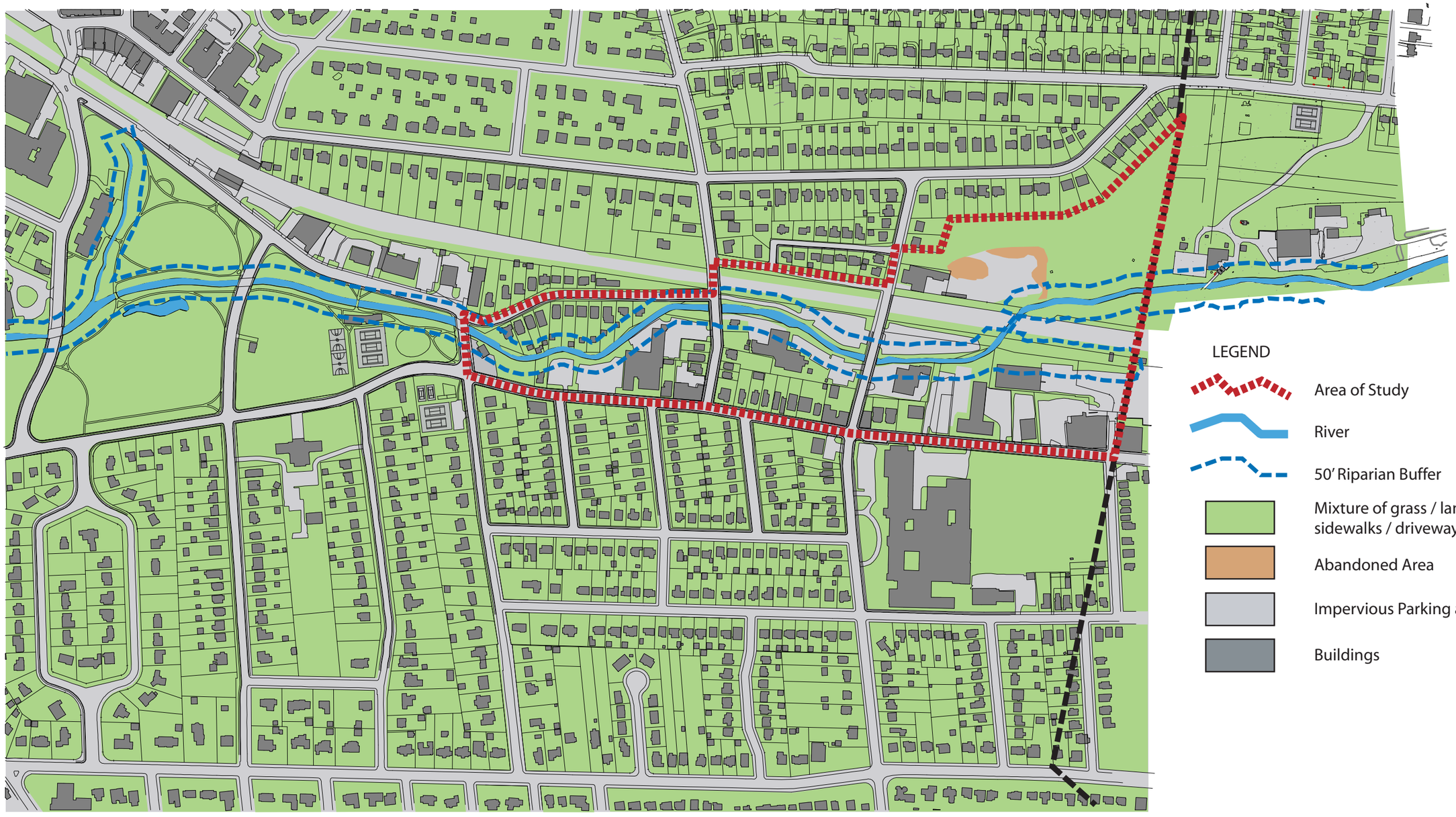
1.5 CIRCULATION and ACCESS



1.4 LAND USE and CONTEXT



1.7 GROUND PLANE



1.8 FLOOD ZONES

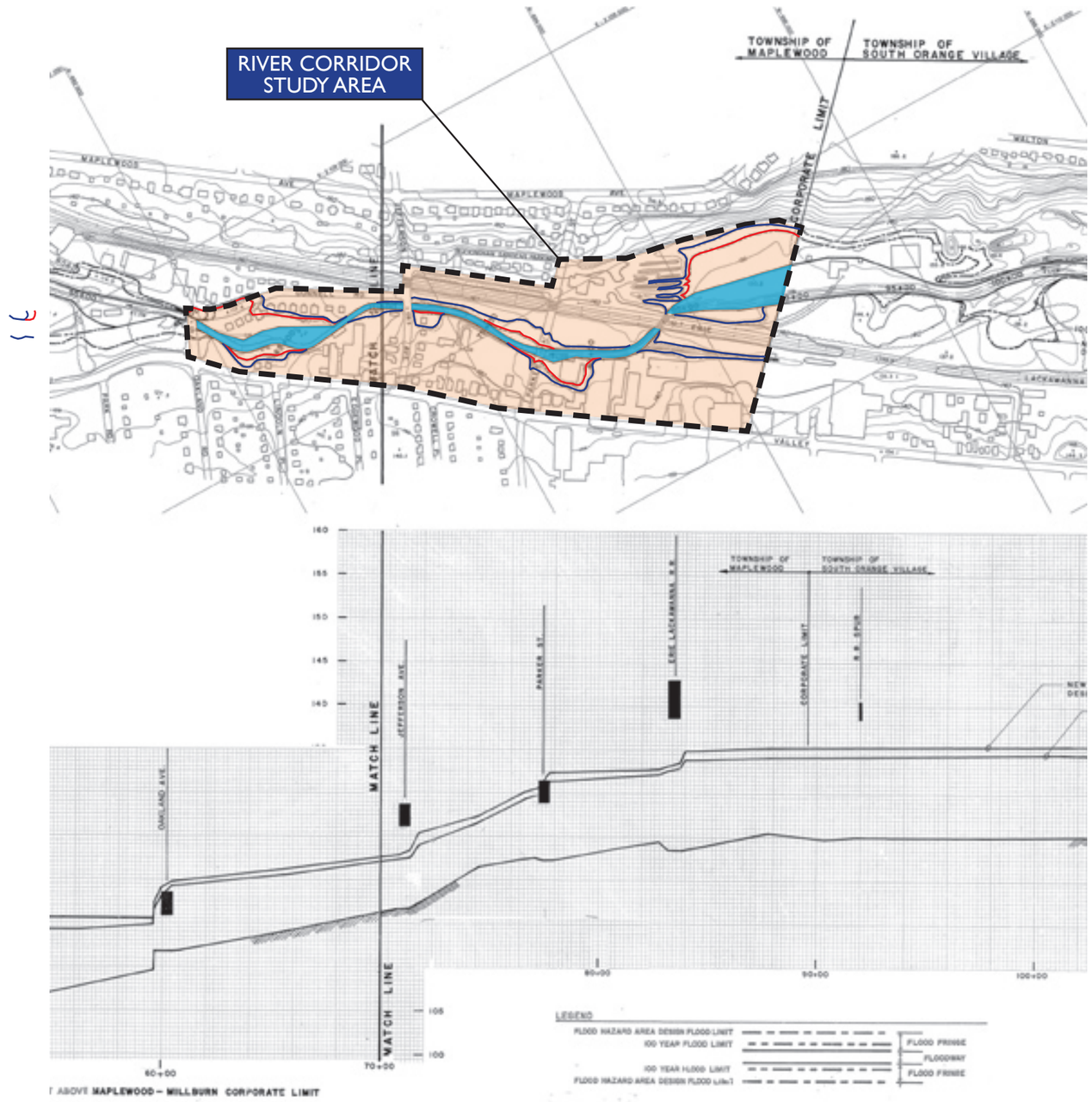
FLOOD HAZARD AREA CONTROL ACT RULES (NJAC 7:13)

The Flood Hazard Area Control Act (FHACA) rules at N.J.A.C. 7:13 include a number of provisions that protect existing flood hazard areas (flood fringe and floodway) and the adjacent riparian zone. A regulated flood hazard area exists along all waters with a drainage area of 50 acres or more. In addition, a riparian zone exists along every regulated water. The Rahway River within Maplewood will include both a regulated flood hazard area and a regulated riparian zone.

The riparian zone along the Rahway River will be measured from the top of bank. Based on our field investigation, the top of bank is either the water ward edge of the retaining wall or the top of the steep, filled slopes. In accordance with N.J.A.C. 7:13 the Flood Hazard Area Control Act (FHACA) rules, the Rahway River will include a regulated riparian zone. Based on our best professional judgment, the riparian zone should be 50 feet along the Rahway River in Maplewood in accord with the following:

- The waters are not classified as Category-1 (C-1)
- The waters are not identified as trout-production or trout-maintenance
- The waters do not flow through areas of acid-producing soils
- The waters are not flowing through an area that contains documented habitat for a threatened or endangered species of plant or animal, which is critically dependent on the regulated water for survival*

*Courtesy of ASGEC



LEGEND

Flood Hazard Area Design Flood Limit

100 Year Flood Limit

Floodway

1.9 INFRASTRUCTURE and ENGINEERING EVALUATIONS

A. The river banks on the southern end of the project consist of hand-laid stone rubble retaining walls, that appear to date back to the 1930s. These walls are approximately 6 to 8 feet in height and exhibit varying degrees of distress. Of significant concern along the walled sections is the cutting of the riverbed along the wall resulting in undermining of the foundations. In some areas, development, including structures, extend up to these walls.

In 1974, Frank H. Lehr Associates prepared plans for limited repairs to address foundation undermining. Based on these plans, it appears that the original stone wall construction extended approximately 18" below the bottom of the river. The 1974 project included an underpinning like placement of concrete at the toe of the rubble wall, to restore support to the masonry structure. Limited sections of wall, primarily in Memorial Park were totally replaced. Here, concrete footings extending to a depth of 3' below the river bottom were placed and a new stone rubble wall, including wall drainage, was constructed. *

B. The river transitions to a steep natural bank near Jefferson Street. From Jefferson to Parker Avenue West, cracking along the top of bank indicates a global slope stability problem along the westerly bank. There is evidence that this section of stream was previously walled, and the walls have completely failed. Banks in this area are "stabilized" with rip rap from remnants of the old wall, natural stone, and broken sidewalk panels. In this area, it will likely be necessary to cut back the slope and restabilize with natural materials, such as wattling, bio-logs, and living stakes.

The east bank of the river in this section is significantly steeper than the west bank through this area. Here, development along the top of bank (Maplewood YMCA) will prevent flattening of the slope. Similar to the west side, it appears that the stream was previously walled, and the walls have completely failed. Banks in this area are "stabilized" with rip rap from remnants of the old wall, natural stone, broken sidewalk panels, and dumped asphalt. In this area, some form of structural stabilization will likely be necessary. *

C Beyond Parker Avenue West and extending up to Chyzowych Park, the river transitions to a flatter, natural bank. In this area primarily natural bank cutting was observed. Here, work will likely be limited to a desnagging program to removed dead vegetation and debris blocking the channel. In some areas, natural bank stabilization methods may be used to supplement areas of sparse vegetation.

Throughout corridor, stabilization and repairs should be anticipated at storm water discharge points such as headwalls and drainage ditches.*

* Courtesy of Frank H. Lehr Associates

1.10 VEGETATIVE SPECIES and SITE ASSESSMENT

STUDY AREA CHARACTERISTICS

The study area includes the river and adjacent properties. The banks of the river have been reinforced through the historic construction of vertical hand-laid stone retaining walls (Photo A) or from the placement of fill and debris such as rip rap, concrete slabs, and timbers. The filled banks exhibit vertical or very steep slopes. Adjacent properties are residential, commercial and municipal development. Very little natural or undisturbed riparian area exists within the study area. The river bed consists of bedrock with a stone/cobble substrate and includes occasional pools and riffles. Due to channelization and filling, the river has largely been disconnected from the (former) floodplain. This has disrupted the natural ability of the river to dissipate energy during flooding. However, because the banks are hardened/reinforced and the river bed consists of bedrock there is little evidence of bank or bed erosion, although some undermining of the hand laid stone walls was noted. Some deposition of cobbles and sand was observed on the inside bends of meanders.

Although the river traverses a highly developed landscape, a variety of mature native and non-native trees are found growing along the steep banks or at the top of bank (Photo B). Typical native trees identified include white ash (Fraxinus Americana), black cherry (Prunus serotina), red maple (Acer rubrum), silver maple (Acer saccharinum) and American elm (Ulmus Americana). Common non-native trees identified included Norway maple (Acer platinoides) and tree of heaven (Ailanthus altissima). Norway maple was the most common tree noted throughout the study area. Some of the trees are large diameter, greater than 20" diameter at breast height, and their extensive root systems help to reinforce the river banks. Because the banks consist largely of debris and fill, very few shrubs or tree seedlings were noted in the understory or along the bank. Because the river is scoured during storm events, no significant vegetation was noted within the channel between the banks. There was also a notable lack of instream habitat such as large woody debris, heterogeneous substrate, overhanging vegetation, root mats, undercut banks, etc. This lack of physical structure results in reduced value to fish and wildlife. The non-native, invasive herbaceous plant Japanese knotweed (Polygonum cuspidatum) was found growing in dense colonies at a few locations within the study area. In particular, it was found growing along the western banks north of Jefferson Ave. and north of West Parker Ave. A brief description of this species is provided below:

Japanese Knotweed (Polygonum cuspidatum)
Japanese knotweed is a non native, invasive herbaceous plant. This plant was introduced in the 1800's as an ornamental and for erosion control. It tolerates a wide range of soil, shade, moisture and temperature conditions. It is most commonly found in riparian areas along rivers and in floodplains. Once established it is extremely persistent and difficult to eradicate. This perennial grows to about 10 feet in height during summer and dies back to below ground rhizomes during winter. Japanese knotweed spreads via the stout rhizomes which can extend 45 to 60 feet from the plant, or via seed. It prefers full sun but tolerates shade. The plant can be managed through repeated pulling of stems, 3 or more times a growing season which will exhaust the rhizome; however, this may take up to ten years. Cutting the plant in early summer and spraying the resprouts in late summer/early fall provides effective control.

Due to the historic filling that has occurred, and loss of natural floodplains, there were no areas of wetland noted within the study area during the field investigation. The river within the study area should therefore be regulated as a State open water. State open waters are regulated under the Freshwater Wetlands Protection Act rules at NJAC 7:7A; however, because there do not appear to be any wetlands, there will not be any associated wetland transition areas.

IMPERVIOUS SURFACES

Large expanses of impervious surfaces, primarily parking lots, occur adjacent to the river.

Block 16.03; Lot 11
A parking lot is located on the east side of the river, between Oakland Road and Jefferson Ave. (Photo C). This parking lot is pitched toward the river and discharges untreated stormwater directly to the top of bank. An erosional channel has developed at the low point along the edge of the parking lot and the river, which will continue to enlarge and undermine the parking lot edge and destabilize the river bank. This parking lot was empty at the time of the field investigation. A small stormwater management structure might be considered at the base of this lot, paralleling the river, to improve water quality and reduce future erosion. This would require the displacement of a number of parking spaces.

Block 50; Lot 51
An abandoned road and a Board of Education parking lot abut the western side of the river between Jefferson Avenue and West Parker Ave. (Photo D). The paved areas abutting the river can be redeveloped with a pedestrian pathway, riparian plantings and stormwater management facilities. This would require the displacement of a number of parking spaces.

Block 50; Lot 41
A Board of Education parking lot abuts the river north of West Parker Avenue (Photo E). The paved areas abutting the river can be redeveloped with riparian plantings and stormwater management facilities. This would require the displacement of a number of parking spaces.

Block 15.07; Lots 419 & 343
A disturbed early successional field dominated by invasive plant species, is located north of the Board of Education Maintenance yard parking lot and south of a playing field (Photo F). This field has been used for dumping and includes earthen fill and debris. This area could be excavated and planted to create additional floodplain storage or regraded and replanted with native upland vegetation in order to enhance the riparian zone.

Note that a sewer easement/ROW underlies portions of the study area and could interfere with proposed construction and restoration activities.

1.10 VEGETATIVE SPECIES and SITE ASSESSMENT

A. View north of river corridor between Oakland Rd and Jefferson Ave. with hand laid vertical stone retaining walls. Study area is characterized by State open waters and no areas of wetland. River bed appears to be scoured to bedrock with some cobbles on surface.

B. View facing north of east bank of river between Oakland Rd and Jefferson Ave. Note that large diameter trees, such as white ash and black cherry, have colonized the river bank and provide shading and habitat.

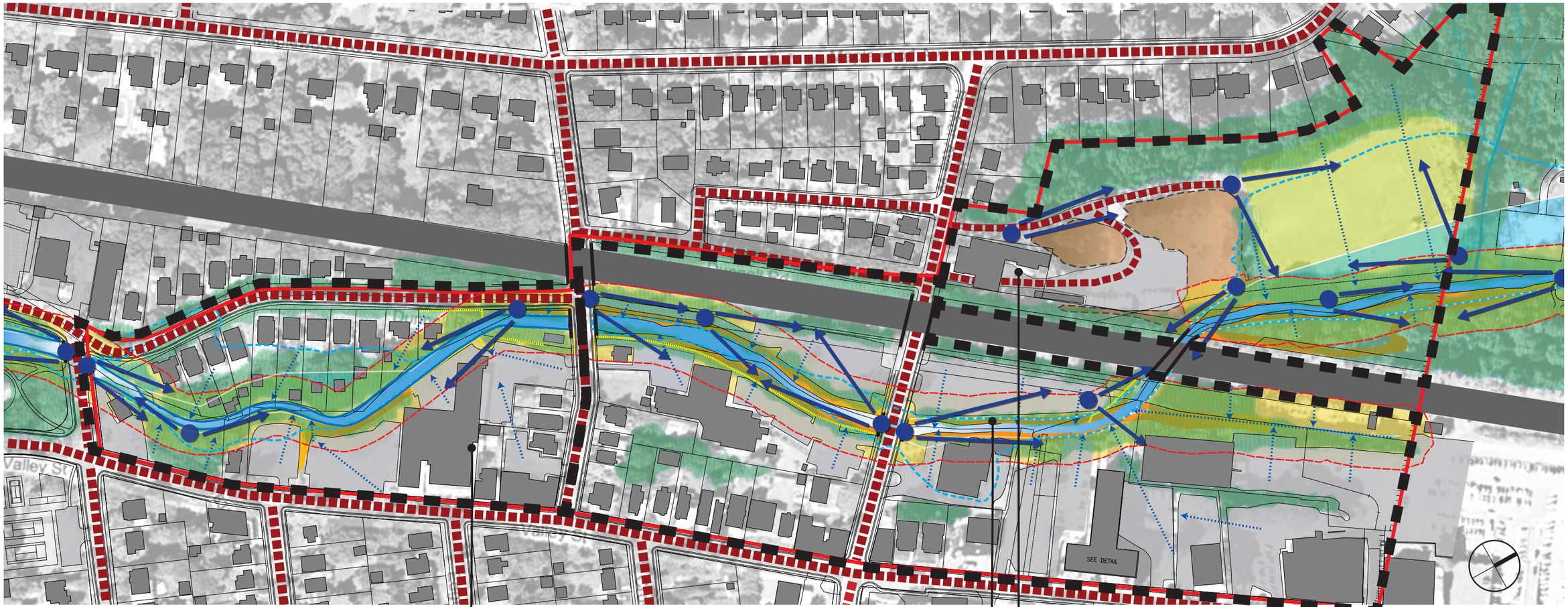
C. View north of parking lot (Block 16.03; Lot 11) adjacent to top of river bank. This area could be utilized to provide stormwater treatment; however, some parking spaces would be displaced.

D. View north from intersection with Jefferson Ave. showing abandoned road. RR ballast on left is colonized by the invasive plant Japanese knotweed and river bank on right includes Japanese knotweed and Norway maple and tree of heaven saplings and small trees.

E. View facing south of Board of Education parking lot (Block 50; Lot 14) north of West Parker Ave. This area provides excellent opportunities for riparian zone restoration and construction of stormwater management facilities.

F. View facing north of area of early successional field (Block 15.07; Lots 419 & 343) north of the Board of Educaiton parking lot. This degraded area has the potential to provide addition riparian zone restoration.

1.11 AESTHETIC and VISUAL ASSESSMENT - AREA OF STUDY ZONES



ZONE 1 - OAKLAND ROAD TO JEFFERESON AVE.

Consists of commercial & residential building lots with extensive impervious surface on the east side and landscaped residential lots on the west with driveways and garages in the backyards. The river is channelized in this zone with hand built stone walls and has limited physical and visual access due to the privately owned land. It appears most surface drainage drains directly into the river and adjacent streets via below grade storm-water conveyance systems.

ZONE 2 - JEFFERSON AVE. TO WEST PARKER AVENUE

Is bordered by the elevated NJ Transit rail line and BOE parking lots on the west and a mixture of commercial, residential and the YMCA on the east side. The river banks are steep and degraded and strewn with debris including concrete, stone and timber. It appears most surface drainage drains directly into the river and adjacent streets via below grade storm-water conveyance systems. A small river tributary drains from the north behind the commercial district along Valley Street.

ZONE 3 - BOARD OF EDUCATION & CHYZOWYCH FIELD

Is bordered by the elevated NJ Transit rail line on the east and the Rahway River crosses underneath the rail behind the BOE Maintenance parking area. There appears to be a large abandoned area between the BOE parking and Chyzowych Field which is composed of mounds and invasive plant species. A sewer easement also parallels the river on it's western bank. An access road also leads back from West Parker Ave. to the field area. The South Orange town border is just to the north of the open field.

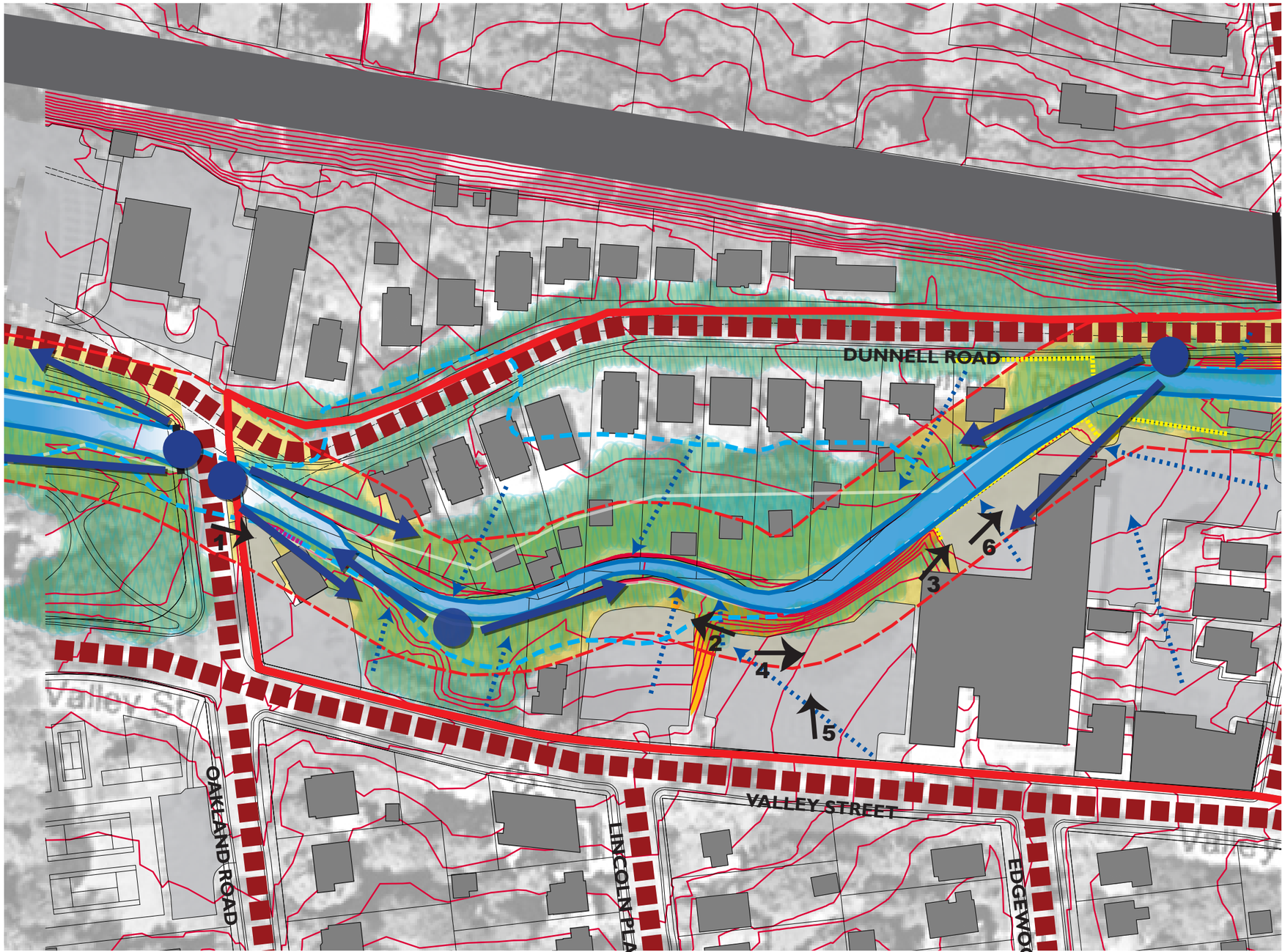
LEGEND:

- Area of Study
- River
- Mixed Vegetation
- Steep Slopes with erosion invasive species
- Parking Lots / flat plantes
- Buildings
- Abandoned Area
- Play Field
- Floodway
- 50' Riparian Buffer
- Railroad / Barrier
- Bridge Abutment
- Stone River Walls
- Views
- Surface Drainage
- Fence
- 100 Year Flood line

1.11 AESTHETIC and VISUAL ASSESSMENT - AERIAL VIEW

Source: BING maps

I.11 AESTHETIC and VISUAL ASSESSMENT - OAKLAND ROAD TO JEFFERSON AVENUE



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KEYMAP

I.11 AESTHETIC and VISUAL ASSESSMENT - OAKLAND ROAD to JEFFERSON AVENUE

The river channel at Oakland Avenue has vegetated slopes on the east and access is limited due to private property and existing buildings, trees and slopes. In this case, it is recommended to direct people onto nearby Dunnell Road.

The river channel has stone walls with flat slopes along the residential west side and varying vegetated slopes along a majority of the east side. The wall is showing severe signs of undermining due to age and frequent storm events. River access would be difficult due to private property and tight conditions.

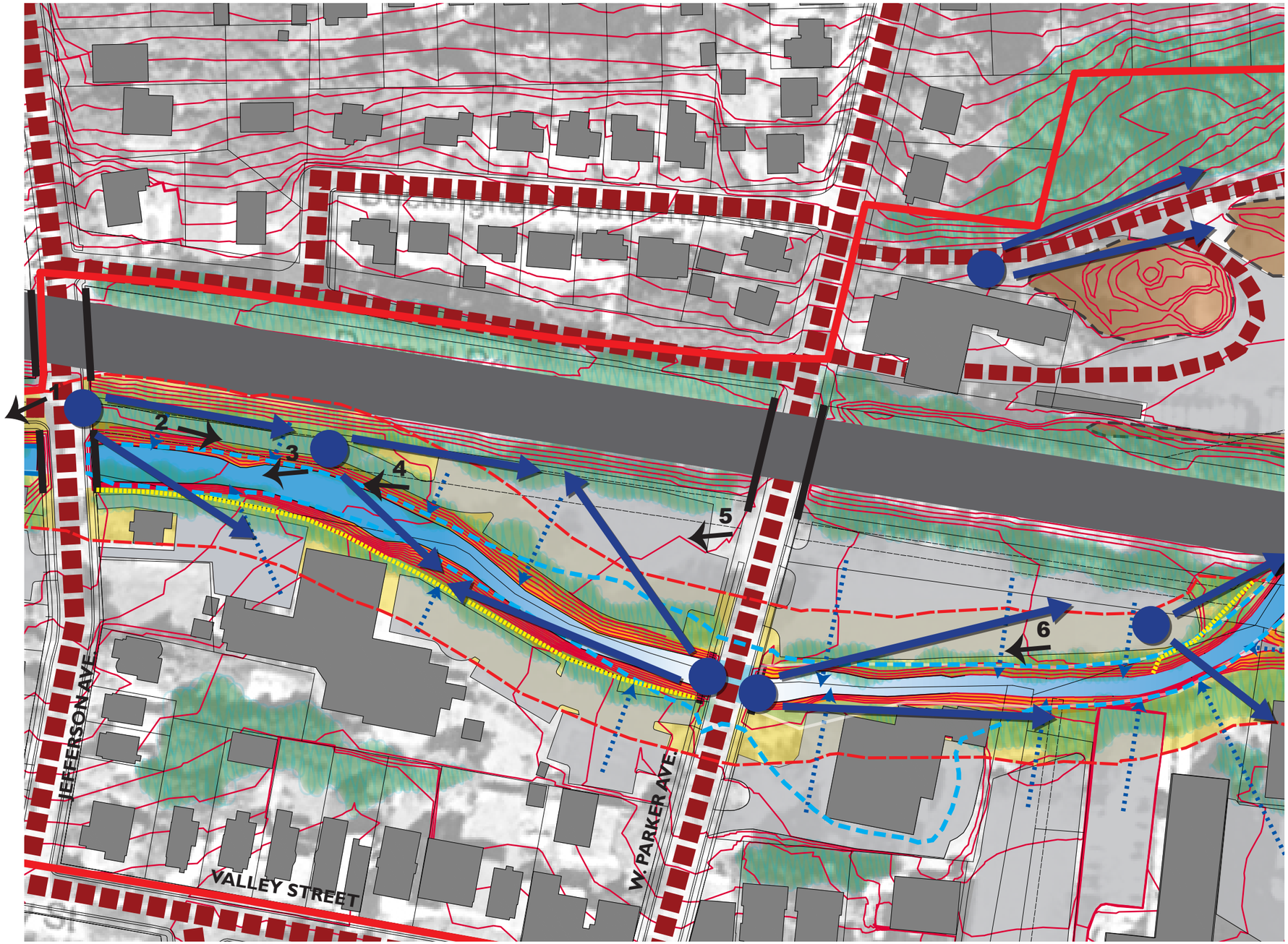
The river channel has stone walls with flat slopes along the residential west side and varying vegetated slopes along a majority of the east side. The wall is showing severe signs of undermining due to age and frequent storm events.

There are steep slopes between the upper Map Building parking lot and the river wall. Erosion is occuring in some spots and drainage could be redirected to a rain garden at the lower lot. Direct access to the river would be difficult for this reason.

The lower Map Building parking lot is draining directly into the river and causing erosion on the slopes between the pavement on the wall. Consideration should be given to removing 25 feet of pavement and creating a rain garden to absorb surface drainage and clean hydrocarbons before the enter the river.

Behind the Map Building, pavement is within 3 feet of the walls and old rusted barbed wire fence hugs the space between. Consideration should be given to removing this fence and replacing it with a new design standard such a wood or decorative metal.

I.11 AESTHETIC and VISUAL ASSESSMENT - JEFFERSON AVENUE to WEST PARKER AVENUE



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- Area of Study
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KEYMAP

I.11 AESTHETIC and VISUAL ASSESSMENT - JEFFERSON AVENUE to WEST PARKER AVENUE


1

The sidewalk along Dunnell Road has pleasant views and sounds of the river. New landscaping and tree pruning/tree removal can add interest as well as provide improved visual access and reinforce the natural corridor.


2

The paved lane adjacent to the river and railroad between Jefferson Avenue and the Board of Education parking lot is abondoned, overgrown with invasive plant species and in some places dangerous due to failing and eroded slopes. This area is ideal for landscape renewal and access to the river with biking and walking paths, regenerative planting restoration and reduced steep slopes.


3

The river channel is highly degraded in this zone. However, some large trees with extensive root systems inhabit the slopes and should remain. Where possible per regulations, slopes should be repaired and revegetated with native shrubs and trees.


4

In several locations along the river the slope is severely eroded and in some cases failing making it unsafe. Reducing the paving width and returning space back to the river side slopes with improve safety, reduce erosion and increase access.

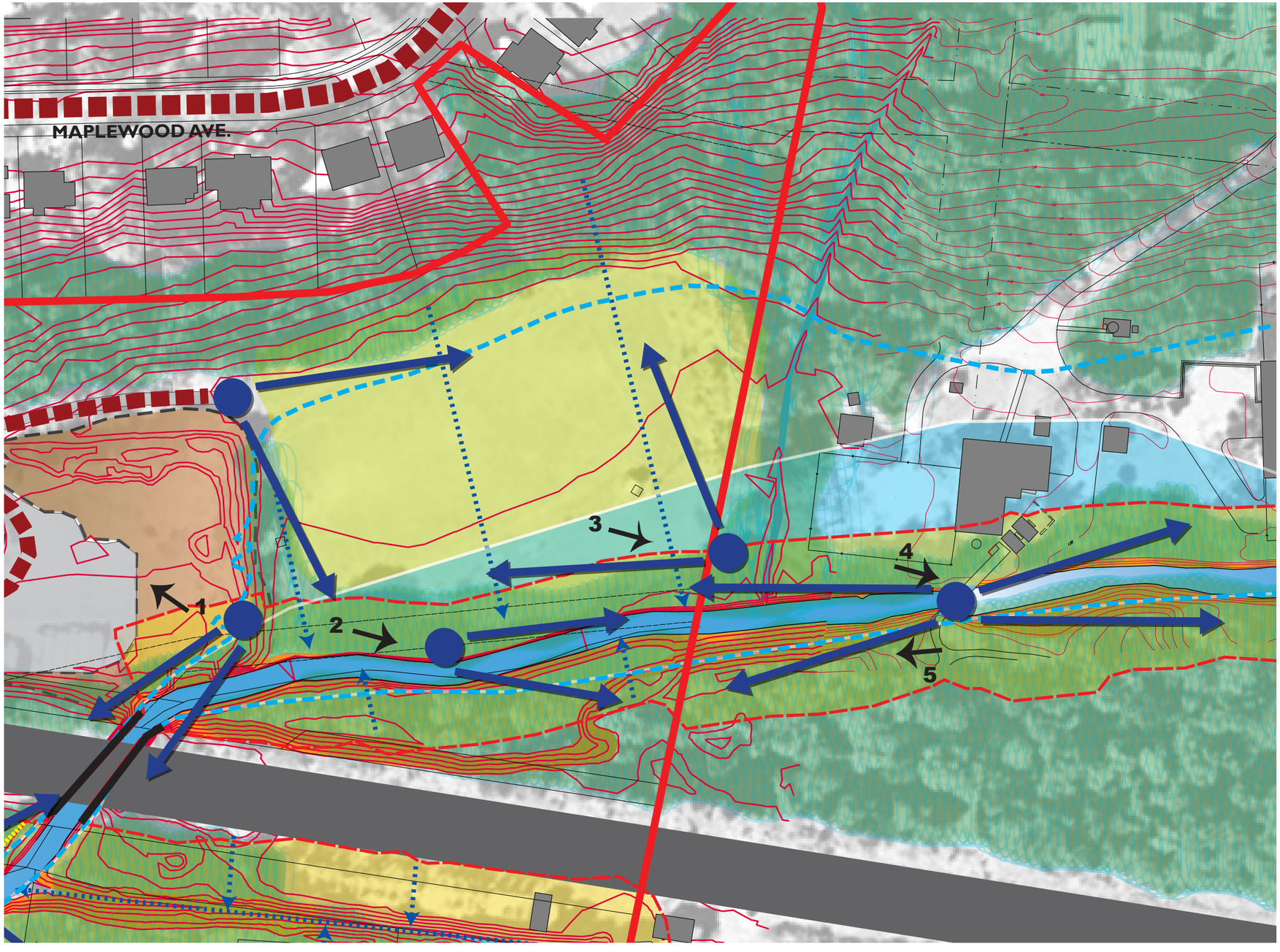

5

The Board of Education parking lot should be restudied for the required amount of spaces as well as the relocation of the spaces to nearby locations. This would free up high-value open space adjacent to the river that could be converted to park, open space with direct river access, opportunity for regenerative planting restoration and stormwater management.


6

The Board of Education parking lots were constructed during a time when permitting was less stringent for how close you can pave within a waterway. This has cut off access to the river as well as degraded and destabilized the slopes. Effort should be made to minimize parking/paving along the river.

I.11 AESTHETIC and VISUAL ASSESSMENT - B.O.E. and CHYZOWYCH FIELD



LEGEND

- Area of Study
- River
- Mixed Vegetation
- Steep Slopes with erosion invasive species
- Parking Lots / flat plantes
- Buildings
- Abandoned Area
- Play Field
- Floodway
- 50' Riparian Buffer
- Railroad / Barrier
- Bridge Abutment
- Stone River Walls
- Views
- Surface Drainage
- Fence
- 100 Year Flood line

KEYMAP

I.11 AESTHETIC and VISUAL ASSESSMENT - B.O.E. and CHYZOWYCH FIELD

Behind the Board of Education Maintenance Building and south of Chyzowych Field is a large former dumping area overgrown with invasive vines, shrubs, and tree saplings. The area is almost one acre in size and will need some environmental testing to determine if there are any contanimants that require removal. This expansive space could be converted into a functional and beautiful amenity space such a community garden or park adjacent to the river for the township.

The river channel slopes are highly eroded and invasive species rampant. Where possible per regulations, slopes should be repaired and revegetated with native trees, shrubs and perennials.

Aside from some large shade trees along the field and river, the dominant understory plants are invasive japanese knotweed and vines. Consideration should be given to renewing this landscape along with path access to the river.

The existing steel and concrete bridge just north of the field could be a main pathway connection point for the river improvements happening in South Orange. The bridge provides elevated views north and south of the river.

Looking south toward Chyzowych Field, the nearby dirt path and landscape is highly degraded and overgrown with invasive shrubs. Consideration should be given to renewing this landscape along with path access in coordination with the Village of South Orange.

1.12 REGULATORY and PLANNING

REGULATORY ISSUES

The project area is within the Rahway River watershed, which is classified as an FW2 non-trout stream by the New Jersey Department of Environmental Protection (NJDEP) (N.J.A.C. 7:9B). According to these rules, the designated uses for FW-2 waters are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

In addition to identifying the designated uses, the water quality classification in part determines the width of the riparian zone, the width of the wetlands transition area associated with wetlands that might drain to the surface water, and certain stormwater management requirements.

Development activities, such as the construction of a pedestrian walkway, paralleling or across the river will be regulated by the NJDEP in accordance with the Flood Hazard Area Control Act (FHACA) rules at N.J.A.C. 7:13 and the Freshwater Wetlands Protection Act (FWPA) rules at N.J.A.C. 7:7A. A summary of the types of activities that are either regulated or authorized (not-regulated) under both the FHACA and FWPA rules is provided in Appendix B.

The construction of a pedestrian trail within undeveloped (vegetated) areas that are within 50 feet of the top of bank of the Rahway River will require an FHACA Individual Permit. This permit will allow up to 1000 sq. ft. of disturbance within the 50 foot riparian zone; however, all disturbances would have to be compensated for at a 2:1 ratio; meaning that twice the area of disturbance would have to be replanted, also within 50 feet of the top of bank. The areas of pavement (parking lots and abandoned road) provide excellent opportunities for compensation and restoration of the riparian zone. Placing a pedestrian path at a distance of greater than 50 feet from the top of bank of the River in order to avoid disturbing the riparian zone would eliminate the need for a permit.

The flood hazard rules at N.J.A.C. 7:13-10.2(v) also provide for cases where an applicant proposes to redevelop areas that have been previously developed within 25 feet of the top of bank. Specifically, at N.J.A.C. 7:13-10.2(v)2, an applicant may construct a public walkway within 25 feet of the top of bank or edge of water. A walkway constructed within this area is permissible, provided it is constructed of permeable material where feasible. Furthermore, the remainder of the area within 25 feet of the top of bank or edge of water must be restored, stabilized and replanted with indigenous, noninvasive vegetation.

A Permit by Rule (PBR) at NJAC 7:13-7.2(b)2 will allow for "the removal of any lawfully existing structure, outside a floodway." This would apply to the removal of asphalt pavement within the riparian zone. This assumes that all "structure" is disposed of outside of the riparian zone and that all areas of asphalt removal would be properly stabilized and replanted with indigenous, non invasive plant species. This Permit by Rule does not allow for the construction of a pedestrian path. This PBR does not require any formal submittal to the NJDEP.

In accordance with N.J.A.C. 7:13-7.2(a)2, the construction of a trail at grade within a flood hazard area is authorized under Permits-by-Rule, as long as "no vegetation is cleared cut or disturbed within the riparian zone" and no disturbance occurs within 25 feet of the top of bank. Prior written notice to the NJDEP is required for activities under NJAC 7:13-7.2(a)2. This PBR would allow the construction of a trail within previously disturbed areas (such as lawns, gardens, gravel); however, the trail would have to be at least 25 feet distant from the top of bank.

In accordance with N.J.A.C. 7:13-11.8, a pedestrian footbridge can be constructed to span the Rahway River. This permit application requires that the structure be designed to carry only light vehicles, bicycles or pedestrians; that it be no more than 10 feet in width; that the floodway not be obstructed; the structure completely spans the river; and that the bottom chord of the bridge be above the elevation of the flood hazard area design flood elevation. A FHACA Individual permit would be required to authorize the construction of a pedestrian bridge.

A pre-application conference may also be scheduled with the NJDEP to discuss NJDEP permit requirements. Similar to the Applicability Determination, the applicant must submit preliminary plans and a project description. The NJDEP will typically schedule a meeting within one month of a meeting request.

FRESHWATER WETLANDS PROTECTION ACT RULES (NJAC 7:7A)

The freshwater wetlands protection act (FWPA) rules at NJAC 7:7A include a number of provisions that protect existing wetlands, wetland transition areas and State Open Waters (SOW). Based on our field investigation, the study area does not include any wetlands, and therefore neither would it include wetlands transition areas. However, the surface waters of the river will be regulated under the FWPA rules since they will be considered State open waters. No permit application would be required under the FWPA rules to construct a pedestrian path paralleling the State open waters, however, the construction of a pedestrian bridge spanning the river would require submission of an application for a General Permit 10A for "very minor road crossings."

Performance of an onsite, detailed wetland delineation and field survey of the wetland delineation, along with locating of the top of bank of the Rahway River, would more accurately establish the location of regulatory boundaries within the study area. The NJDEP is the ultimate arbiter with regard to state open water/wetland boundaries and the width of the wetland transition area, if any.

1.12 REGULATORY and PLANNING

SUMMARY

The river corridor is degraded as a result of channelization, filling and the construction of stone retaining walls. The riparian zone is degraded due to the loss of vegetation and proximity of structures, including buildings and asphalt surfaces, some of which are at the top of bank. Large diameter native and non native trees are currently growing along most of the immediate river banks. However, there are very few shrubs or tree saplings, and the invasive plant Japanese knotweed has colonized some locations, particularly where there is greater sunlight. Because of the lack of physical diversity, the river corridor provides limited aquatic or terrestrial habitat. The river has been disconnected from its floodplain and, based on our preliminary field investigation, there are no freshwater wetlands within the study reach.

Opportunities do exist for providing pedestrian paths, improving the riparian habitat and treating stormwater runoff. The extensive areas of pavement and degraded areas that occur abutting the top of the river bank at various locations can be redeveloped to provide various amenities including pedestrian pathways, riparian plantings and stormwater treatment.

The flood hazard area and riparian zone associated with the Rahway River will each be regulated under the FHACA rules. A FHACA Individual Permit will be required in order to develop vegetated areas or to redevelop impervious areas adjacent to the river. A FHACA Individual Permit would also be required in order to construct a pedestrian walkway over the river. The State open waters will be regulated under the FWPA rules; however, as the construction of a pedestrian pathway paralleling the river would not impact SOW, no permit should be required under this program. The construction of a pedestrian bridge spanning the river would require submission of an application for a GP 10A for a very minor road crossing.

An Applicability Determination or a pre-application conference should be scheduled with the NJDEP once a conceptual design has been developed.

SUMMARY OF WETLAND RULES & REGULATIONS & FLOOD HAZARD AREA CONTROL ACT RULES

The following types of activities are "regulated" within wetlands:

1. The removal, excavation, disturbance or dredging of soil, sand, gravel, or aggregate material of any kind;
2. The drainage or disturbance of the water level or water table so as to alter the existing elevation of groundwater or surface water, regardless of the duration of such alteration
3. The dumping, discharging or filling with any materials;
4. The driving of pilings;
5. The placing of obstructions, including depositing, constructing, installing or otherwise situating any obstacle which will affect the values or functions of a freshwater wetland; and
6. The destruction of plant life which would alter the character of a freshwater wetland, including killing vegetation by applying herbicides or by other means, the physical removal of wetland vegetation, and/or the cutting of trees.

The following types of activities are "regulated" within wetland transition areas:

1. Removal, excavation, or disturbance of the soil;
2. Dumping or filling with any materials;
3. Erection of structures;
4. Placement of pavements; and
5. Destruction of plant life which would alter the existing pattern of vegetation.

The following activities are authorized (not regulated) in wetlands:

1. Surveying or wetlands investigation activities, for the purpose of establishing or reestablishing a boundary li or points, which use only hand held equipment and do not involve the use of motorized vehicles;
2. The placement of temporary structures (such as observation blinds, waterfowl blinds, artificial nesting structures, or sign posts) for observing, managing, or harvesting fish or wildlife
3. Placement of one or more small guy anchors that screw into the ground to secure a guy wire supporting a utility pole;
4. Hand trimming of trees or other vegetation, provided the trimming does not alter the character of the freshwater wetland; and
5. The driving of one or more pilings in a State open water, if the pilings are not regulated by the ACOE under the Federal 404 program.

The following activities are authorized (not regulated) in wetland transition areas:

1. Mowing of existing lawns. The conversion of a field to a lawn by planting, seeding, frequent mowing or any other means requires a transition area waiver;
2. Maintenance of existing fields;
3. Pruning of trees and shrubs;
4. Selective cutting of trees;
5. Replacement of existing non-native plants with either native or non-native species that will not significantly change the character of the existing vegetational community of the transition area; and,
6. Limited supplemental planting of non-native plant species that will not significantly change the character of existing vegetational community of the transition area. The creation of a lawn is not considered supplemental planting;
7. Planting of native species, that is, plants naturally occurring in transition areas in the local region, (the count agricultural agent may be consulted to obtain information regarding these species);
8. Continued cultivation of existing gardens; and the development of new gardens provided that the new gard is:
   (A) No larger than 2,500 square feet in size;
   (B) Located in a non-forested transition area; and
   (C) Located in a transition area not subject to a conservation restriction or easement; and
9. Maintenance of artificial features including the repair, rehabilitation, replacement, maintenance or reconstruction of any previously authorized, currently serviceable structure, lawfully existing prior to July 1, 1

The following types of activities are "regulated" within the flood hazard area and riparian zone:

1. The alteration of topography through excavation, grading and/or placement of fill;
2. The clearing, cutting and/or removal of vegetation in a riparian zone;
3. The creation of impervious surface;
4. The storage of unsecured material;
5. The construction, reconstruction and/or enlargement of a structure; and
6. The conversion of a building into a private residence or a public building.

1.12 REGULATORY and PLANNING

SUMMARY OF WETLAND RULES & REGULATIONS & FLOOD HAZARD AREA CONTROL ACT RULES (CONTINUED)

The FHACA rules at NJAC 7:13-7.2(b)1 allow the disturbance of vegetation in a riparian zone for "normal property maintenance," including:

1. Pruning;
2. Selective tree cutting;
3. Planting indigenous, non-invasive vegetation;
4. Maintaining a field, lawn, park and/or easement that was lawfully established prior to October 2, 2006, and that has been maintained (such as through periodic mowing) since that date;
5. The removal of trash, debris and dead vegetation by hand; and
6. Maintaining a garden that was lawfully established prior to October 2, 2006.

Normal property maintenance does not include:

1. Mowing an area that was not lawfully mowed prior to October 2, 2006, or which was lawfully mowed prior to this date but has since been allowed to revert to its natural vegetative state;
2. Removing vegetation to create a new lawn, garden, field or park;
3. Burning vegetation;
4. Applying herbicide;
5. Grading and other changes in topography; and,
6. Constructing structures, or placing fill or impervious surfaces.

1.13 SITE ANALYSIS - OPPORTUNITIES and CONSTRAINTS

CONTRAINTS

- Private property along the river between Oakland Road and Jefferson Avenue limits direct visual and physical access in several locations.
- The NJ transit rail line divides the river in half and presents a visual and physical barrier from east to west along the river.
- The 50 foot riparian buffer measured from top of river bank has many areas of impervious surface. The combination of building and pavements along the river result an increase of untreated storm water draining directly into the river.

  This results in an increase in flow velocity and volume during storm events causing streambed \ scouring, erosion and a degraded ecosystem.

  Untreated surface water from impervious surfaces contains dirt, litter, road salt, pesticides, hydro carbons and larger debris during large storm events. this is known as non-point source pollution.
- Opportunistic invasive plant species are abundant due to degraded soils, river banks, steep slopes and ecological imbalance.
- Under utilized space exists in the Chyzowych Field area with some access to the river.
- Stormwater runoff from the parking areas along the river contribute to visual and physical degrada tion of the river banks.
- Erosion of the riverbed is resulting in undermining of the foundations of the river wall as well as areas of development that extend up to the walls.

OPPORTUNITIES

- Is a visible water body running through heart of a the township with people living and working all around.
- The east branch of the river is an important part of the larger rahway watershed system.
- The river corridor contains existing remnant woodlands within a developed area which is key to renewing the biodiversity within an ecosystem.
- The river is easily accessible by pedestrians and bicyclists and has the potential to connect to future pedestrian and bicycle paths for recreational use and alternative transporation.
- Many properties directly adjacent to the river are within the public domain.
- Opportunity to connect learning to ecological and community restoration through educational programs for local grade school and high school students.
- Opportunity to restore the riparian zones along the river for the benefit of the township residents and the local ecosystem.
- Restoring a historical sense of place the flowing river provided for generations in Maplewood.

1.14 CASE STUDIES

There are several on-going and built projects regionally and nationwide that illustrate the possibilities of ecological restoration and design associated with urbanized streams, rivers and drainage courses. The successful ones incorporate a mix of pedestrian access via walking paths, bike routes and overlooks with native vegetation to increase interaction and beautification through natural resources. These projects bring together communities and revitalize natural spaces/places in often forgotten, neglected and under-utilized areas by adding new 'fabric' to existing and built-up communities.

These projects are and can be catalysts for new community development and property appreciation by providing direct access to naturalized spaces for recreation and community interaction that is sorely lacking in many urbanized settings. The end results are more vibrant communities, cleaner air and water, increased wildlife and aesthetically pleasing open spaces and corridors.

ROCKEFELLER PARK - CLEVELAND, OH

Is an Master Plan to study improved access to existing natural and restored site throughout the city while improving watershed conditions that cause degradation of urban streams and tributaries.

Source: www.ASLA.org

FLOYD FORKS GREENWAY - LOUISVILLE, KY

Is an ongoing study to provide access to parkland watershed wetlands and streams while simultaneously restoring degraded watershed ecosystems.

Source: www.ASLA.org

1.14 CASE STUDIES

ATLANTA BELTLINE - ATLANTA, GA

Is an ongoing greenways project connecting under-utilized public and private spaces throughout greater urban Atlanta. The project seeks to provide alternative transportation and recreational opportunities while improving ecological and man-made landscapes.

Before & After

Source: www.beltline.org

Before & After

NINE MILE RUN - PITTSBURGH, PA

Is an ongoing ecological restoration project including stream restoration, wetland restoration and public access in conjuction with the Army Corps.

Before & After

Source: Images courtesy of Nine Mile Run Rivershed Association

Before & After

PART 2 - RECOMMENDATIONS FOR IMPROVEMENTS

2.0 CONCEPT / PROJECT GOALS

SUMMARY

The concept for the Rahway River Study in Maplewood seeks to reingage the local citizens of Maplewood and adjacent towns to their historic river valley. This can be accomplished by providing passive (and some active) access in the forms of walking paths, biking lanes, a community garden, a series of scenic overlooks and ecological restoration of native plant communities and wildlife habitat. Inclusion of interpretitive signage throughout the river corridor can also reinforce points of interest regarding cultural, educational and environmental history of past and present river uses.

The concept also seeks to provide a connection of movement between Southlands Waterlands Park & Playground green spaces in South Orange and Memorial Park green space in Maplewood through biking and walking opportunities. Future connection to Millburn and South Mountain Preserve is also possible with future bike lanes.

GOALS

- Enhance aesthetic & ecological value of river banks
- Determine how land use zones impact the river corridor
- Evaluate regulatory constraints for proposed site improvements
- Enable safe, appropriate public access to the river
- Identify safe and appropriate routes where river access is not feasible
- Study opportunities for scenic overlooks at river crossing points or along river
- Recapture under utilized public spaces
- Look for opportunities for continuous and contiguous recreational and passive activities along the river
- Create environmentally sensitive guidelines for river beautification
- Create a unified river corridor aesthetic and associated wayfinding signage
- Develop creative solutions for stewardship

BOARD OF EDUCATION PARKING LOTS

Key areas of the Concept Plan focus on realignment of the BOE parking lots adjacent to the Rahway River to reduce paved surfaces within the 50 feet riparian buffer (thereby improving stormwater runoff) to make room for river access paths and revegeation. Meetings were held with the Board of Education to determine how reducing the amount of existing parking spaces will affect their operations and demonstrate the benefits of improving the riparian ecosystem. This study should be considered a work in progress whereby a final design of the study area will be determined with continued input from all levels of the community. The Concept Plan presented in this study emphasizes the goals stated in our scope of work to enhance the aesthetic and ecological value of the river. This results in reduced parking that allows for introduction of new access paths, stormwater runoff treatment through vegetated rain gardens and a stabilized river bank.

Memorial Park, Maplewood, N.J.

Rahway RIver Restoration, South Orange, N.J.

2.1 OVERALL CONCEPT PLAN

Overlook w/ seating & signage

Planted Rain Garden w/in 50' Riparian Buffer

Restored Riparian Edge Planting (typ.)

Overlook w/ seating & signage

Future Bike Route

Walking Path

Planted Rain Gardens with native perennials, trees and shrubs (typ.)

New B.O.E. Parking Lot Layout with 44 parking spaces

New B.O.E. Parking Lot Layout w/ 74 spaces

Pedestrian Bridge over Rahway River

Planted Rain Gardens with native perennials, trees and shrubs (typ.)

Overlook w/ seating & signage

Planted Rain Gardens with native perennials, trees and shrubs (typ.)

Overlook w/ seating & signage

Community Garden

New B.O.E. Parking Lot Layout w/ 34 parking spaces, 17 bus spaces and 6 van spaces

Future bike lane

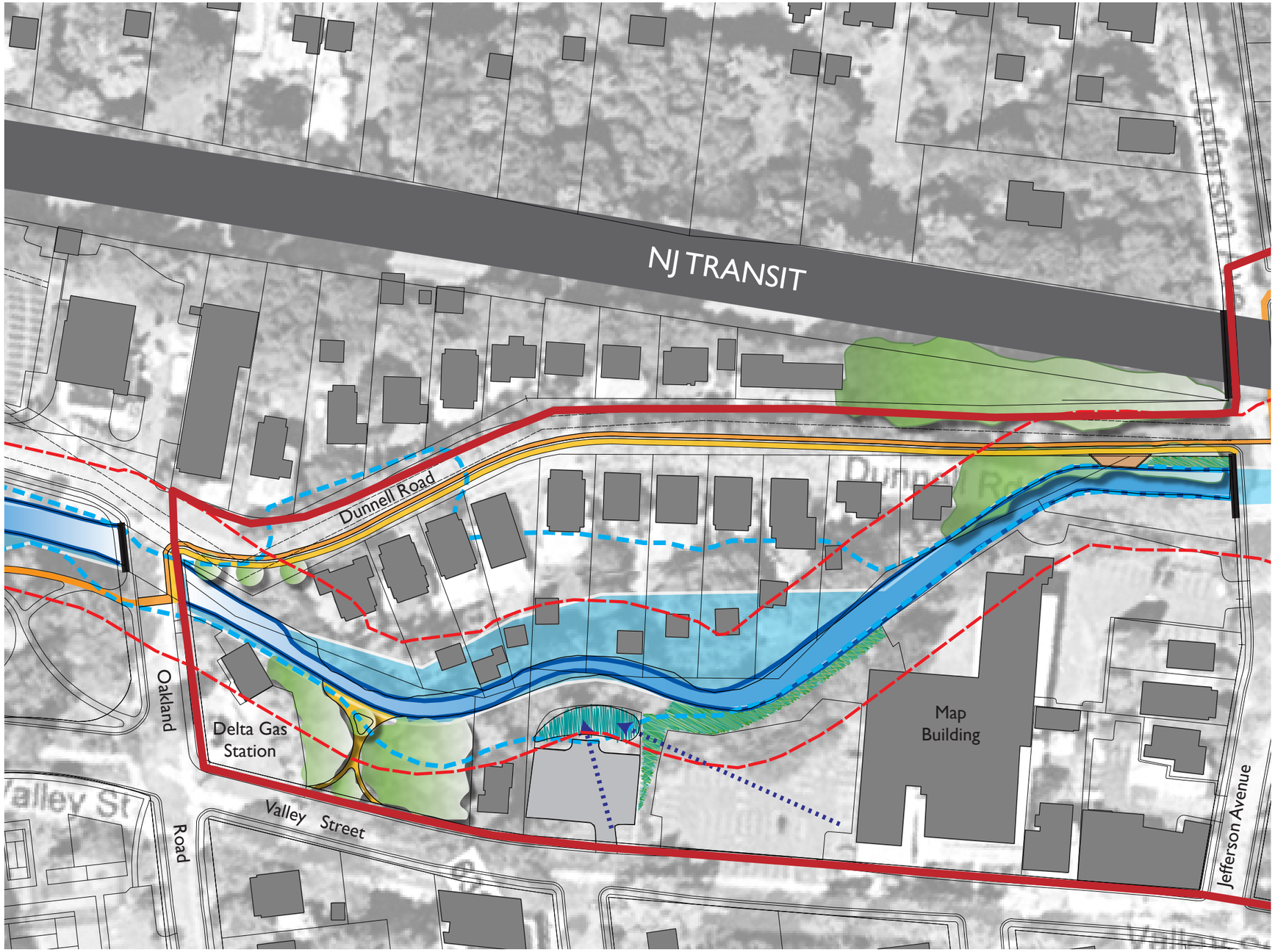
200 feet

2.2 CONCEPT PLAN - OAKLAND ROAD to JEFFERSON AVENUE

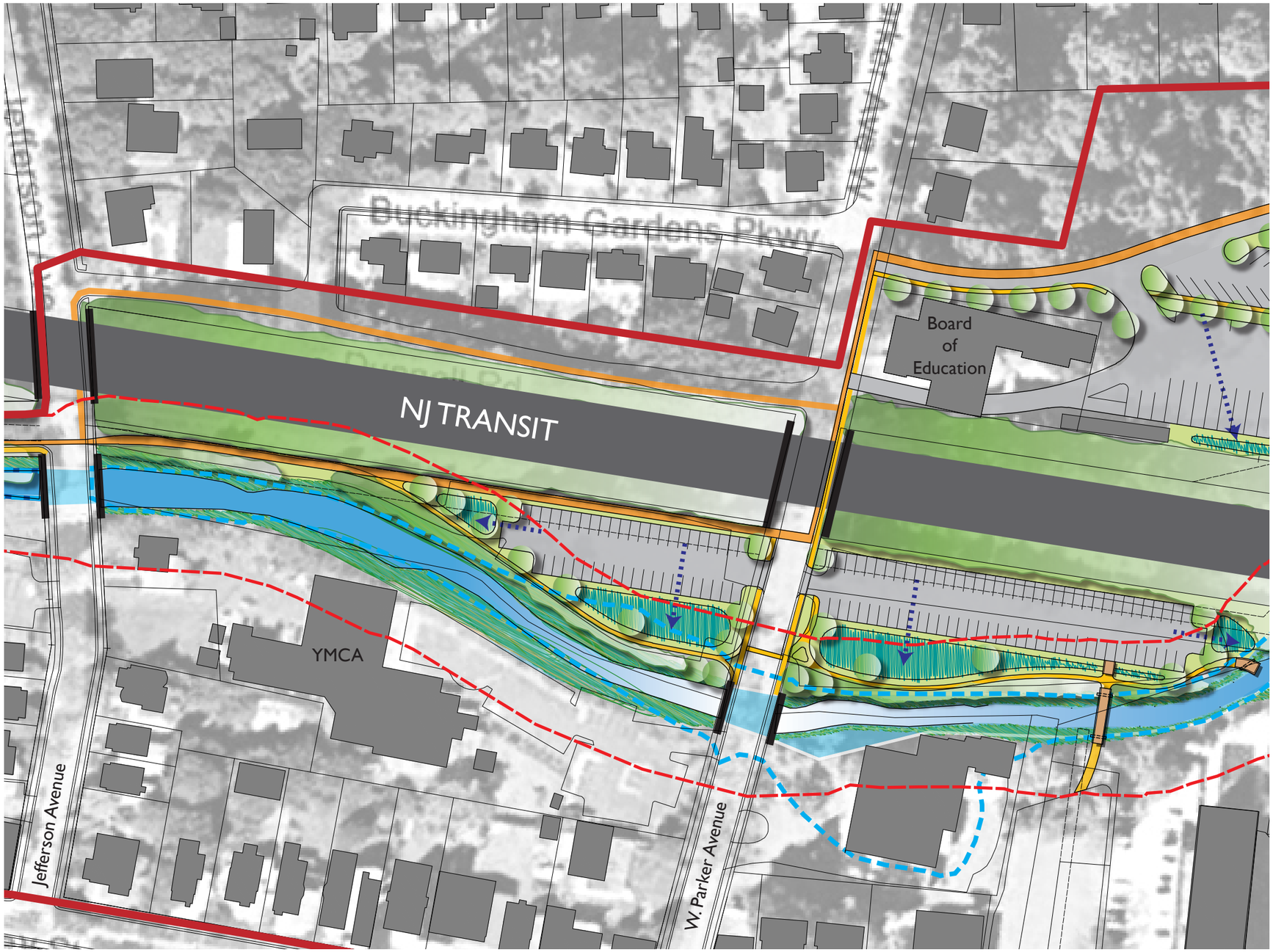
LEGEND

- Area of Study
- River
- Lawn
- Vegetated Rain Garden
- Steep slope planting/stabilization
- Restored Vegetation
- Community Garden
- Reconfigured Parking Lots
- Bike Route
- Walking Path
- Railroad / Barrier
- Bridge Abutment
- Stone River Walls
- 50' Riparian Buffer
- Approximate100' Year Flood
- Approximate Floodway
- Surface Drainage
- Garden Shed
- Footbridge / Overlook

100 feet



2.3 CONCEPT PLAN - JEFFERSON AVENUE to WEST PARKER AVENUE



LEGEND

- Area of Study
- River
- Lawn
- Vegetated Rain Garden
- Steep slope planting/stabilization
- Restored Vegetation
- Community Garden
- Reconfigured Parking Lots
- Bike Route
- Walking Path
- Railroad / Barrier
- Bridge Abutment
- Stone River Walls
- 50' Riparian Buffer
- Approximate100' Year Flood
- Approximate Floodway
- Surface Drainage
- Garden Shed
- Footbridge / Overlook

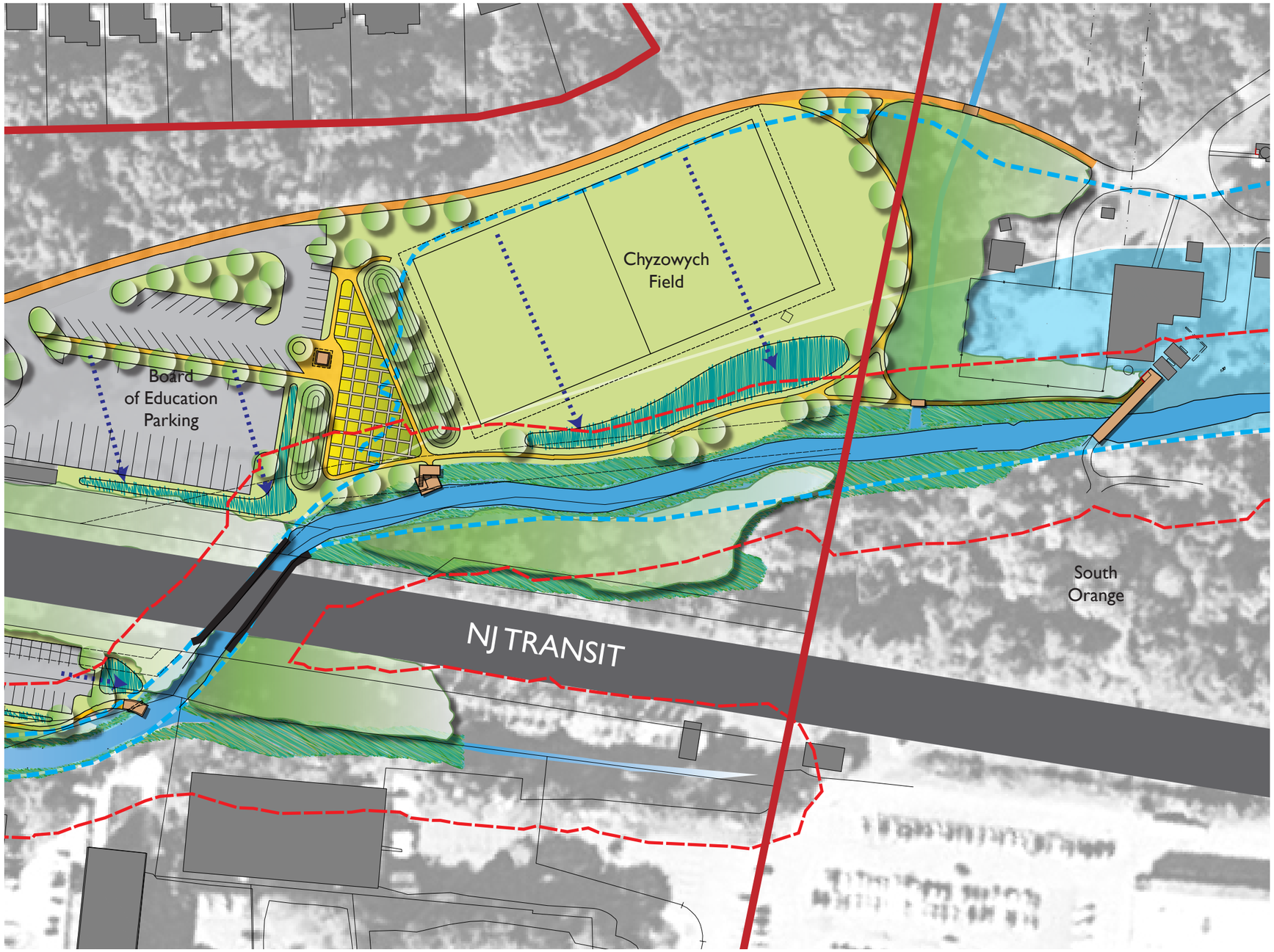
50 feet

2.4 CONCEPT PLAN - B.O.E. and CHYZOWYCH FIELD

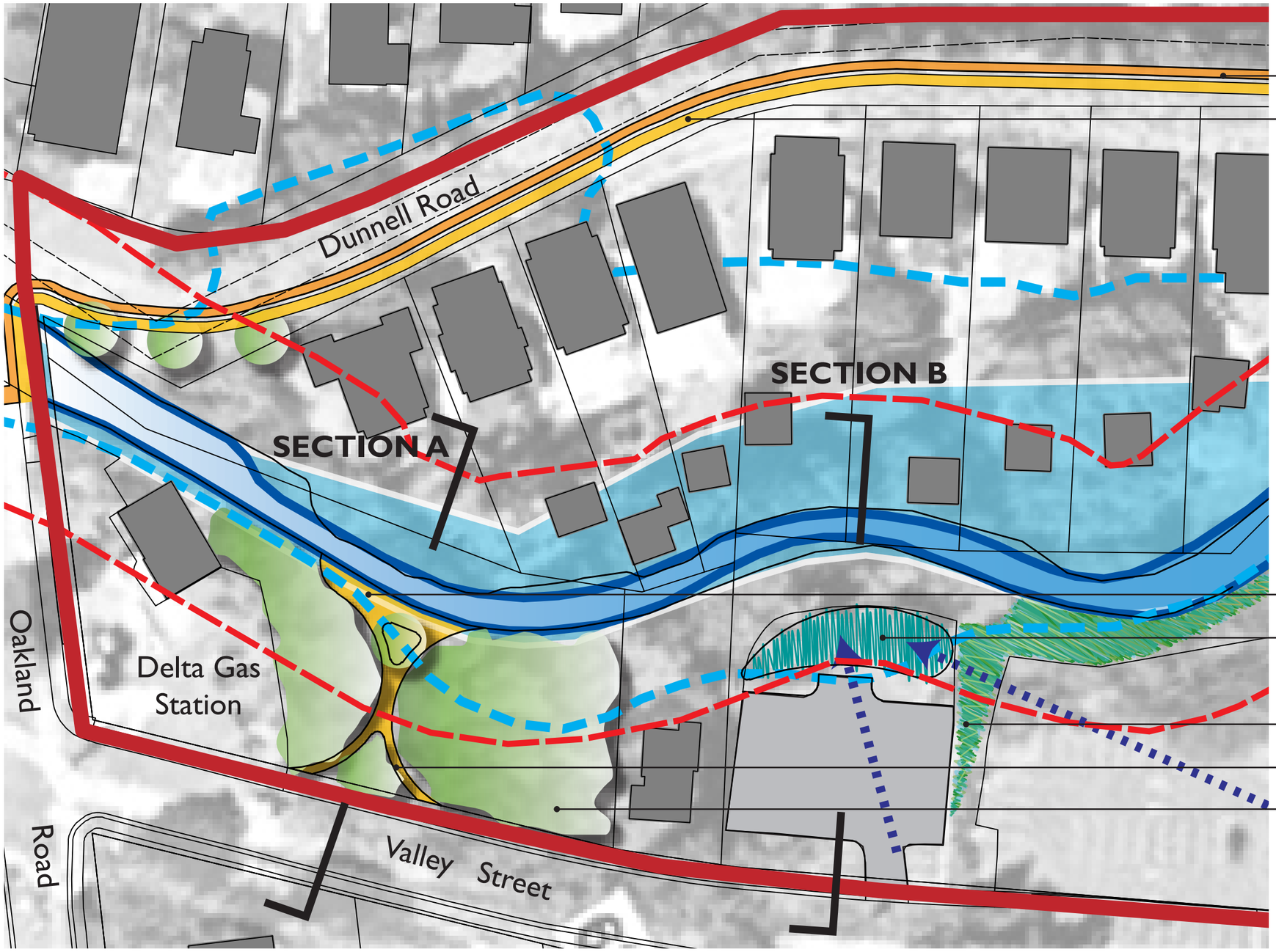
LEGEND

- Area of Study
- River
- Lawn
- Vegetated Rain Garden
- Steep slope planting/stabilization
- Restored Vegetation
- Community Garden
- Reconfigured Parking Lots
- Bike Route
- Walking Path
- Railroad / Barrier
- Bridge Abutment
- Stone River Walls
- 50' Riparian Buffer
- Approximate100'Year Flood
- Approximate Floodway
- Surface Drainage
- Garden Shed
- Footbridge / Overlook

100 feet



2.5 CONCEPT PLAN ENLARGEMENT - MAP BUILDING and DUNNELL ROAD



Future Bike Route

Existing Sidewalk / Path

Overlook Area with seating & signage

Planted Rain Garden (typ.)
- remove 25 feet of pavement and plant native perennials, trees, shrubs

Restored Riparian Planting

Walking Path (typ.)

Restored Riparian Forest

50 feet

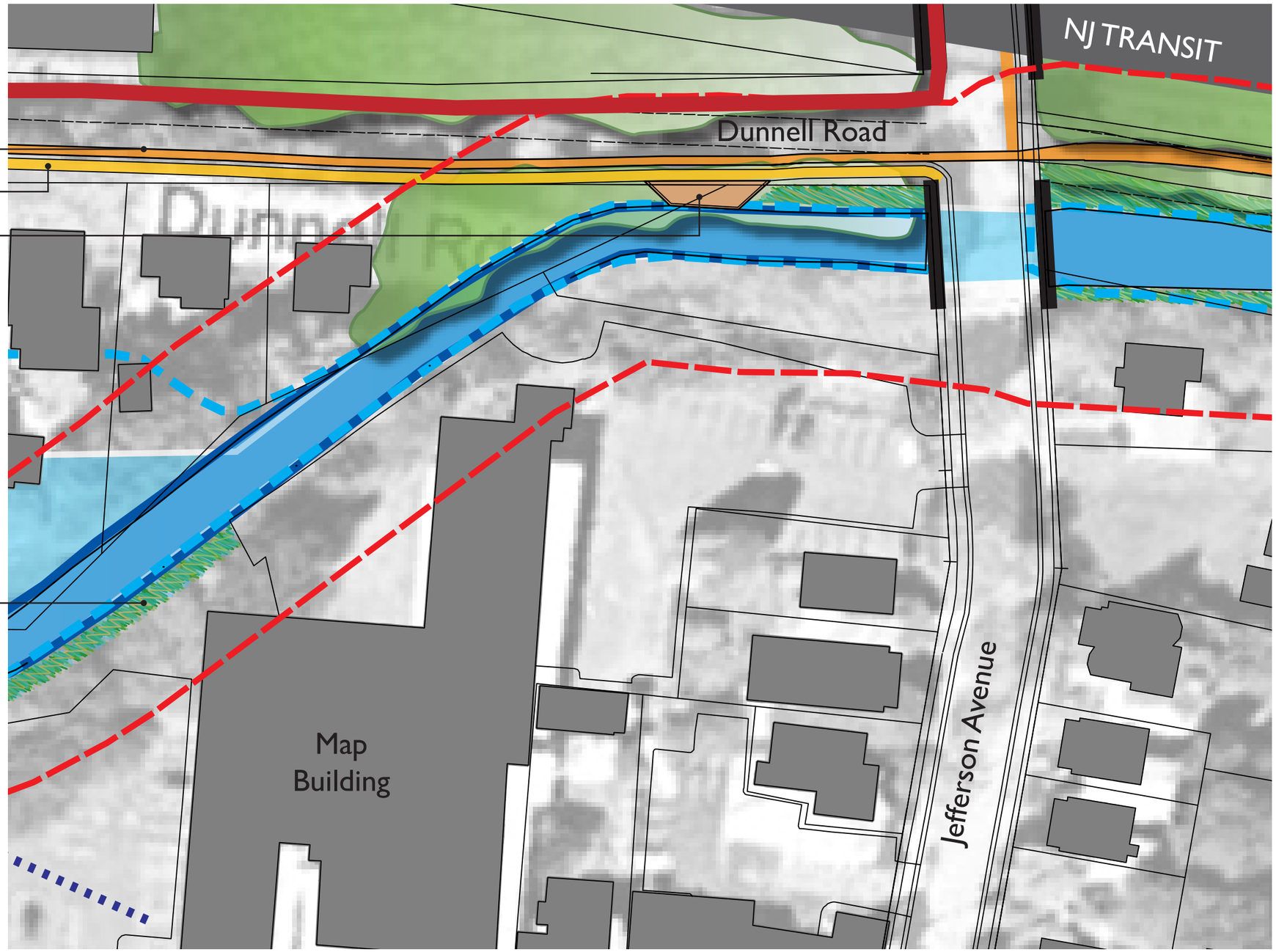
2.5 CONCEPT PLAN ENLARGMENT - MAP BUILDING and DUNNELL ROAD

Future Bike Route

Existing Sidewalk / Path

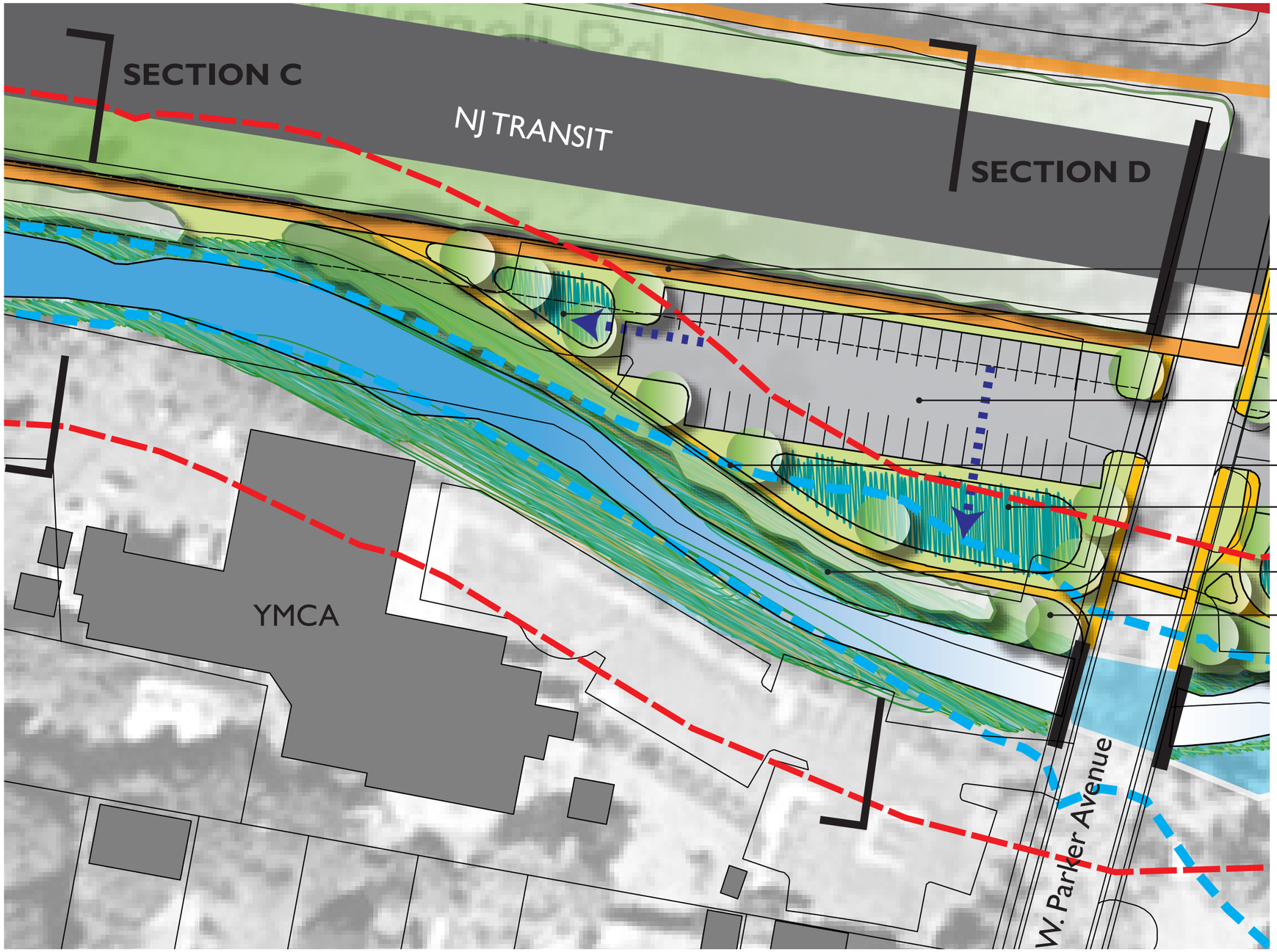
River & Garden Overlook Structure
- wood and steel construction

Restored Riparian Planting



50 feet

2.6 CONCEPT PLAN ENLARGEMENT - SOUTH B.O.E. PARKING LOT



Future Bike Route

Planted Rain Garden (typ.)
- native perennials, trees, shrubs

New B.O.E. Parking Lot Layout
- 44 car parking spaces

Walking Path (typ.) - 4 feet wide

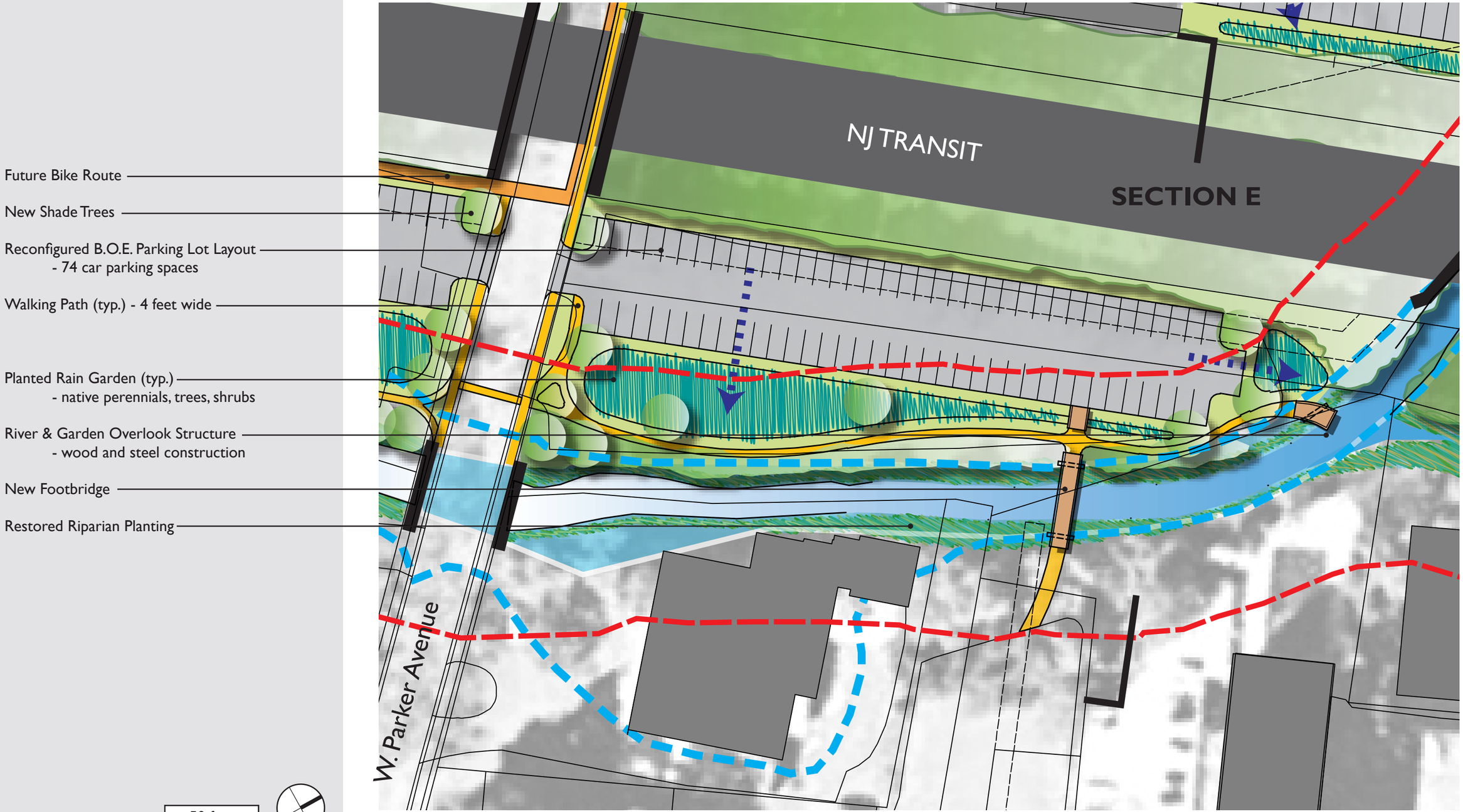
Planted Rain Garden (typ.)
- native perennials, trees, shrubs

Restored Riparian Planting

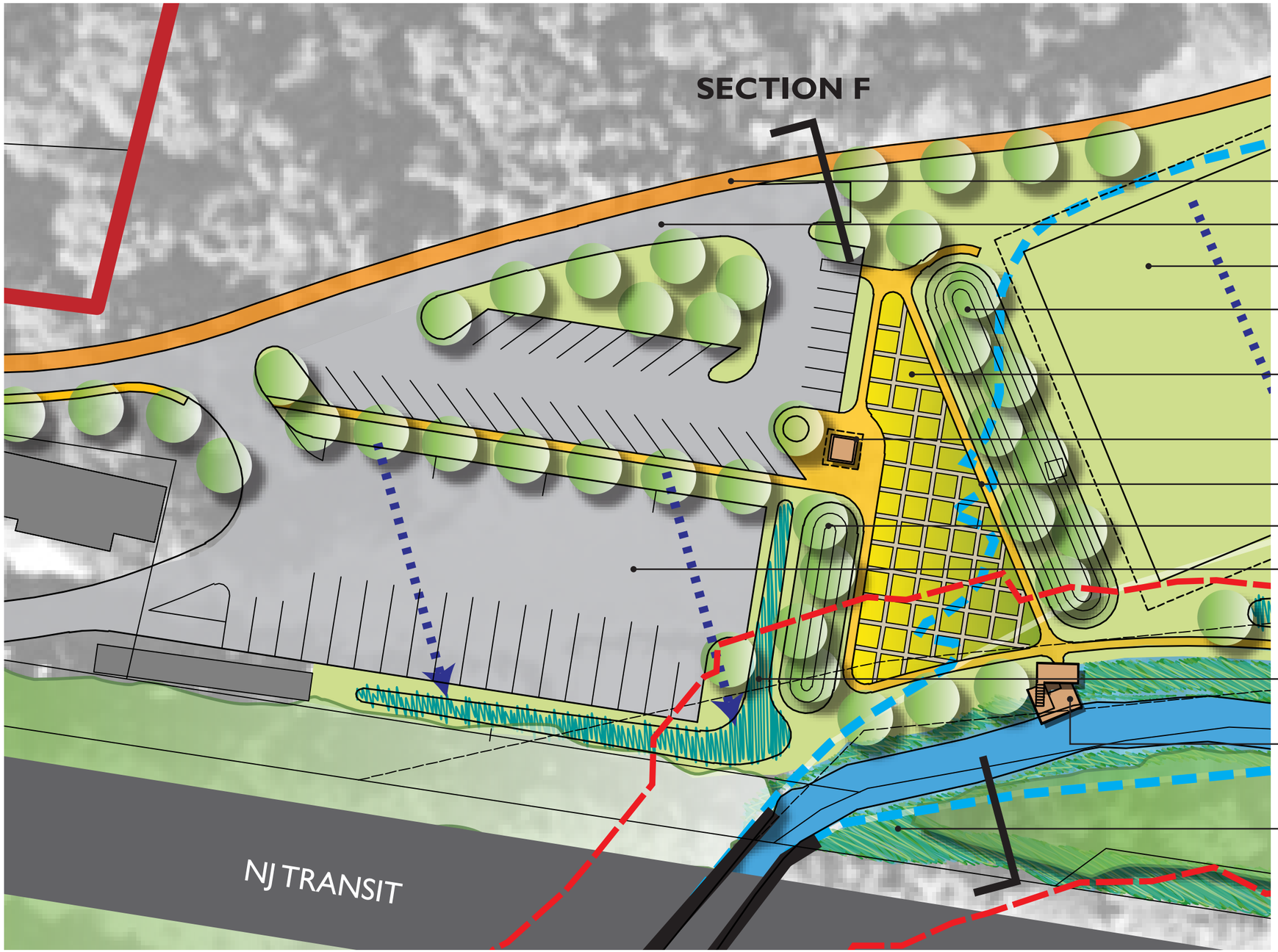
New ShadeTrees

50 feet

2.7 CONCEPT PLAN ENLARGEMENT - NORTH B.O.E. PARKING LOT



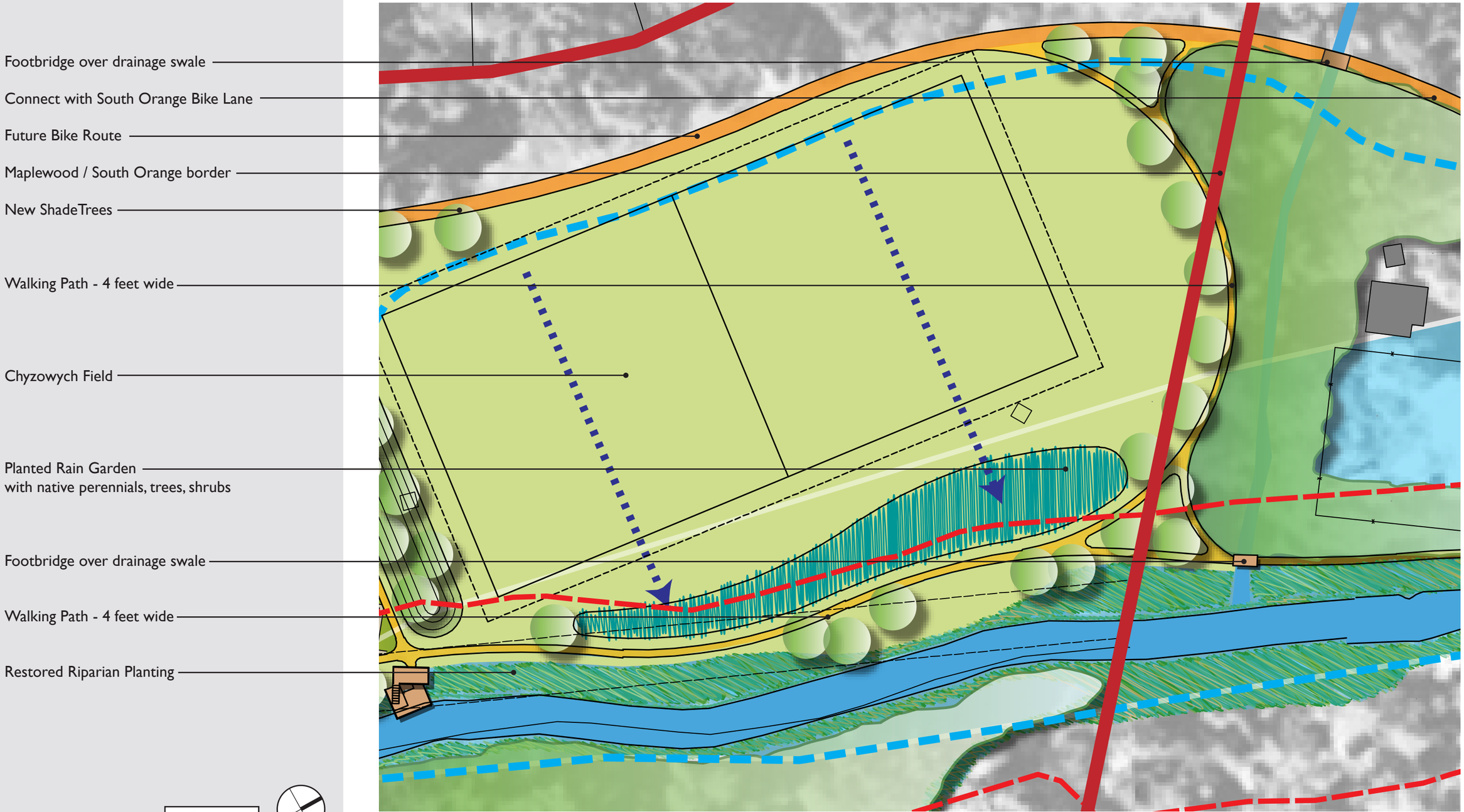
2.8 CONCEPT PLAN ENLARGEMENT - COMMUNITY GARDEN / B.O.E. PARKING LOT



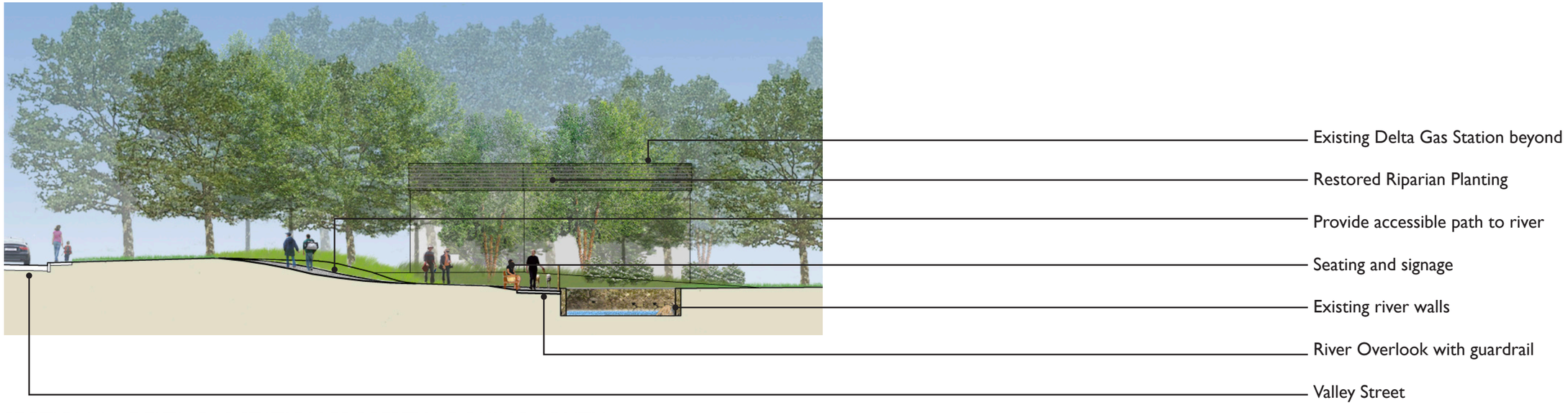
- Future Bike Route
- Repaved Access Lane
- Chyzowych Field
- Landscape Berm w/ planting
- Community Garden Plots
- Community Garden Shed
- Walking Path (typ.) - 4 feet wide
- Landscape Berm w/ planting
- New B.O.E. Parking Lot Layout
  - 34 car parking spaces
  - 17 large yellow bus parking spaces
  - 6 small bus / van parking spaces
- Planted Rain Garden (typ.)
  - native perennials, trees, shrubs
- River & Garden Overlook Structure
  - two levels
  - wood and steel construction
- Restored Riparian Planting

50 feet

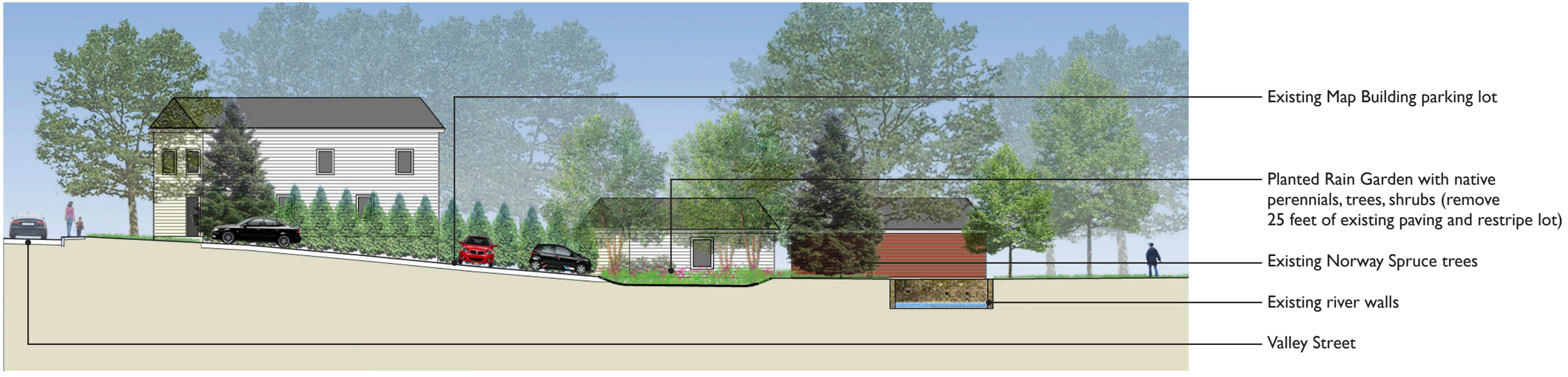
2.9 CONCEPT PLAN ENLARGEMENT - CHYZOWYCH FIELD



2.10 CONCEPT CROSS SECTIONS



SECTION A - DELTA GAS STATION PROPERTY LOOKING SOUTH

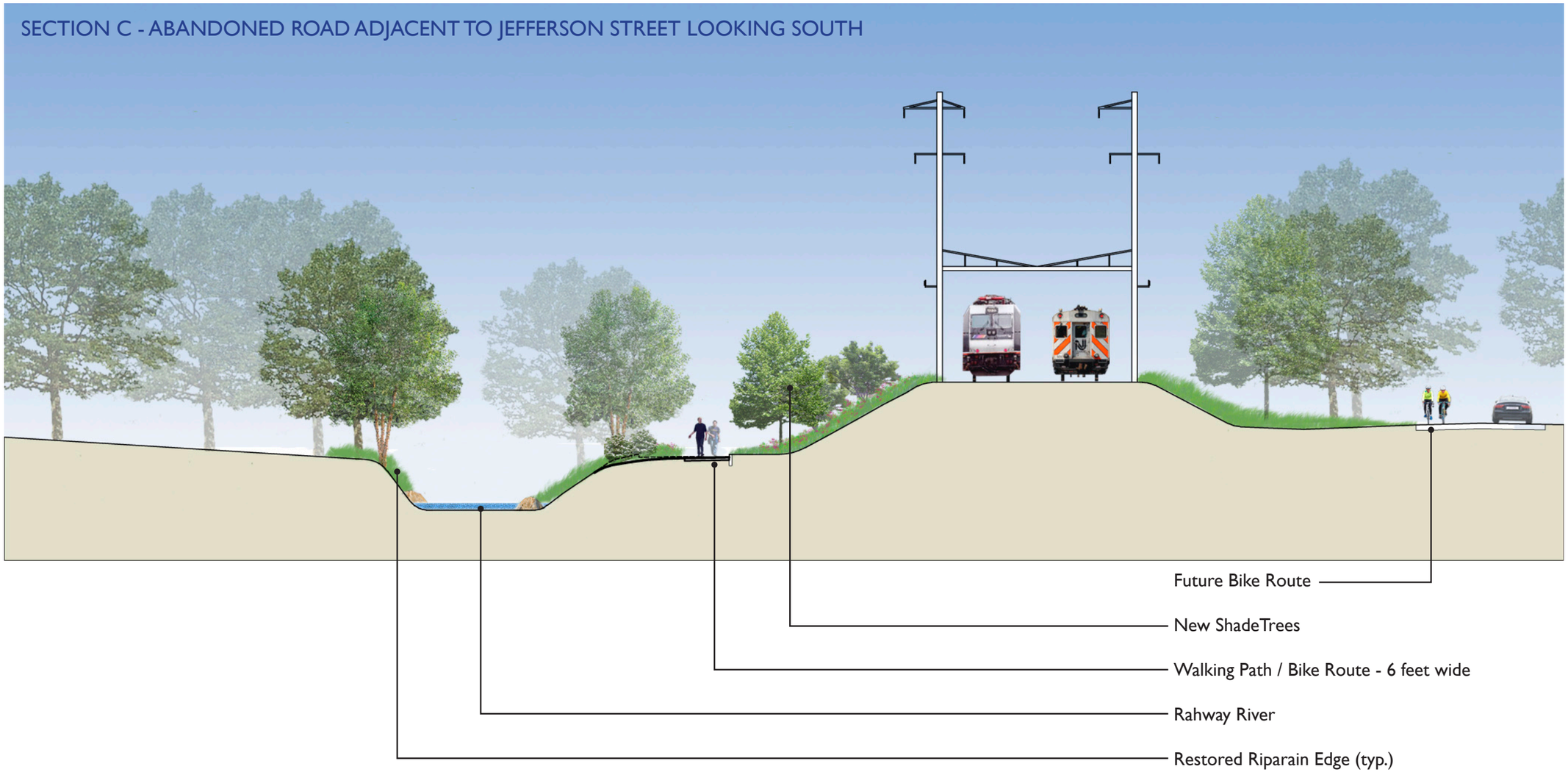


SECTION B - MAP BUILDING PARKING LOT LOOKING SOUTH

20 feet

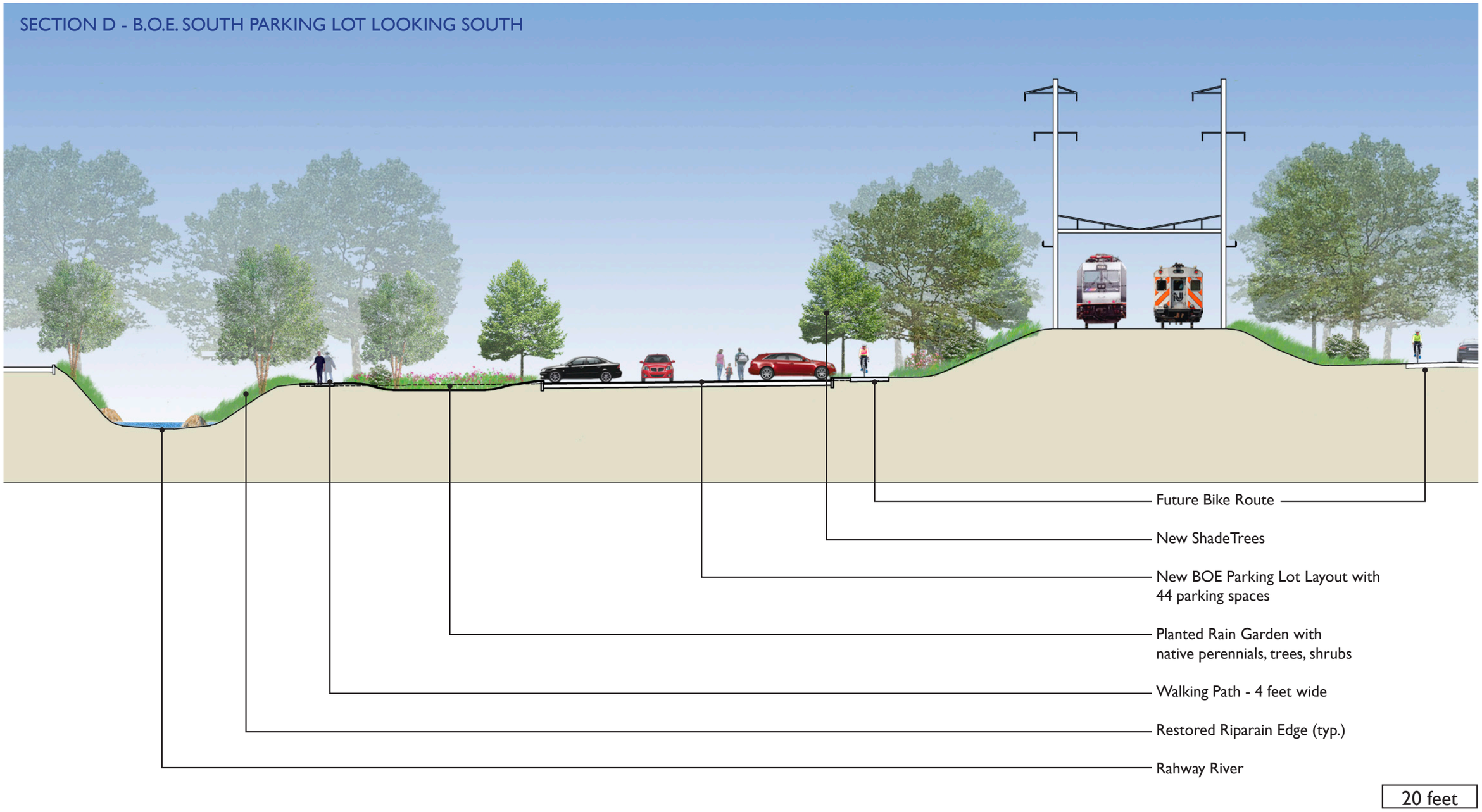
2.10 CONCEPT CROSS SECTION

SECTION C - ABANDONED ROAD ADJACENT TO JEFFERSON STREET LOOKING SOUTH



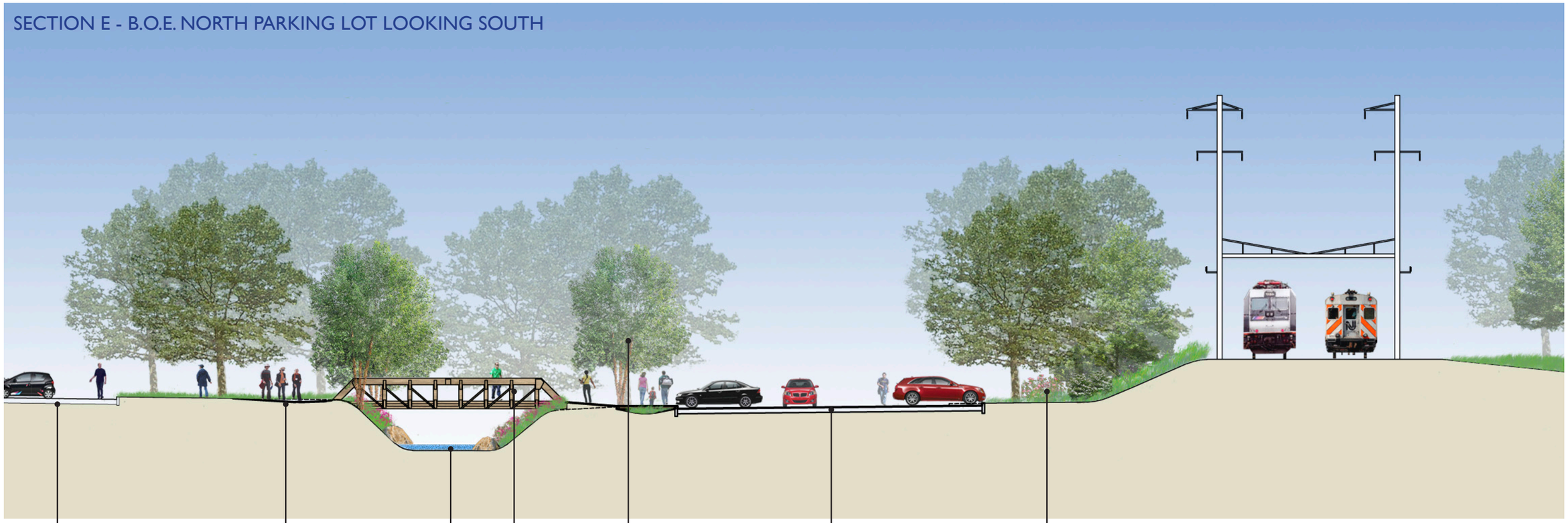
2.10 CONCEPT CROSS SECTION

SECTION D - B.O.E. SOUTH PARKING LOT LOOKING SOUTH



2.10 CONCEPT CROSS SECTION

SECTION E - B.O.E. NORTH PARKING LOT LOOKING SOUTH



Restored Riparain Edge (typ.)

New BOE Parking Lot layout with 74 parking spaces

New ShadeTrees

Pedestrian Bridge over river

Rahway River

Walking Path

Existing BOE Parking Lot

20 feet

2.10 CONCEPT CROSS SECTION

SECTION F - COMMUNITY GARDEN LOOKING SOUTH

2.11 MATERIALS - BRIDGES and INFRASTRUCTURE

INFRASTRUCTURE

These heavily trafficked areas of the site require materials that can withstand heavy traffic from pedestrians and bicyclists. These materials are an opportunity to recognize and reinforce building practices found locally. and introduce architectural elements into the design at points of interest along the river.

Source: http://www.wyomingcountyny.com/Pedestrian_BridgeLsp.jpg

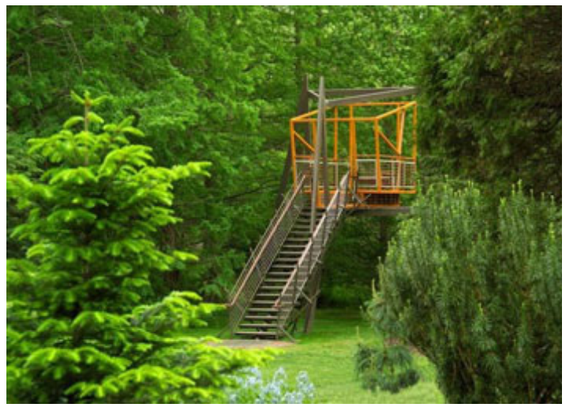
Steel span footbridge

Source: http://www.moosmanbridge.com

Wood, steel and cable span footbridge

Source: http://asla.org

Wood span footbridge



Source: http://farm1.static.flickr.com/85/236011551_5f9a92530b1.jpg

Tree Overlook at Morris Arboretum, Philadelphia, PA

Source: http://www.chronicle.com

Overlook at Mattabeseck Audubon Society, Portland, CT

Source: Design by Edgewater Design, LLC

Wood and steel footbridge in Princeton, NJ

RIVERINE EDGE

These materials must be selected to withstand the most frequent flooding on-site while also being a natural barrier between seating and walkings areas and the riverbank. These materials should be beautiful, natural and resistant to flooding.

Source: http://upload.wikimedia.org/wikipedia/commons/9/97/Riprap.jpg

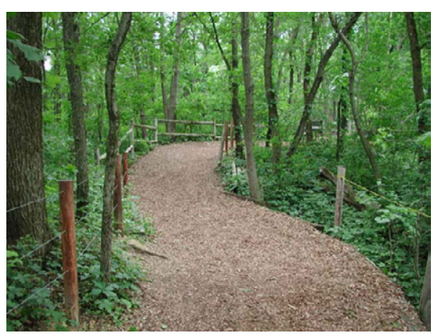
Rip Rap stone

Source: Michael Lipko

Soft gravel path

Source: Edgewater Design

Boulders and rock seats and bridges



Source: http://www.ncaonline.org

Soft mulch path

2.11 MATERIALS - COMMUNITY GARDEN and SIGNAGE

COMMUNITY GARDEN

Space exists within the plan to develop a community garden for local residents without the yard space to grow their own food. This is an ideal opportunity to create a focal point along the river as well as community interaction featuring local food, therapuetic gardeneing and programs for adults and children.

Source: http://godetia.com/dirt/community-garden4.jpg

Fort Mason Community Garden, CA

Source: http://commondatastorage.googleapis.com/static.panoramio.com/photos/origi-

Metal planter and raised beds, Emeryville, CA

Source: http://www.southernpines.net/client_resources/recreation/seniors/pictures/

Southern Pines Community Garden, NC

Source: http://www.peripheryprojects.com

Wood and steel rod tunnel - Welsyan University, NY

EDUCATION and WAYFINDING

The opportunity for locating interpretive and wayfinding signage along the Rahway River Corridor can aide in educating the community to the merits of ecological conservation and restoration. Wayfinding signage can help direct people through the preserve and to highlights and path experiences.

Source: http://sightworksexhibits.com

Plant Signage

Source: Michael Lipko

Interpretive Signage - Historical

Source: http://www.naturalkansas.org

Trail Signage

Source: http://www.taylorstudios.com

Educational Signage

Source: http://uvtrails.files.wordpress.com

Bike Trail Signage

2.12 COMPONENTS and LANDSCAPE RESTORATION

GENERAL DESIGN GUIDELINES FOR PATH DEVELOPMENT

The objective of the proposed improvements is to encourage active and passive recreational activity along the river and foster responsible use. The primary goal of management is to confine the impacts of the path to the path itself. The strategies to accomplish this are both physical, as well as programmatic.

A great path or trail is memorable and worth returning to year after year, season after season. The most successful paths are those that were purposefully planned to foster a rich visitor experience and interaction within a landscape setting. The well-maintained path is especially successful. The Rahway River corridor paths and associated amenities should comprise a system that affords access and influences the nature of the visitor's experience.

As the plan for the path and amenities are refined and implemented over time the following guidelines should be met:

- Create well-defined trail heads that have good connections
- Provide access points and gateways to adjacent neighborhoods and schools including South Orange
- Has points of interests and destinations along the path
- Is well demarcated and signed for safe and easy navigation
- Allows for ease of maintenance and up keep over time and seasons

PATH FEATURES

The proposed path features may include signage, maps, benches, overlooks, foot bridges, sculpture and landscape restoration.

- Trail heads are the welcoming entrances to the path. This is where visitor information about use and destinations is available. Controlled access of bicycles to the path is necessary at trail heads.

  Two materials are proposed for the path surfaces:

  1. Foot bridges - sturdy and durable wood such as cedar, ipe or mahongany. Steel may be utilized for longer spans.
  2. Compacted Stone fines or gravel which are permeable and bituminous asphalt in high use areas outside the riparian zones.

- Residents who presently utilize the Rahway River corridor will enjoy new overlooks and river access for birdwatching and scenic views.

HABITAT RESTORATION & LANDSCAPE MANAGEMENT

"Restoration is not a one time thing, any more than raising a child is." - Leslie Sauer, Andropogon Associates

The development of the Rahway River corridor will result in opportunities to improve the ecological aesthetic of the area immediately adjacent to the river and its amenities; raise awareness of regional native plant species; and increase the biodiversity of the land. The "restoration" of the landscape will be incremental, just as it has been throughout the history of the land, by managing the process of ecological succession.

"Ecosystem integrity and function set the necessary conditions for biodiversity to flourish by achieving stability." (Dennis Martinez, Society for Ecological Restoration, 1995)

The Rahway River only partially resembles the typical Piedmont physiography, especially along the Rahway River edge. Invasive plants species have taken over and buildings and pavement are fully within the riparian zone. The restoration / landscape strategies in these areas, therefore, cannot use a former state as a model. Rather, the successful landscape restoration plan must reflect current conditions of soil, availability of moisture, and exposure in conjunction with the policies that affect the daily operations of the river corridor.

This plan outlines several typical conditions for the Rahway River corridor and suggests a set of Landscape Design and Management Principles as outlined below:

LANDSCAPE DESIGN AND MANAGEMENT GUIDELINES

- Consider undertaking soil reworking and massive planting efforts only where the landscape is in collapse, overwhelmed by non-native invasive species, or extensively eroded.
- Specify native plant species. Wherever possible, contract grow plant material from local seed. Utilize native plant species that may be missing from the area where they are appropriate.
- Do not displace or modify any relatively healthy natural system.
- Minimize disturbance to any natural area.
- Reestablish natural drainage patterns and hydrologic regimes where they have been disturbed.
- Establish missing links and provide connectivity, such as forest edges where possible.
- Use the NJDEP rules regarding riparian zones and transition areas.

2.13 GRANT FUNDING OPPORTUNITIES and NEXT STEPS

Restoration of natural systems along the Rahway River in Maplewood could be a significant capital investment over time. Fortunately some of these costs could be covered with grant money. An investigation into available grants revealed that the preserve contains all the requirements needed to qualify for the grants.

For example, grants that deal with habitat improvement may have the following requirements:

- Contains invasive species (yes)
- Size of 5 or more acres
- Home to rare, threatened, or endangered species
- Adjacent to protected open space (Memorial Park & Chyzowych Field)
- Contains a waterway (Rahway River)

Here are some potential grants worth investigating further:

WILD HABITAT INCENTIVE PROGRAM (NRCS)

- Bog Turtle habitat
- Grassland enhancement
- Riparian vegetation restoration
- Invasive exotic vegetation control
- School-site habitat development projects for environmental education
- Provides 75% of project cost

website: http://www.nrcs.usda.gov/programs/whip/

PARTNERS FOR FISH AND WILDLIFE (U.S. FISH & WILDLIFE)

- For habitat protection, enhancement, and restoration
- 50% cost-sharing (or more if deemed valuable enough)

website: http://njfieldoffice.fws.gov/

ENVIRONMENTAL EDUCATION GRANT PROGRAM (U.S. EPA)

- Funds available for projects that raise public awareness, knowledge, and skills to make informed decisions about environmental quality
- Most grants range from $15-$25,000

website: www.epa.gov/enviroed/grants.html

COMMUNITY-BASED HABITAT RESTORATION PROJECT GRANTS (NOAA)

- To catalyze locally-driven habitat restoration programs
- Up to $250,000 grants available

website: www.nmfs.noaa.gov/habitat/restoration/funding_opportunities/funding.html

NEW JERSEY DOT LOCAL AID INFRASTRUCTURE FUND

- Any county or municipality may apply at any time.
- These projects are approved at the discretion of the Commissioner. Payment of project costs is the same as the Municipal Aid Program. Under this program a county or municipality may also apply for funding for pedestrian safety and bikeway projects.

website: http://www.state.nj.us/transportation/business/localaid/descrfunding.shtm

NEW JERSEY GREEN ACRES

- System of interconnected Open Spaces to preserve and enhance New Jersey's natural environment and it's historic, scenic and recreational resources for public use and enjoyment
- Properties (including structures) that have been damaged by, or may be prone to incurring damage caused by, storms or storm-related flooding, or that may buffer or protect other lands from such damage, are eligible for acquisition.
- $24 Million approved by voters in 2009.

website: http://www.state.nj.us/dep/greenacres/

NEW JERSEY DOT SAFE ROUTES TO SCHOOL (SRTS)

- Safe Routes to School (SRTS) is a federal, state and local effort to enable and encourage children, including those with disabilities, to walk and bicycle to school - and to make walking and bicycling to school safe and appealing.
- The goal of New Jersey's Safe Routes to School Program is to assist New Jersey communities in developing and implementing projects and programs that encourage walking and bicycling to school while enhancing safety.
- Most municipality grants range from $8,000-$300,000.

website: http://www.state.nj.us/transportation/community/srts/

NEW JERSEY DOT BIKEWAYS GRANT PROGRAM

- The program provides funds to municipalities to promote bicycling as an alternate mode of transportation
- A primary objective of the Bikeway Grant Program is to support the State's goal of constructing 1,000 new miles of dedicated bike paths (facilities that are physically separated from motorized vehicular traffic by an open space or barrier either within the highway right of way or within an independent right of way).
- In an effort to establish regionally connected bicycle networks, this program is available to every municipality and county throughout New Jersey. Although priority will be given to construction of new bike paths, the proposed construction or delineation of any new bicycle facility will be considered.

website: http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm

NEXT STEPS ..... MOVING FORWARD

Time is a crucial component for securing funding, maintaining public interest and support and ecological site management. Acting quickly can be the most economical and successful course of action. Infrastructure improvements and ecological systems are linked and all of the problems identified at the Rahway River corridor are interrelated and require to be handled as such, instead of as individual pieces. The following next steps should be considered to allow for successful design, development and management in the future:

- Submit a Concept Plan to NJDEP for initial review comments and recommendations.
- Determine potential sources of funding for Phase 1 improvements.
- Present the Concept Plan to the community to catalyze public support as well as volunteer opportunities.
- Finalize Board of Education consensus and support for reconfiguring parking lots as shown on Concept Plan.

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