REBUILD BY DESIGN

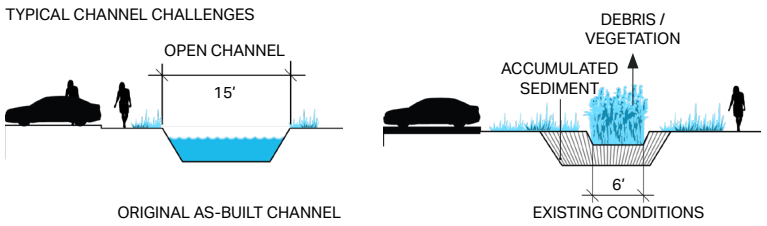
MEADOWLANDS

CHANNEL IMPROVEMENTS

AN APPROACH TO REDUCE FLOOD-RISK

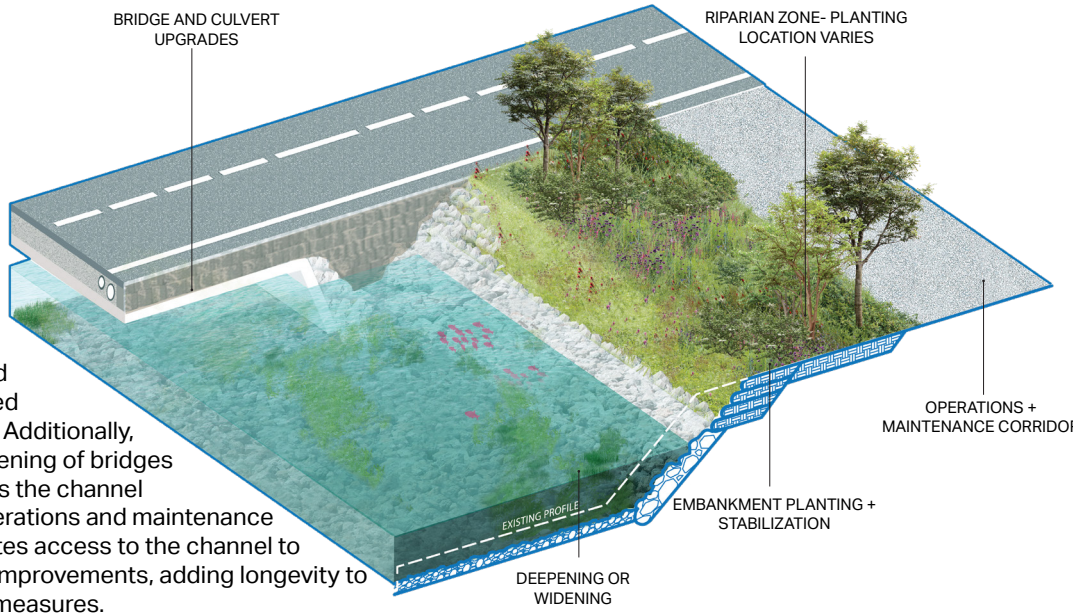
TYPICAL CHALLENGES AND GOALS

The Meadowlands has an extensive network of human-made or human-altered drainage channels and ditches built over the last century in an effort to create developable land. Today, this network is aging and often cannot provide adequate drainage from heavy rain events in the area. Improvements to existing channels can provide increased flood-risk reduction by improving conveyance and increasing drainage capacity. Additionally, improvements can enhance the ecological function of these waterways. This document describes an approach to channel improvements as they apply to the Rebuild by Design Meadowlands East Riser Ditch case study.

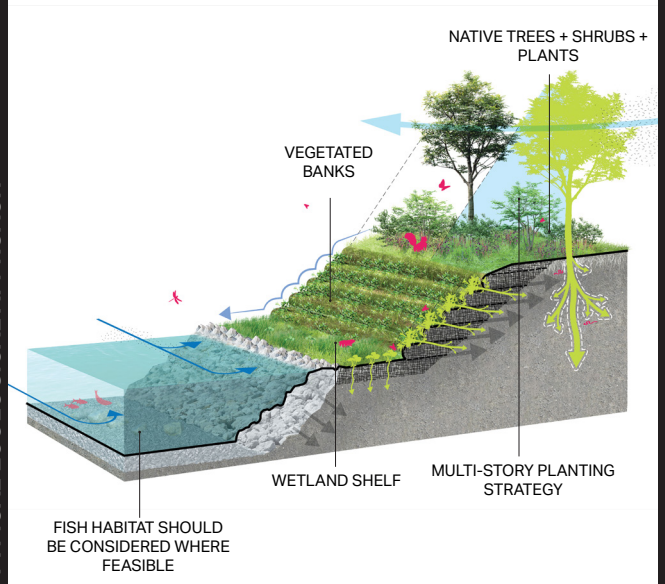


EAST RISER DITCH IMPROVEMENT COMPONENTS

In designing channel improvements, site conditions influence the types of improvements best suited to achieve flood-risk reduction. In the East Riser Ditch, these improvements include deepening and widening to increase capacity and removing accumulated sediment and debris. Additionally, replacement and widening of bridges and culverts improves the channel performance. An operations and maintenance access corridor creates access to the channel to help towns maintain improvements, adding longevity to the flood protection measures.



TYPICAL ECOLOGICAL APPROACH



In addition to stormwater conveyance, ecological restoration and bioengineering can assist in providing an overall holistic ecological uplift to the channel.

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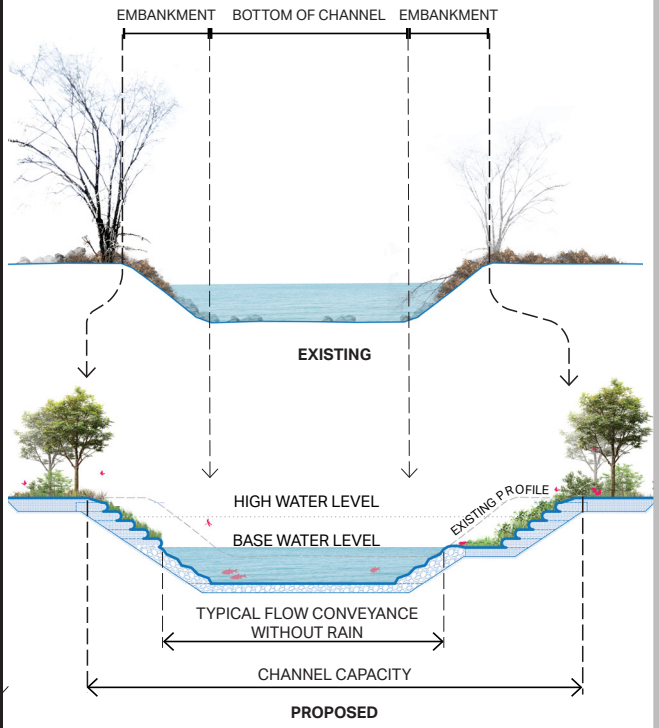
TYPICAL CHANNEL WIDENING APPROACH



For more information please visit:
https://www.nj.gov/dep/floodresilience/rbd-meadowlands.htm

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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

EAST RISER DITCH CASE STUDY

CHANNEL IMPROVEMENTS + PUMP STATION

IMPROVED CONVEYANCE

VOLUME CONTROL

RIPARIAN ECOLOGY

EXISTING CHALLENGES

The East Riser Ditch is a human-made and human-altered channel approximately 4.2 miles long flowing from a spring in a historically-wetland area into Berry's Creek in Bergen County, NJ. Its drainage watershed covers approximately 730 acres. As part of the Rebuild by Design Meadowlands project, channel improvements were designed in the lowest reach of the watershed between Moonachie Avenue in Moonachie and Starke Road in Carlstadt. The channel conveyance was challenged by over-burdened infrastructure, lack of channel capacity, water flow regulated by a tide gate and low-lying elevations with minimal grade changes all within a densely developed area. These conditions contributed to the frequent flooding experienced in the community.

STORMWATER MANAGEMENT COMPONENTS

4100 linear feet of channel improvements

190 cubic feet per second capacity for a 2-year storm within the channel

500 cubic feet per second of additional pump capacity

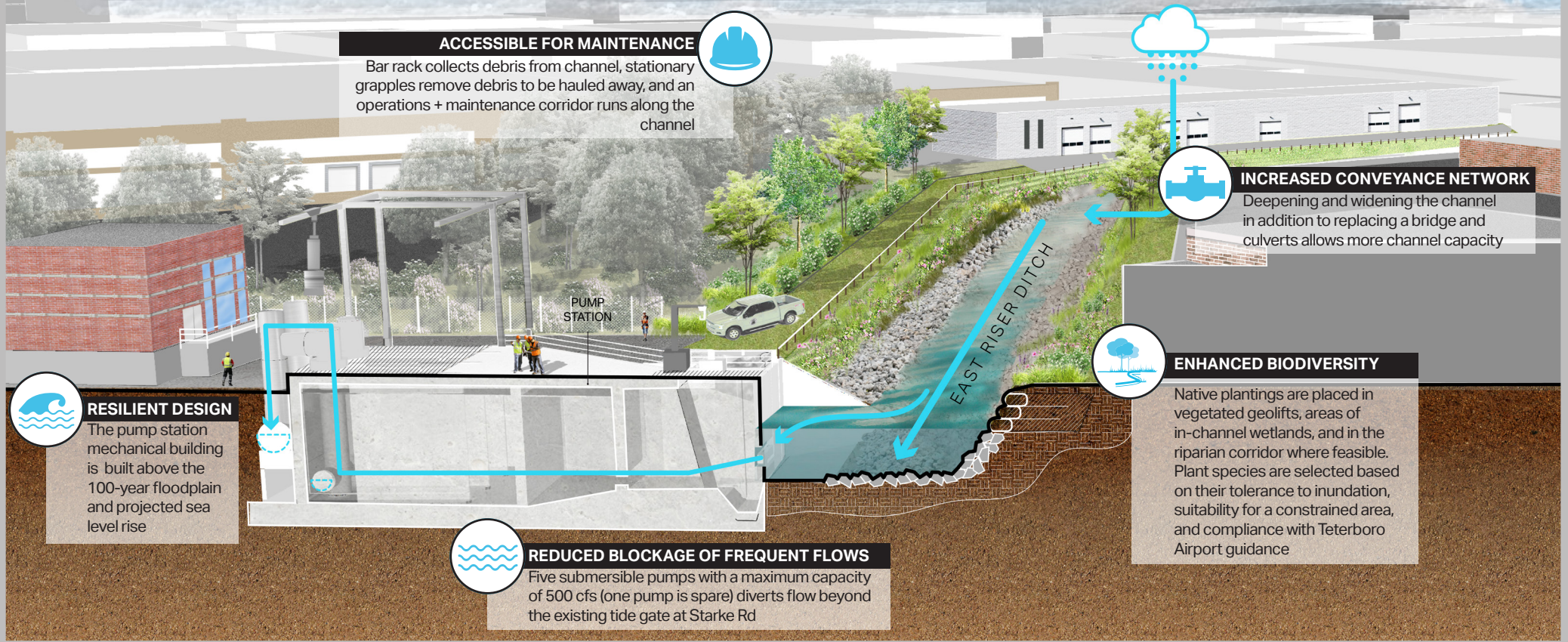
5 pumps total

HOW TO REDUCE FLOOD RISK?

Through hydraulic modeling, numerous potential approaches to reduce flood risk in the East Riser Ditch watershed were assessed. The final design includes deepening and widening the channel with stabilized embankments which are vegetated where feasible. The design also includes a new pump station which pulls water out of the channel when water reaches a threshold to allow more drainage capacity. An operations and maintenance corridor is needed for long-term viability of the drainage channel. The placement of the corridor uses existing adjacent parking lots where feasible to allow more space for revegetation in other areas of the channel. These improvements reduce both the depths and extent of flooding in the channel for storms ranging in frequency from 2 to 100 years.

ADDITIONAL INFORMATION

This project is one component of the efforts the NJDEP is facilitating to assist communities in building resilience. For more information, check out these resources: www.nj.gov/dep/floodresilience/rbd-meadowlands.htm and www.nj.gov/dep/cfr/ and www.nj.gov/dep/floodresilience/toolkit.html



ACCESSIBLE FOR MAINTENANCE
Bar rack collects debris from channel, stationary grapples remove debris to be hauled away, and an operations + maintenance corridor runs along the channel

INCREASED CONVEYANCE NETWORK
Deepening and widening the channel in addition to replacing a bridge and culverts allows more channel capacity

RESILIENT DESIGN
The pump station mechanical building is built above the 100-year floodplain and projected sea level rise

ENHANCED BIODIVERSITY
Native plantings are placed in vegetated geolifts, areas of in-channel wetlands, and in the riparian corridor where feasible. Plant species are selected based on their tolerance to inundation, suitability for a constrained area, and compliance with Teterboro Airport guidance

REDUCED BLOCKAGE OF FREQUENT FLOWS
Five submersible pumps with a maximum capacity of 500 cfs (one pump is spare) diverts flow beyond the existing tide gate at Starke Rd