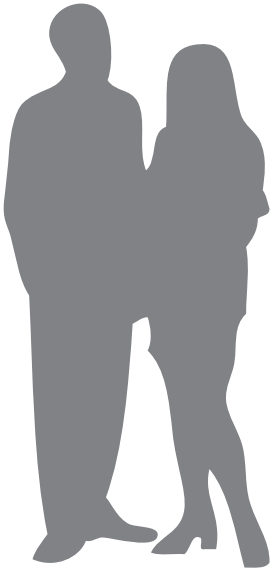
Fact:

“Two out of every three people in the world will be facing water shortages by 2025...
global conflict will inevitably result...”
-United Nations



Fact:

20%

of the Earth's fresh water is on deposit in the Great Lakes

Source: Southern Lake Michigan Regional Water Supply Consortium

95%

of the United States' fresh water is on deposit in the Great Lakes

Source: Southern Lake Michigan Regional Water Supply Consortium

Fact:

1,000,000,000

(billion)

gallons of Lake water per day are consumed by Chicagoans

Source: Water Agenda 2003, City of Chicago

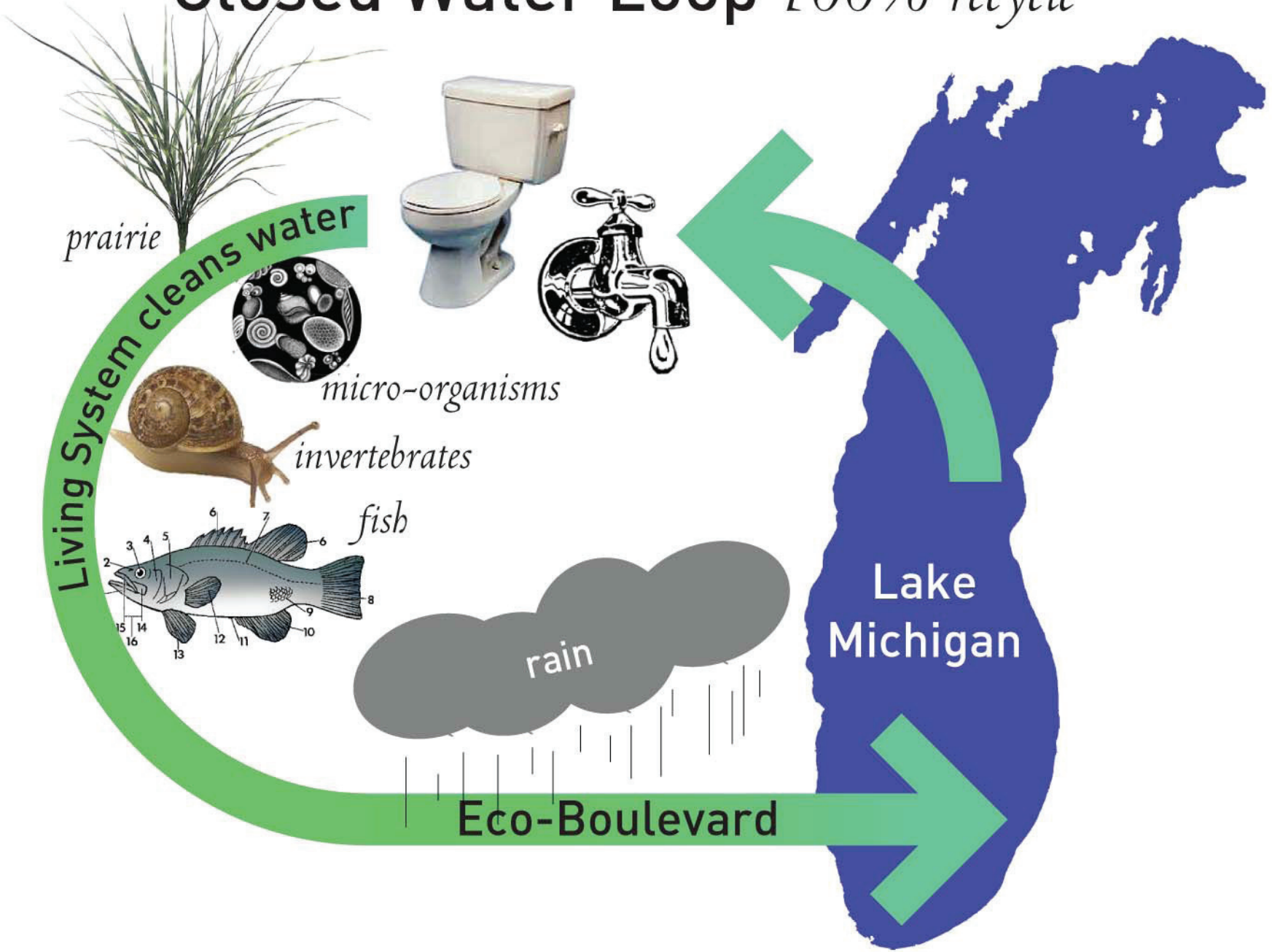
Fact:

<1%

of drained water
is renewed by Chicagoans

Source: Water Agenda 2003, City of Chicago

Closed Water Loop *100% recycle*



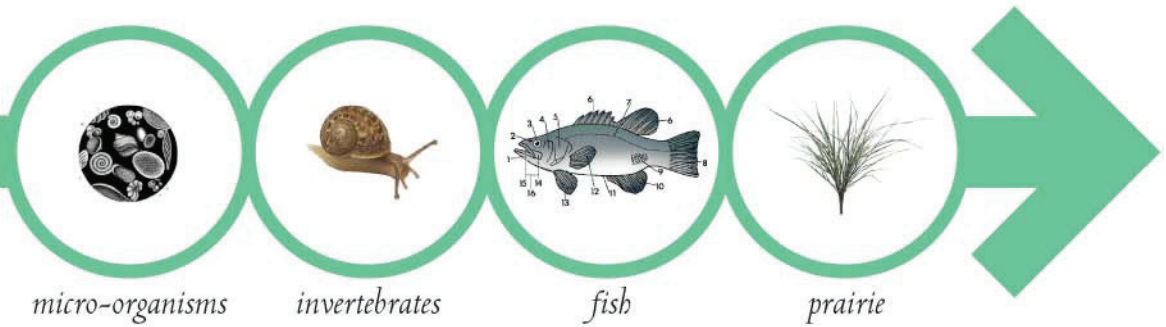
Chicago as a Living System:

How Will It Work?

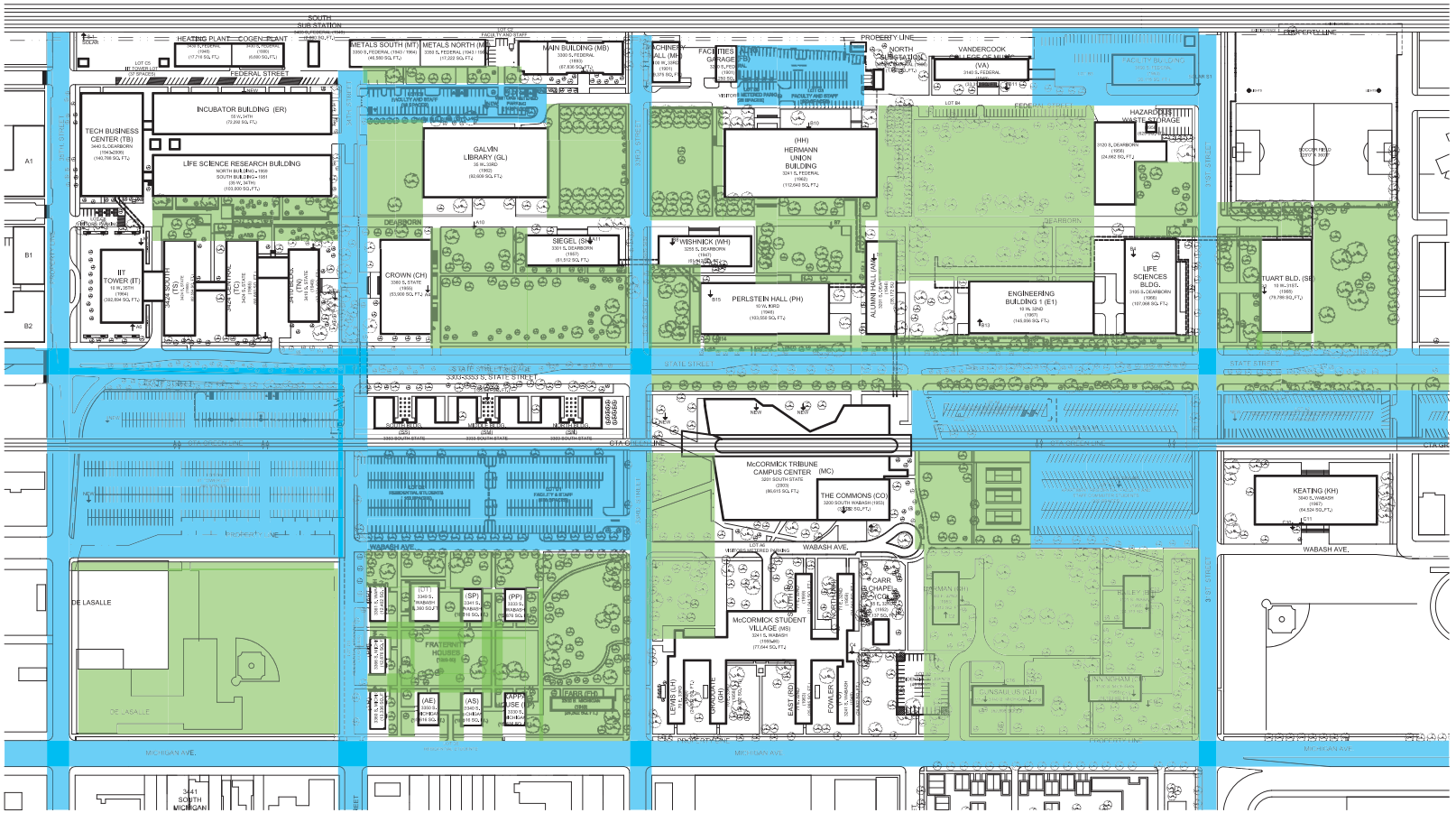
As a Living System, Chicago will treat 100% of its wastewater + stormwater naturally, using micro-organisms, small invertebrates (such as snails), fish and plants.

Treated water will be harvested and/or returned to the Great Lakes Basin.

Living System **Eco-Boulevard**



Challange: Transform IIT into a Living System



Blue: Streets

Green: Green Space

Technique: Construct Demo Stormwater Best Management Practice Education Park(s)

Best Management Practices

Stormwater BMPs are methods used to substantially reduce surface runoff quantities and resultant pollutant loadings.

Researched Types (selection)

Infiltration Bioswale
Filter Strip Bioswale
Concrete Lin ed Bioswale
Single Cell Infiltration Planter
Filter Strip Infiltration Trench
Infiltration Planter
Sand Filter
Bioretention Pond
Constructed Wetlands
Permeable Paving

Best Management Practices / Ecological Implications

BMP/ Tool	Maintenance	Length of Operation	Circulation Speed	Water Source	Sediment Removal	TSS Total Suspended	Phosphate Reduction	Nitrogen Reduction	Metals Reduction	Bacteria Reduction	Sun Exposure	Annual/Season	Synergy 1 low 10 High	Visability 1 low 10 High	Economic Sustainability 1	Green Sustainability
Infiltration Bio Swale	Low	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	5	yes	yes
Vegetation																
Black Soil Prairie	Low	N/A	Fast		Moderate	30%-65%	Yes	Yes	Yes	Yes	Yes	S	N/A	7	yes	yes
Sand Prairie	Low	N/A	Slow		High	50%-80%	Yes	Yes	Yes	Yes	Yes	S	N/A	9	yes	yes
Gravel Prairie	Low	N/A	Moderate		Moderate	40%-60%	Yes	Yes	Yes	Yes	Yes	S	N/A	5	yes	yes
Dolomite Prairie	Low	N/A	Fast		Moderate	30%-45%	Yes	Yes	Yes	Yes	Yes	S	N/A	8	yes	yes
Hill Prairie	Low	N/A	Slow		Low	60%-85%	Yes	Yes	Yes	Yes	Yes	S	N/A	8	yes	yes
Shrub Prairie	Low	N/A	Moderate		Low	30%-50%	Yes	Yes	Yes	Yes	Yes	S	N/A	7	yes	yes
Compost Amended Soil																
Filter Strip Bioswale	Moderate	Long Term	Fast	Ground	Moderate	50%-80%	15%-45%	50%-80%	85-90%	90%	Yes	S	10	5	yes	yes
Vegetation																
Compost Amended Soil																
Filter Strip Infiltration Tren	Moderate	Long Term	Fast	Ground	Moderate	50%-80%	15%-45%	50%-80%	85-90%	90%	Yes	S	10	5	yes	yes
Vegetation																
Compost Amended Soil																
Concrete Lined Bioswale	High	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	A	10	8	yes	yes
Vegetation																
Compost Amended Soil																
Single Cell Infiltration Plan	Low	Long Term	Fast	Ground	High	60%-70%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Infiltration Planter Between Street and	Low	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%	85-90%	90%	Yes	A	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Single Cell Infiltration Planter w/ Street Runoff	Low	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Vegetation																
Sand Filter w/ Planter	High	Long Term	Fast	Ground	High	60%-70%	15%-45%	15%-45%	85-90%	90%	No	A	10	8	yes	yes
Sand																
Gravel Drainage																
Flow Through Planter w/ Vegetation	Moderate	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Vegetation																
Bioretention Pond	Low	Long Term	Fast	Ground	Low	100%	20%	40%	85-90%	90%	Yes	A	10	5	yes	yes
Constructed Wetland	3%-5% Const. Cost	Long Term	Slow	Ground	High	50%-80%	30%	15%-45%	85-90%	90%	Yes	S	10	7	yes	yes
Vegetation																
Compost Amended Soil																
Permeable Paving	High	Long Term	Fast	Ground	High	100%	80%	0%	85-90%	90%	No	A	10	7	yes	yes
Concrete Pavers	Low	Long Term	Fast		High	100%	80%	0%	80%-90%	90%	No	A	10	10	yes	yes
Plastic Grid Pavers	Low	Long Term	Fast		High	100%	80%	0%	80%-90%	90%	No	A	10	3	yes	yes
Porous Asphalt	Low	Long Term	Fast		High	100%	80%	0%	80%-90%	90%	No	A	10	7	yes	yes

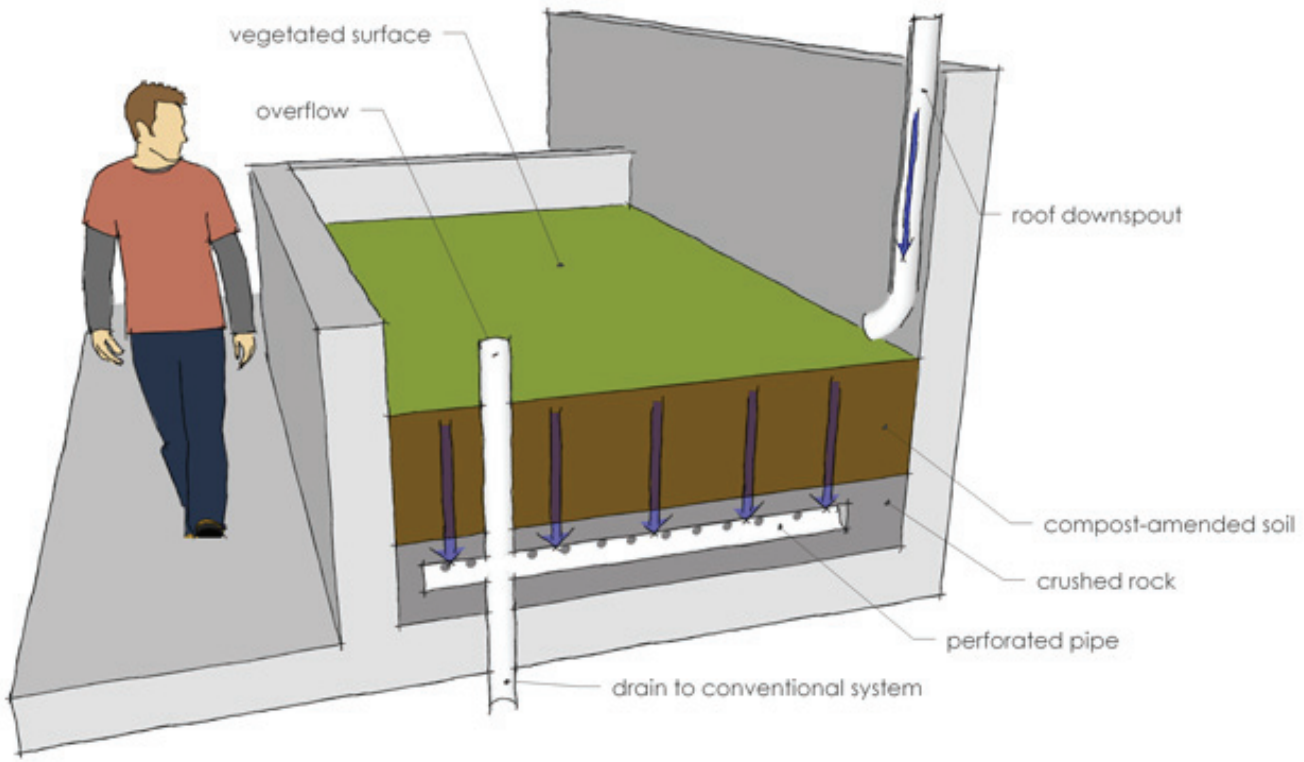
Criteria

BMP/ Tool	Maintenance	Length of Operation	Circulation Speed	Water Source	Sediment Removal	TSS Total Suspended	Phosphate Reduction	Nitrogen Reduction	Metals Reduction	Bacteria Reduction	Sun Exposure	Annual/Season	Synergy 1 low 10 High	Visability 1 low 10 High	Economic Sustainability 1	Green Sustainability
Infiltration Bio Swale	Low	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	5	yes	yes
Vegetation																
Black Soil Prairie	Low	N/A	Fast						Yes	Yes	Yes	S	N/	7	yes	yes
Sand Prairie	Low	N/A	Slow		Hi h	50%-80%	Yes	Yes	Yes	Yes	Yes	S	N/	9	yes	yes
Gravel Prairie	Low	N/A	Moderate		Mode	50%-80%	Yes	Yes	Yes	Yes	Yes	S	N/	5	yes	yes
Dolomite Prairie	Low	N/A	Fast						Yes	Yes	Yes	S	N/	8	yes	yes
Hill Prairie	Low	N/A	Slow		Low	60%-85%	Yes	Yes	Yes	Yes	Yes	S	N/	8		
Shrub Prairie	Low	N/A	Moderate						Yes	Yes	Yes	S	N/	7		
Compost Amended Soil																
Filter Strip Bioswale	Moderate	Long Term	Fast	Ground					85-90%	90%	Yes	S	10	5	yes	yes
Vegetation																
Compost Amended Soil																
Filter Strip Infiltration Tren	Moderate	Long Term	Fast	Ground							Yes	S	10	5	yes	yes
Vegetation																
Compost Amended Soil																
Concrete Lined Bioswale	High	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	A	10	8	yes	yes
Vegetation																
Compost Amended Soil																
Single Cell Infiltration Pla	Low	Long Term	Fast	Ground	High	60%-70%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Between Street and	Low	Long Term	Fast	Ground		75%			85-90%	90%	Yes	A	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Planter w/ Street Runoff	Low	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%	85-90%	90%	Yes	S	10	10	yes	yes
Splash Rock																
Filter Fabric																
Gravel Drainage																
Compost Amended Soil																
Sand Loam Topsoil																
Vegetation																
Sand Filter w/ Planter	High	Long Term	Fast	Ground	High	80%-90%	15%-45%	15%-45%	85-90%	90%	No	A	10	8	yes	yes
Sand																

Maintenance
Length of Operation
Circulation Speed
Water Source
Sediment Removal
TSS Total Suspended Solids
Phosphate Reduction
Nitrogen Reduction
Bacteria Reduction
Sun Exposure
Annual / Seasonal
Synergy
Visability
Economic Sustainability
Green Sustainability

Compost Amended Soil							
Concrete Lined Bioswale	High	Long Term	Moderate	Ground	High	30%-65%	15%-45%
Vegetation							
Compost Amended Soil							
Single Cell Infiltration Planter	Low	Long Term	Fast	Ground	High	60%-70%	15%-45%
Splash Rock							
Filter Fabric							
Gravel Drainage							
Compost Amended Soil							
Sand Loam Topsoil							
Infiltration Planter Between Street	Low	Long Term	Fast	Ground	High	75%	15%-45%
Splash Rock							
Filter Fabric							
Gravel Drainage							
Compost Amended Soil							
Sand Loam Topsoil							
Single Cell Infiltration Planter w/ Street Runoff	Low	Long Term	Fast	Ground	High	75%	15%-45%
Splash Rock							
Filter Fabric							
Gravel Drainage							

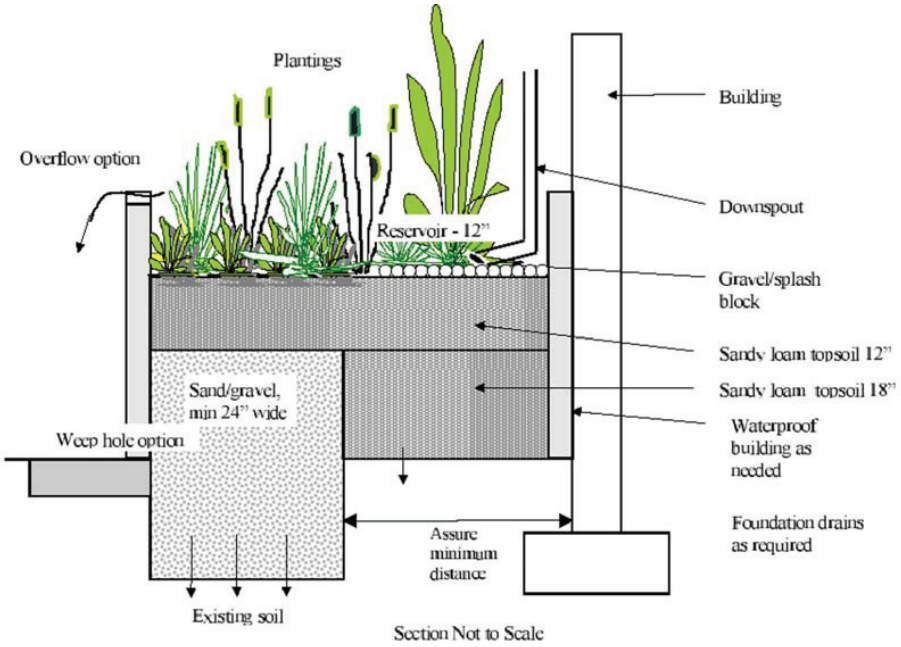
Stormwater Planters

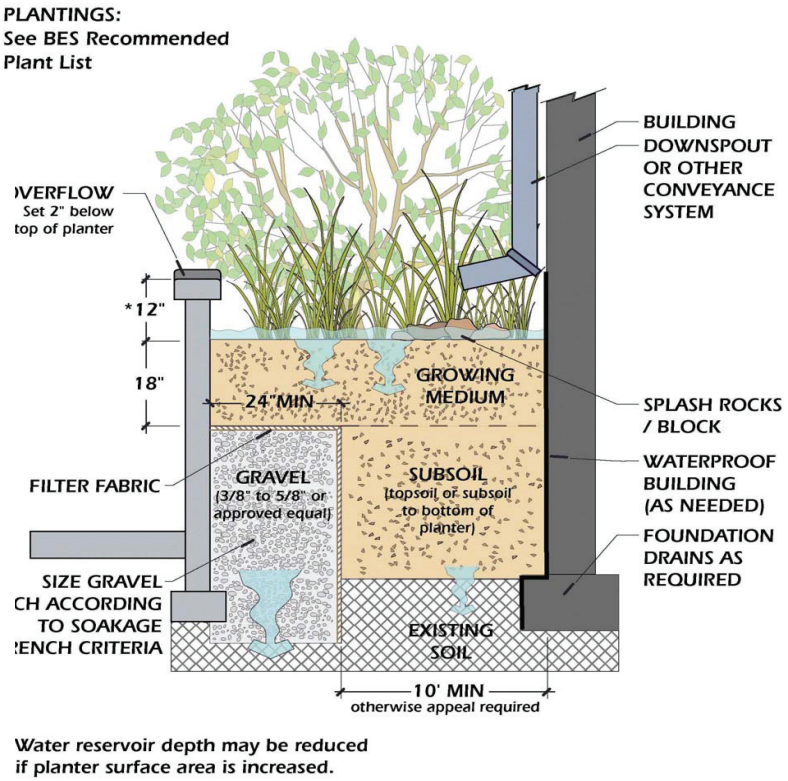


Stormwater planters are small landscaped stormwater treatment devices that can be placed above or below ground and can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and bio-geo-chemical processes to decrease stormwater quantity and improve water quality.

http://www.greeninfrastructurewiki.com/page/3SP%3A+Stormwater+Planter

Infiltration Planters



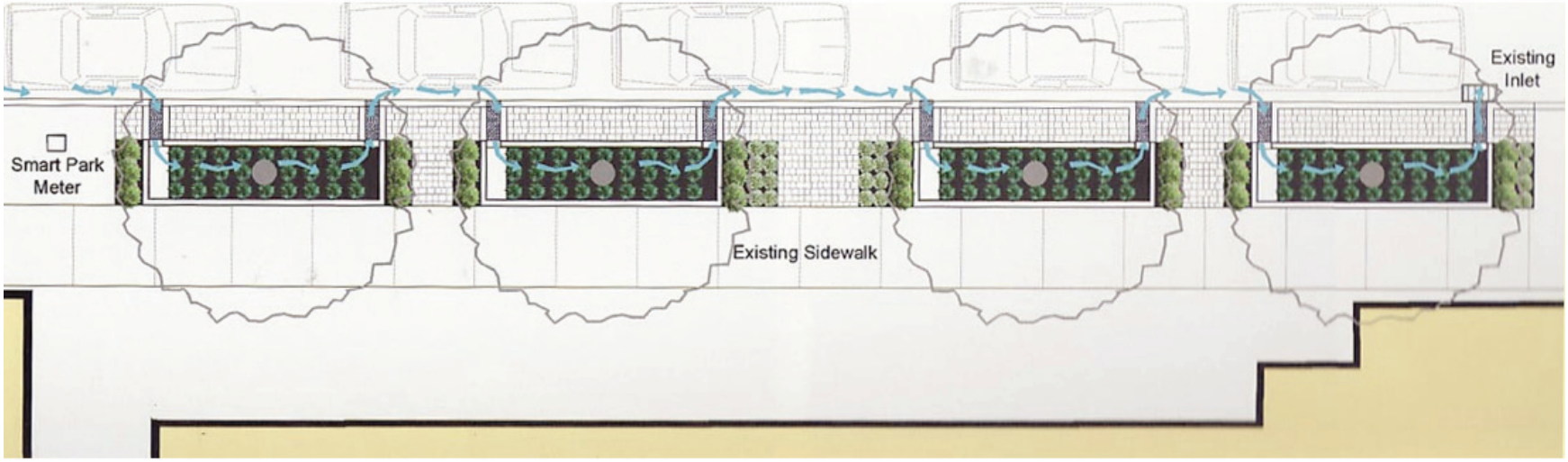


Infiltration planters are contained planters with a pervious bottom that allows stormwater to infiltrate through the soil media within the planter and pass into underlying soil matrix.

Infiltration Planters

Liberty Center Parking Garage at 650 NE Holladay. From City of Portland 2004

Urban Application: Portland



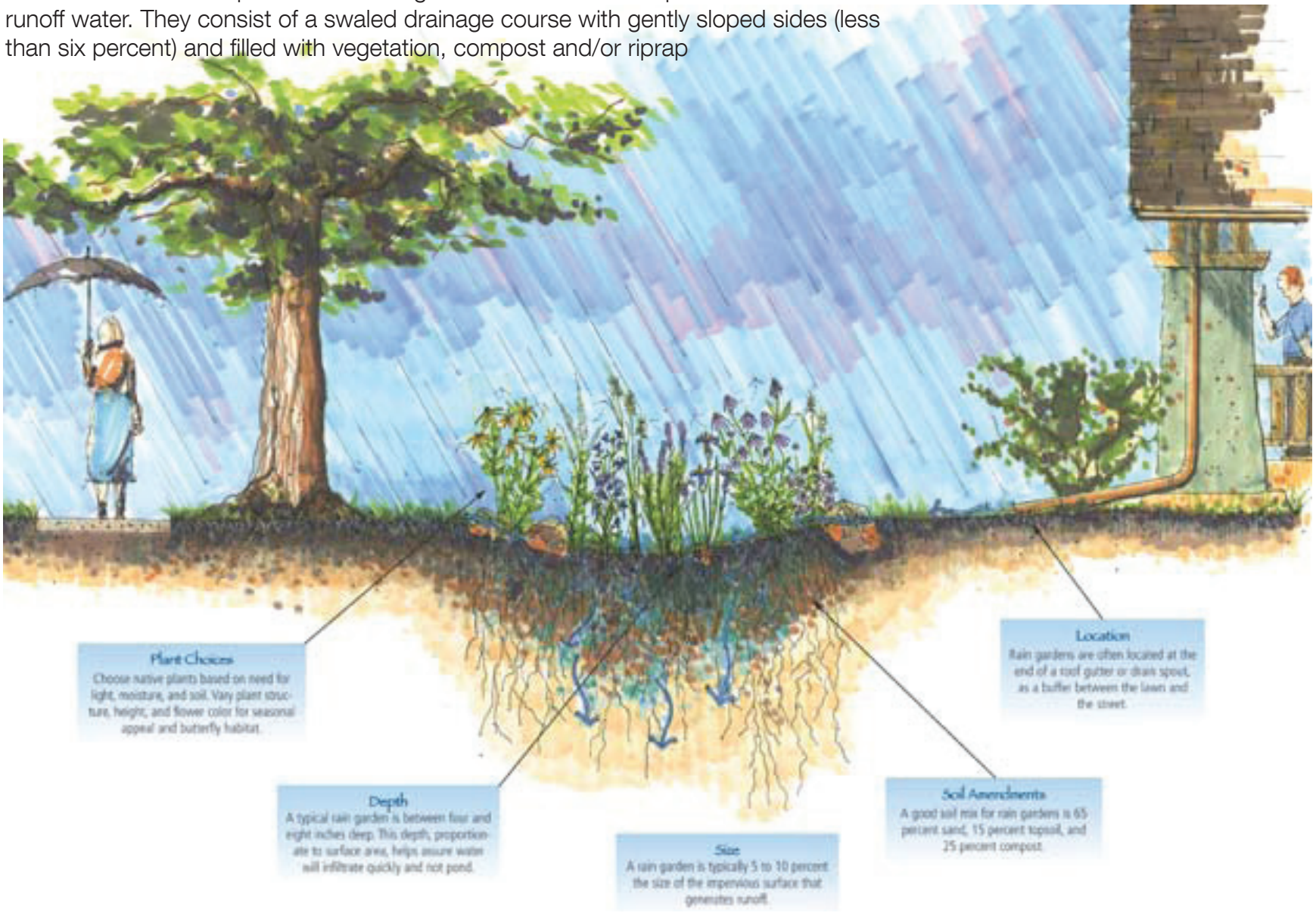
The project consists of a series of four 4×17' planters set 9" below grade surrounded by a 4" curb. The system was sized to handle 60% of SW 12 street run-off (180,000 gal annually). The planters were filled with native soils amended with an equal mix of sand, compost, and screened loam. Native Grooved Rush and Tupelo were planted for their water absorption and drought resistance.

http://www.ecologycenter.org

Infiltration Bio Swale	Low	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	S
Vegetation												
Black Soil Prairie	Low	N/A	Fast		Moderate	30%-65%	Yes	Yes	Yes	Yes	Yes	S
Sand Prairie	Low	N/A	Slow		High	50%-80%	Yes	Yes	Yes	Yes	Yes	S
Gravel Prairie	Low	N/A	Moderate		Moderate	40%-60%	Yes	Yes	Yes	Yes	Yes	S
Dolomite Prairie	Low	N/A	Fast		Moderate	30%-45%	Yes	Yes	Yes	Yes	Yes	S
Hill Prairie	Low	N/A	Slow		Low	60%-85%	Yes	Yes	Yes	Yes	Yes	S
Shrub Prairie	Low	N/A	Moderate		Low	30%-50%	Yes	Yes	Yes	Yes	Yes	S
Compost Amended Soil												
Filter Strip Bioswale	Moderate	Long Term	Fast	Ground	Moderate	50%-80%	15%-45%	50%-80%	85-90%	90%	Yes	S
Vegetation												
Compost Amended Soil												
Filter Strip Infiltration Tren	Moderate	Long Term	Fast	Ground	Moderate	50%-80%	15%-45%	50%-80%	85-90%	90%	Yes	S
Vegetation												
Compost Amended Soil												
Concrete Lined Bioswale	High	Long Term	Moderate	Ground	High	30%-65%	15%-45%	15%-45%	85-90%	90%	Yes	A
Vegetation												
Compost Amended Soil												
Single Cell Infiltration Plan	Low	Long Term	Fast	Ground	High	60%-70%	15%-45%	15%-45%				
Splash Rock												
Filter Fabric												
Gravel Drainage												
Compost Amended Soil												
Sand Loam Topsoil												
Infiltration Planter Between Street and	Low	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%				
Splash Rock												
Filter Fabric												
Gravel Drainage												
Compost Amended Soil												
Sand Loam Topsoil												
Single Cell Infiltration Planter w/ Street Runoff	Low	Long Term	Fast	Ground	High	75%	15%-45%	15%-45%				
Splash Rock												
Filter Fabric												

Filter Strip Bioswale

Bioswales are landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides (less than six percent) and filled with vegetation, compost and/or riprap



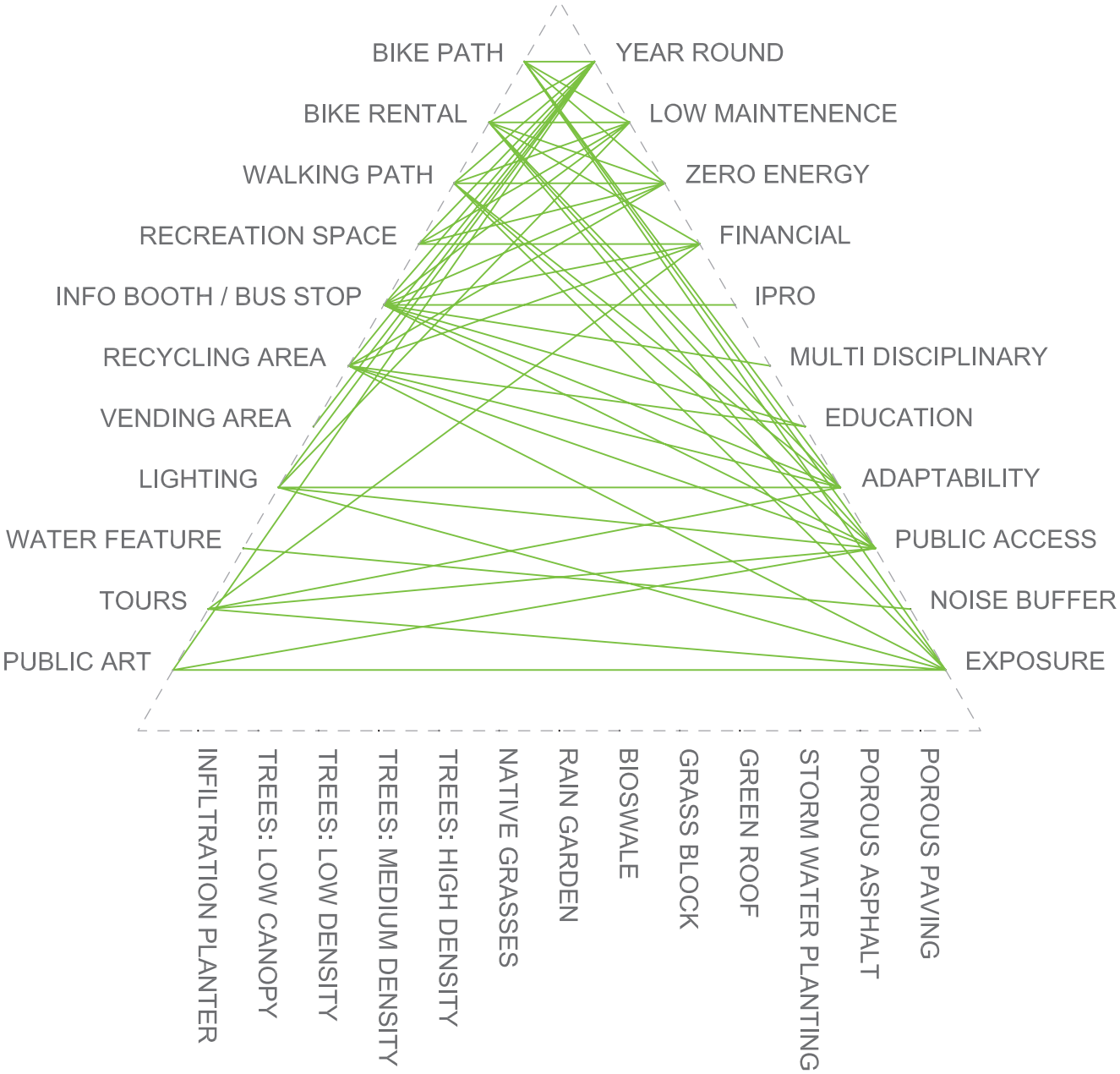
Urban Application: Chicago

Saint Margret Mary Church and School (West Rogers Park, Chicago)
Runoff from roofs, parking lots and small building lots often led to flooding in the basements of the parish and school buildings. To prevent this from occuring the parking lot was divided into two lots: a Filter Strip Bioswale and a rain garden.

IPRO 322: Construct (BMP) Stormwater Demo Park at IIT

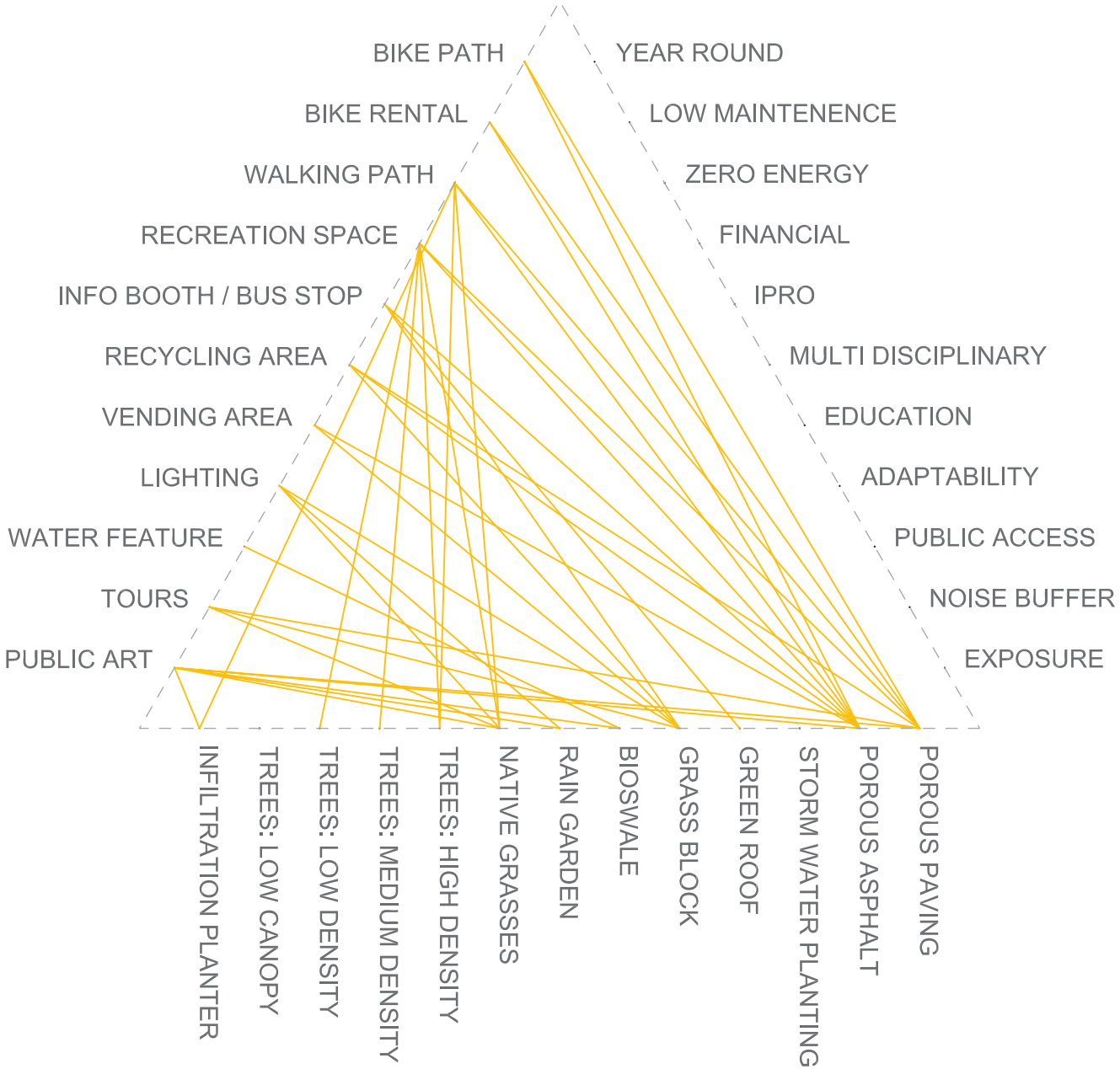
BMP: Social Function Evaluation

BMP CULTURAL MATRIX

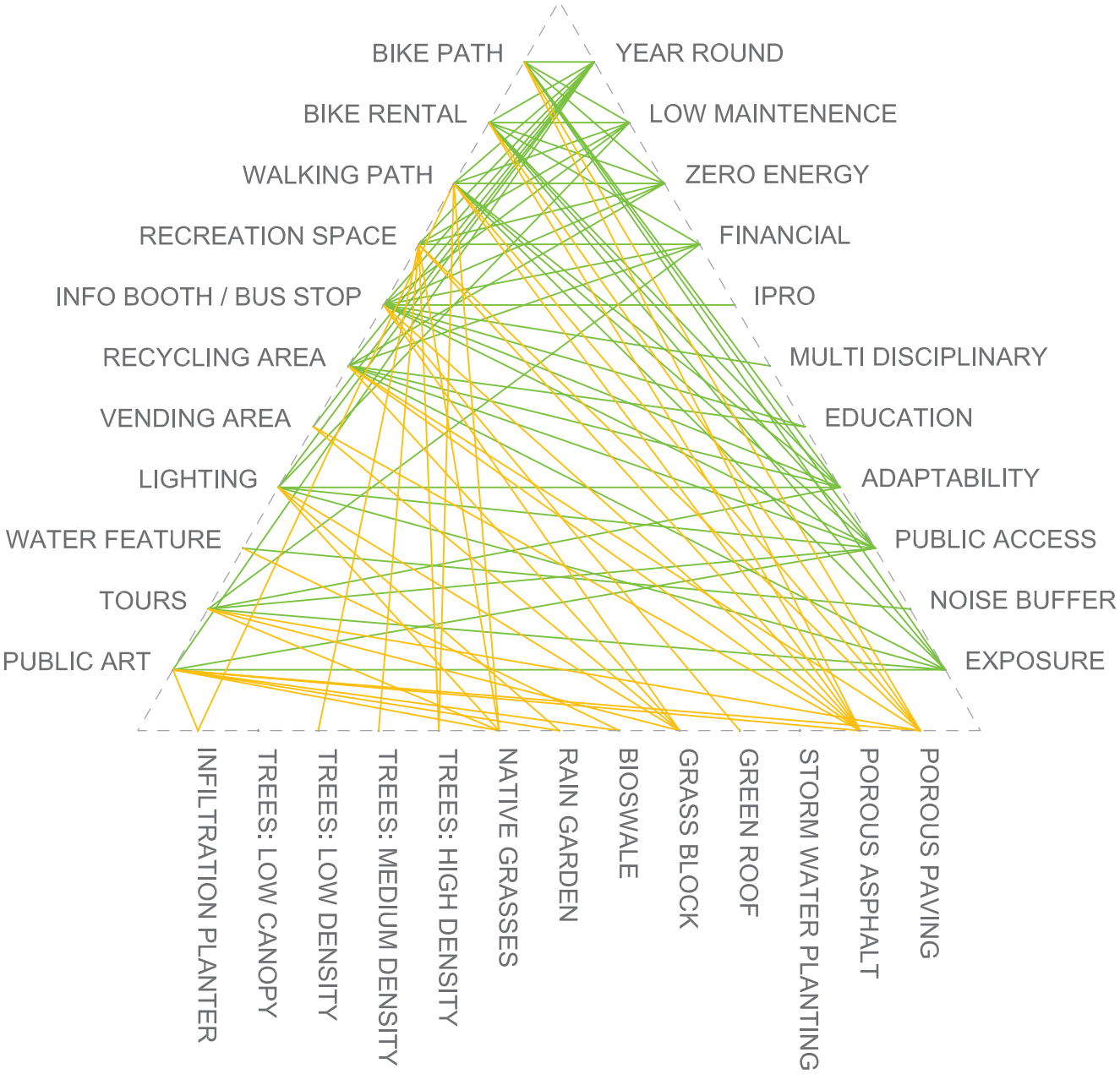


BMP and Social Function Evaluation

BMP CULTURAL MATRIX

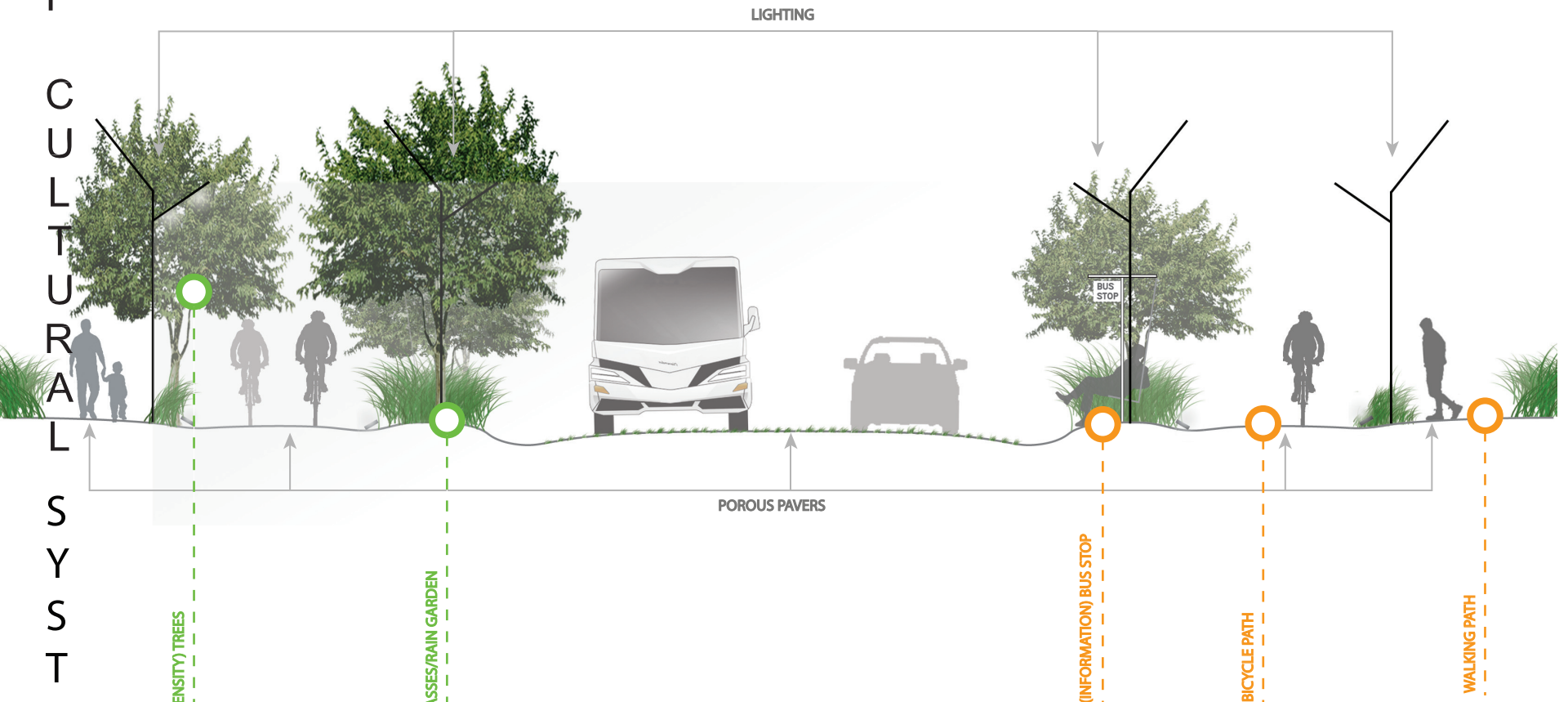


BMP CULTURAL MATRIX



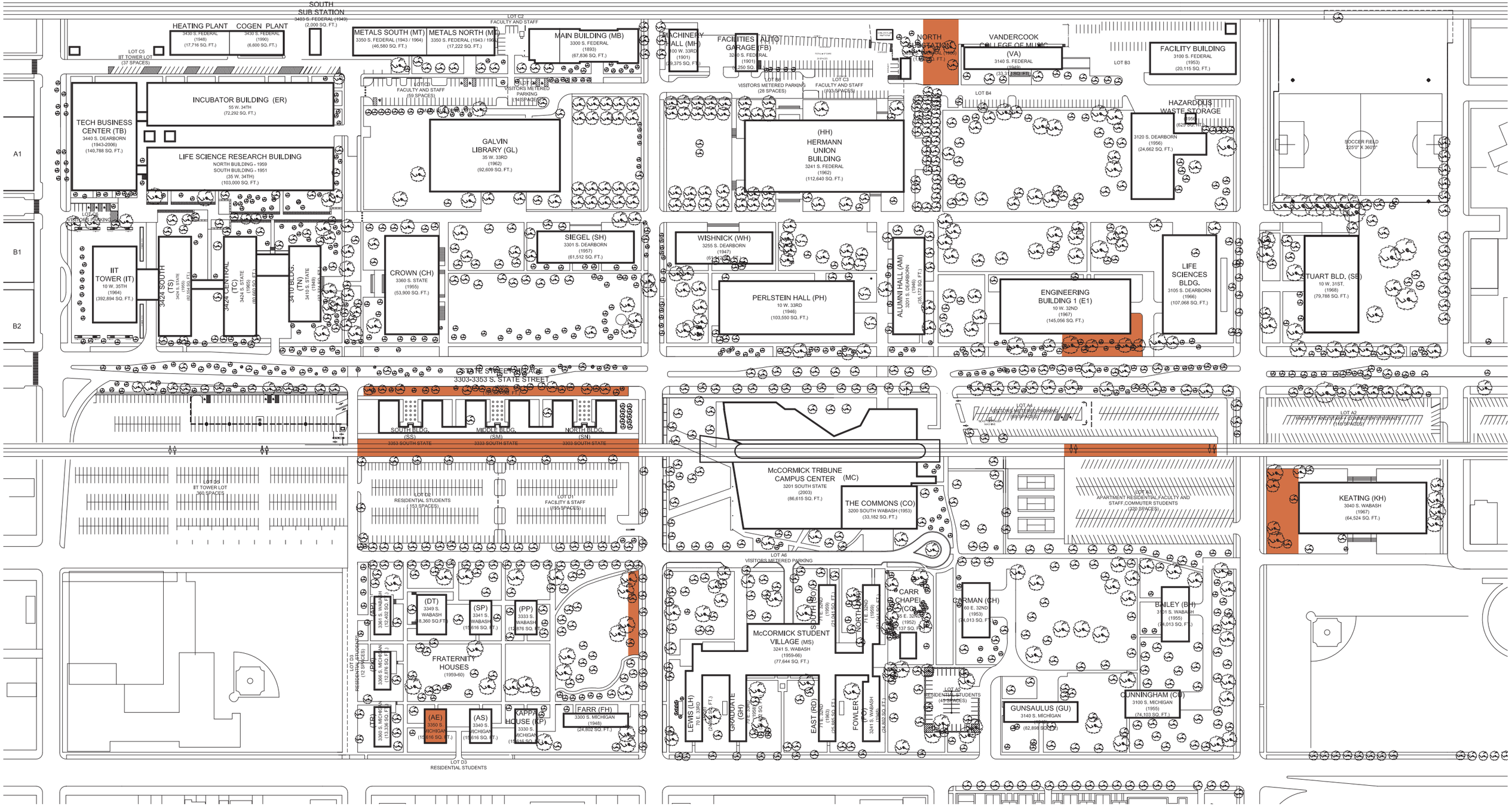
Multi-BMP System: Street Cross-Section

BMP CULTURAL SYSTEM



Taylor Square: Sydney, Australia

BMP Cultural Case Study



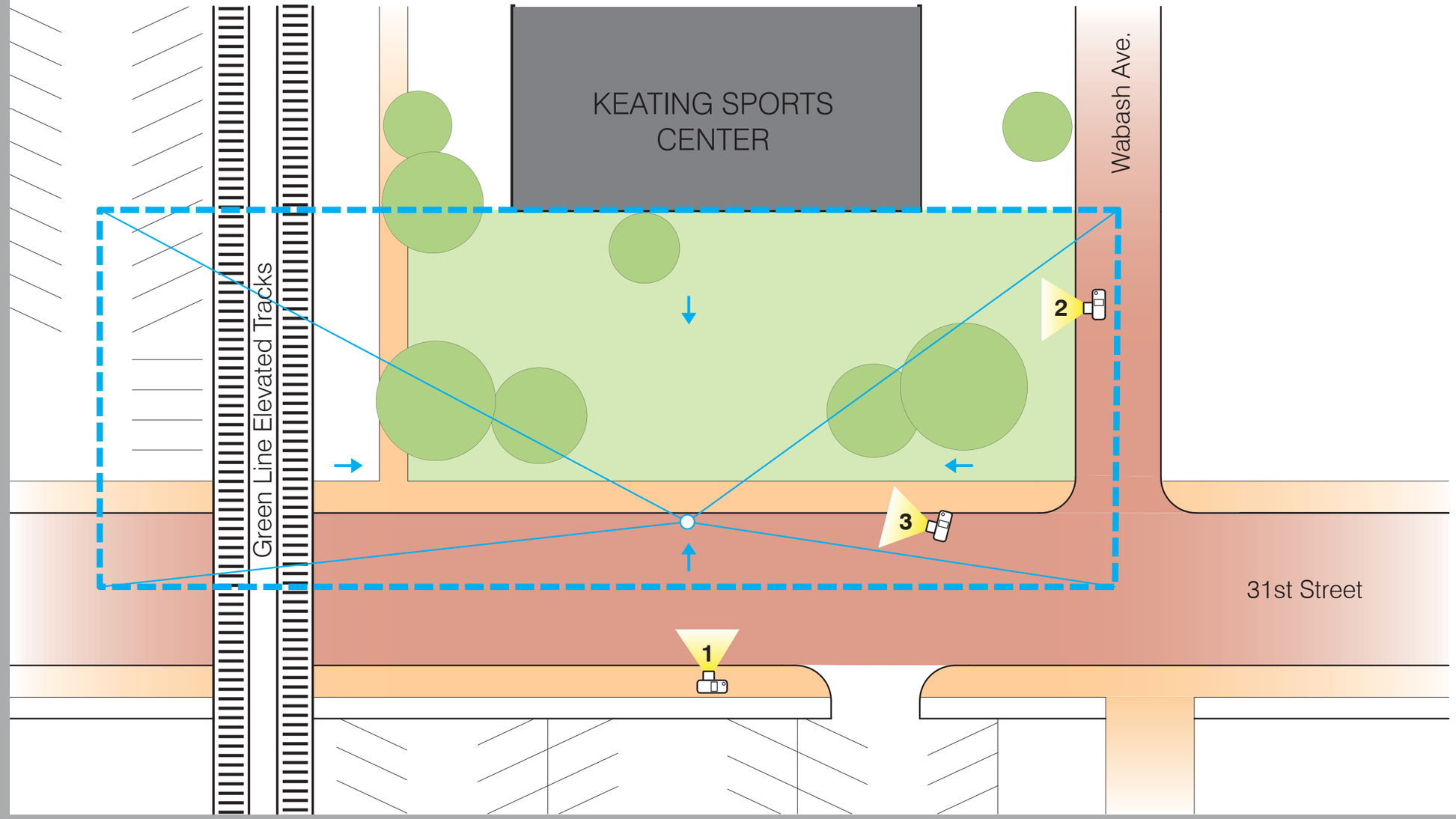
IIT Campus Site Plan - Possible BMP Sites

scale_1:200

1_Looking North

2_Looking West

3_Looking West



N

Enlarged Site Plan - Keating Sports Center

scale_1/32" = 1'-0"

The Keating Site offers several key advantages:

-Visibility to IIT as well as the public from 31st Street
-Heavy foot trafic from IIT students as well as visitors
-Proximity to contaminated water coming from the roof, train tracks, and 31st Street
-Only minimal site grading will be needed
-Constant solar exposure throughout the day

Proposed Site

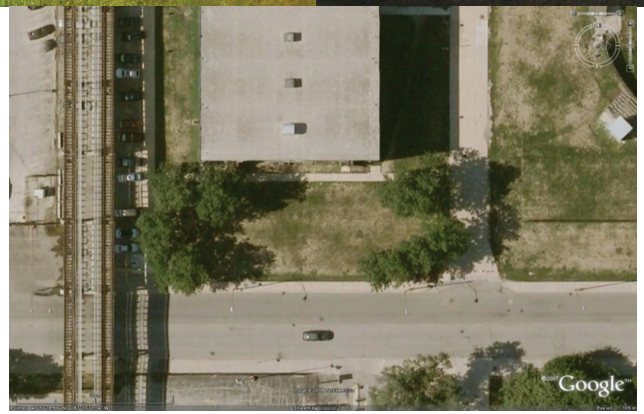
Image Location

Current Drainage

Vehicular Visibility

Pedestrian Visibility

Keating Hall



Site Cultural Matrix

Location	Visibility			Site Aesthetics						Social Significance				
	Car Traffic	IIT Pedestrian Traffic	Community Pedestrian Traffic	Existing Greenspace	Density of Surrounding Buildings	Walkways (Number surrounding the space)	Adjacent Street	Capacity	Noise	Regular Meeting Area	Seating Areas	Regular Recreation	Part of Disc Golf Course	Recognized Areas for IIT Tours
Keating Hall	High	Medium	High	Yes	Low	High	Yes	Medium	High	Yes	No	Baseball (University and recreational)	No	Yes
Vandercook Utility Lot	Yes	Low	Low	No	Low	Low	No	Low	Low	No	No		No	No
Former AEP Fraternity House	None	Low	Low	Yes	Medium	Low	No	Low	Low	No	No	Ultimate Frisbee	No	No
The "Man on the Bench Park"	None	High	Low	Yes	High	High	No	High	Low	Yes	Yes		Yes	Yes
Walkway West of SSV	High	High	High	Yes	High	High	Yes	Medium	High	No	No		No	Yes
Pavement under the "EL" tracks, east of SSV	Yes	Medium	Medium	Yes	High	Low	No	High	High	No	No		No	No
Pavement under the "EL" tracks, west of Keating	Low	Low	Low	No	Low	Low	Yes	High	High	No	No		No	No
Northwest of E1 and South/Southeast of Life Science	High	High	High	Yes	High	High	Yes	Medium	High	No	No		No	No
Farr Field, along 33rd St.	Medium	Low	High	Yes	Low	Medium	Yes	Medium	Medium	No	No	Ice Rink	No	No
Field South of MSV Entrance	Medium	High	Medium	Yes	Medium	Low	Yes	Medium	Medium	Yes	No		No	Yes

Goals

- ImproveMatrix
  - Developingcriterion
    - Validity
  - Sites
    - Proposal
    - Investigation
- Evaluation
  - BMPs
  - Cultural