NE 138th Street Rain Garden Cluster

Background

Rain gardens are a beautiful and effective means of reducing the volume and improving the quality of stormwater runoff. The purpose of the City of Kirkland's rain garden program is threefold: to reduce stormwater runoff, to educate our citizens about stormwater issues, and to involve them in stormwater management by installing rain gardens on existing residential properties.

Constructing rain gardens to serve existing residential properties is a win-win proposition: The City receives the benefit of reduced stormwater flow at a very low cost compared to traditional flow control facilities in the city right of way, while the homeowner receives a beautiful garden that will complement their home. The project also educates residents about stormwater problems, and involves them in a solution to those problems.

The specific goal of the program is to install a cluster of 6-8 rain gardens on residential properties in a different neighborhood each year. Property owners agree to maintain the rain gardens. The project is funded using funds from the Stormwater Awareness line item of the Customer Service Professional Services budget.

NE 138th Street Rain Gardens

2012 was the pilot year of the rain garden program. Seven rain gardens were constructed on six properties in October 2012. The City of Kirkland worked with a group of NE 138th Street homeowners along with Rain Dog Designs, a landscape design company, to design, construct and plant the gardens.

The project began with a rain garden workshop presented by Stewardship Partners in May 2012. The workshop focused on the beauty and importance of rain gardens and gave an overview of the construction process. At the workshop, the City asked for volunteers to recruit a group of six to eight neighbors to participate in a rain garden installation project. Multiple workshop participants expressed interest in recruiting their neighbors.

An especially enthusiastic participant from the Finn Hill neighborhood recruited eight of her neighbors shortly after the workshop.

Working with this enthusiastic homeowner, the City scheduled an initial meeting with her neighbors. At the meeting, the neighbors were given an introduction to rain gardens, the construction process and the City of Kirkland's program.

Following the meeting, assessments were conducted with each homeowner to determine the best size and location for each garden. The designer from Rain Dog Designs then worked with each homeowner to design a garden that fit in with existing landscaping and their lifestyle.

When the homeowners had signed off on their garden designs and had signed a Rain Garden Maintenance Covenant from the City, we were able to start the construction process. A landscape contractor was chosen through a Small Public Works Roster bid process. The contractor excavated the site for each rain garden, laid out

the flex pipe that delivers water to each garden, constructed the garden's overflow and amended the garden's soil as needed with compost.

The culminating activity for this project was the planting of the rain gardens on a neighborhood planting day. On October 20th, the homeowners and volunteers worked together to plant all the participants' gardens.

Project Timeline

Rain garden workshop	Stewardship Partners, City of Kirkland	May 16
Design contract	Rain Dog Designs, City of Kirkland	June 25
Initial meeting with NE 138th Street neighborhood	NE 138th Street residents, Rain Dog Designs, City of Kirkland	July 26
Soil testing	NE 138th Street residents	August 1 – 14
Utility locate	Rain Dog Designs	August 29 – 31
Garden design, contractor meets with individual property owners	NE 138th Street residents, Rain Dog Designs	August 20 – 31
Meet to review & sign off on garden designs; distribute maintenance covenants for homeowners' signatures	NE 138th Street residents, Rain Dog Designs, City of Kirkland	August 28
Small Public Works Project bid process	City of Kirkland	September 11 – 24
Collect signed rain garden maintenance covenants	City of Kirkland	August 18 – October 5
Garden construction	Rain Dog Designs and subcontractor	October 8 – 12
Rain garden planting day	NE 138th Street residents, Rain Dog Designs, City of Kirkland	October 20

Project Budget

Design Contract	Presentation to neighborhood, meetings with homeowners, utility locates, homeowner interviews regarding design, homeowner sign-off on design, supervise construction and installation process, planting day, order and purchase plants, final project report	$13,977.18
Construction Contract	Excavation and installation of seven rain gardens, as well as the installation of	$15,880 + tax

	appropriate mulch, drain rock, flex pipe and interpretive signs, as well as excavation, loading, hauling and disposal of excess materials.	

Internal Process

The internal City process for a project depends on the cost of the work to be completed. For this project, we used a noncompetitive process for the design contract (we were only aware of one company providing this service) and a Small Works Roster process for the construction contract.

Design Contract

- Interview potential designers
- Write up scope
- Select designer and route PSA

Maintenance Covenant

- Draft covenant
- Have covenant reviewed/edited by City attorney
- Distribute maintenance covenant paperwork to participants for signature and notarization
- Record covenants and associated paperwork with King County

Construction Contract

- Write Small Public Works bid document; incorporate all steps of construction process – including excavation, installation and disposal into bid document
- Have document reviewed by CIP engineer
- Select potential landscape contractors off the Shared Procurement Portal's Small Works Roster
- Send invitation to bid to selected contractors
- Review bids and award contract
- Process purchase order or contract, as defined by project cost
- Be sure that contractor submits all required prevailing wage documentation
- Monitor garden construction

Lessons Learned

This pilot rain garden project was definitely a learning experience for City staff. Here are a few lessons that staff learned:

- Conduct preliminary research and estimate project costs prior to contracting

- Consult with Purchasing Agent early in the project planning stages regarding proper purchasing and contracting procedures. Have clear and definite guidance prior to starting contracting process
- Consult with a CIP engineer early in the project planning stages and throughout the project to get their input/guidance on bid document, contract and project management. Have engineer manage process?
- Set up date for rain garden planting and an alternative date that work for as many project participants as possible
- Have as much of a presence as possible during rain garden construction. Visit site at least twice a day
- Having a contractor with outreach experience was essential to project success
- Decide primary focus early – outreach or flow control?

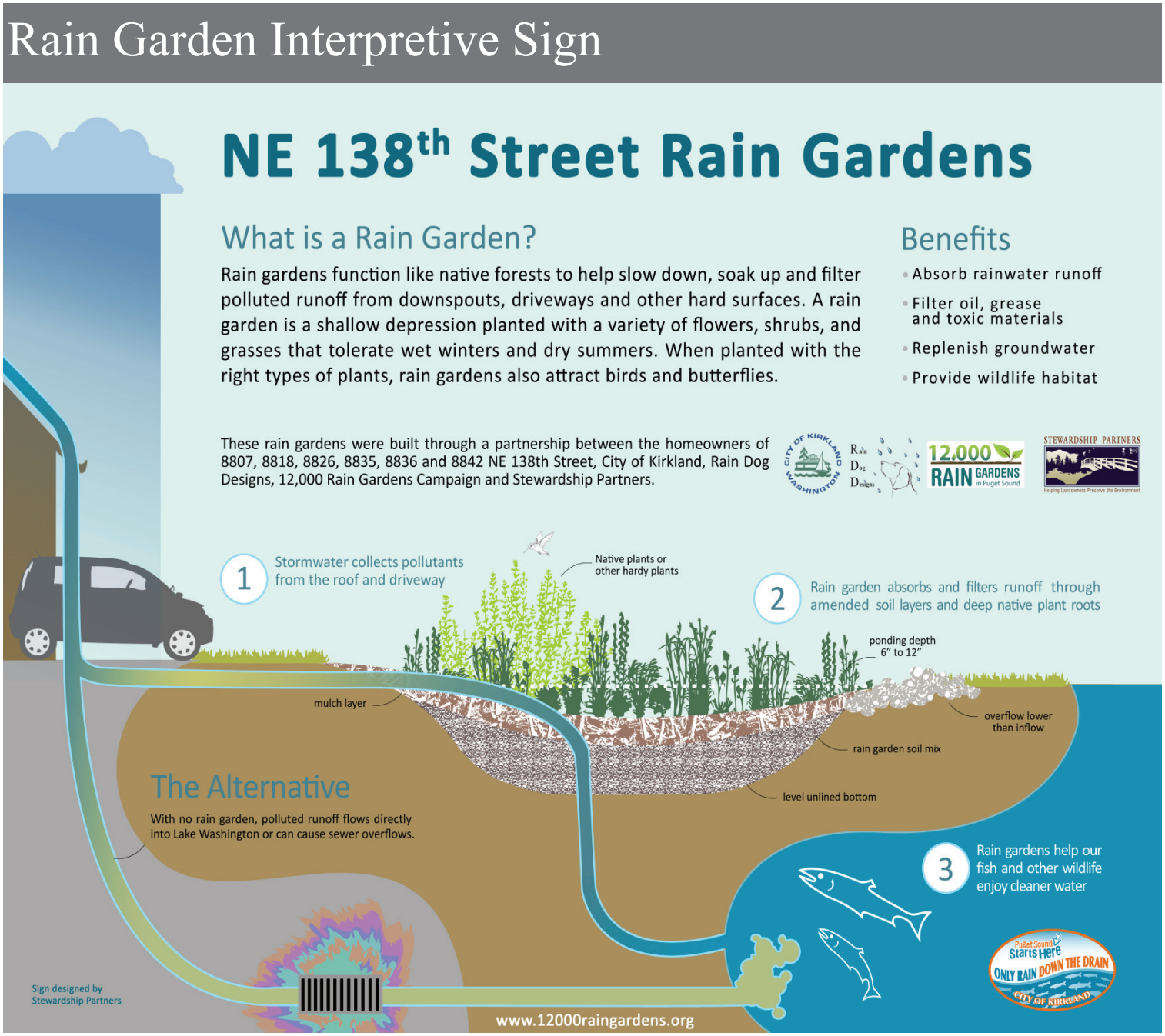
Rain Garden Locations

Rain Gardens Location Key

1. 8807 NE 138th St
2. 8818 NE 138th St
3. 8826 NE 138th St
4. 8836 NE 138th St
5. 8836 NE 138th St
6. 8842 NE 138th St
7. 8835 NE 138th St

i Interpretive Sign

Rain Garden Interpretive Sign



8807 NE 138th St

Dimensions and Installation Details

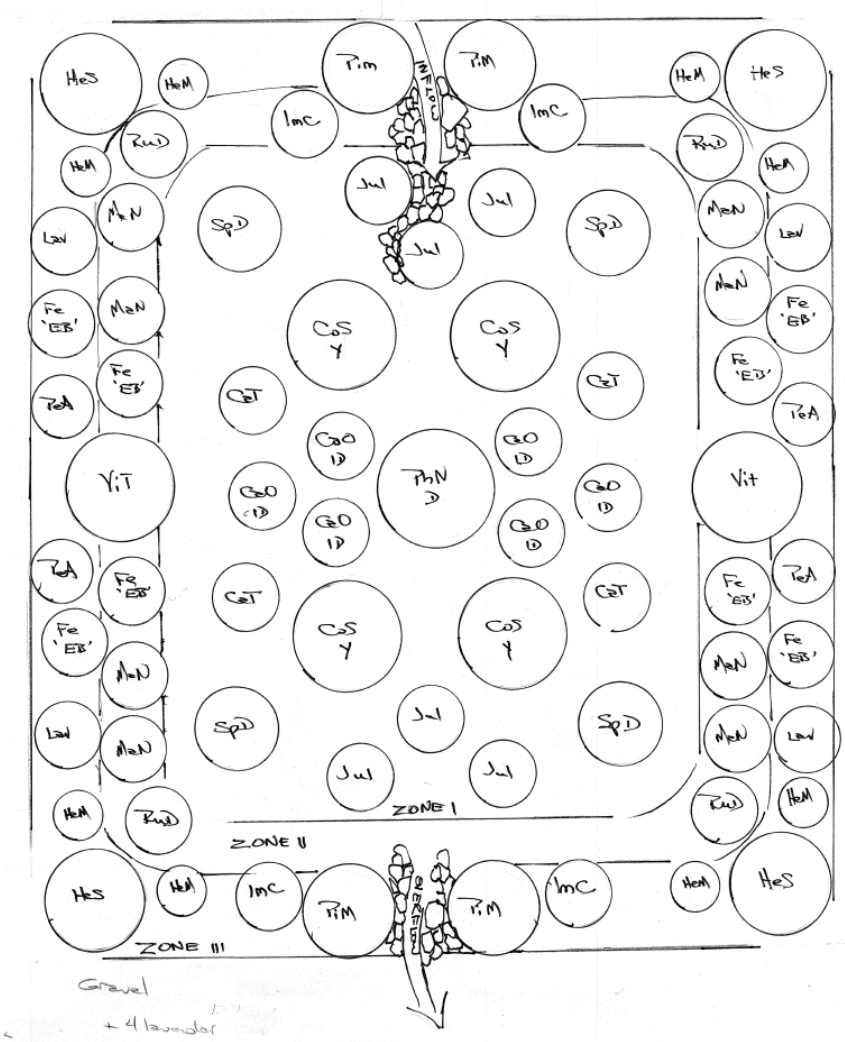

Before


After

Outside Dimensions	16’ width x 10’ length
Inside Dimensions	8’ width x 12.5’ length
Bottom Dimensions	100 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	2475 square feet
Total Roof Area Treated	975 square feet, approximate
Total Sidewalk Area Treated	None
Pond Bottom Area	100 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.5 CY
Comments	Two right front downspouts were connected into this attractive street side rain garden. The original designs was rectangular. The shape was changed just before construction start to accomodate a last minute homeowner request. The planting plan was adjusted somewhat for the new layout.

8807 NE 138th St

Layout and Planting Plan



Qty	Key	Common	Latin
4	Pim	Mugo Pine	*Pinus mugo 'Slow Mound'*
4	HeS	Blue Oat Grass	*Helictrichon sempervirens*
2	RuD	Black-eyed Susan	*Rudbeckia hirta*
4	ImC	Japanese Blood Grass	*Imperta cylindrca*
8	MaN	Low Oregon Grape	*Mahonia nervosa*
2	ViT	High Bush Cranberry	*Viburnam trilobum 'compacta'*
8	Fe'EB'	Blue Fescue	*Fescue 'Elija Blue'*
4	Lav	Lavender	*Lavender hidcote*
1	PhN D	Pacific Ninebark	*Physocarpos diablo*
6	Cos Y	Yellow Twig Dogwood	*Cornus*
4	CaT	Orange Sedge	*Carex testacea*
6	CaO	Slough Sedge	*Carex obnupta*
4	SpD	Alpine Spirea	*Spirea densifolia*
36	FrC	Lipstick Strawberry	*Fragaria chiloensis 'Lipstick'*

8818 NE 138th St

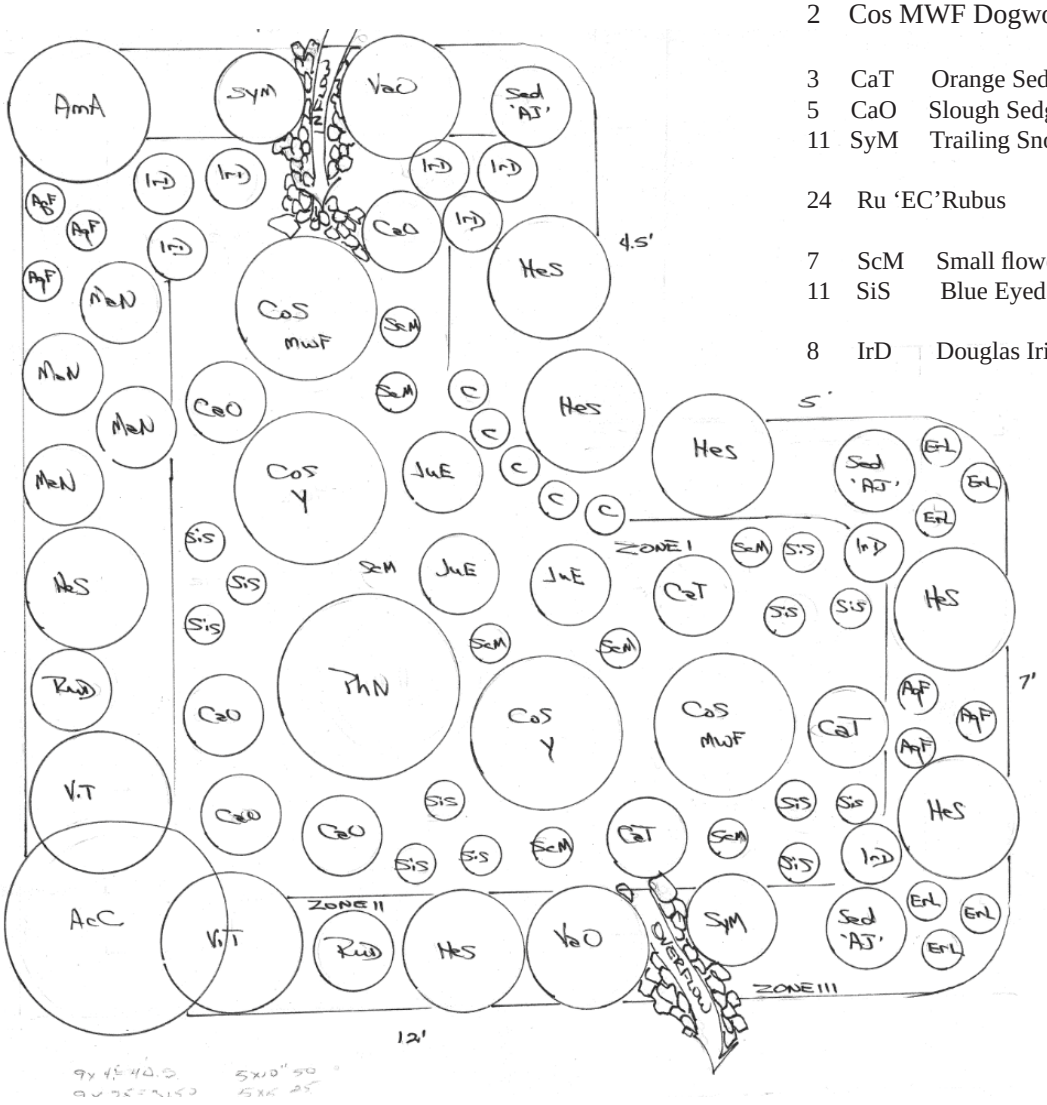
Dimensions and Installation Details

Outside Dimensions	10’ width x 12.5’ length
Inside Dimensions	8’ width x 10’ length
Bottom Dimensions	80 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	2125 square feet
Total Roof Area Treated	825
Total Sidewalk Area Treated	None
Pond Bottom Area	80 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.5 CY
Comments	Two left front downspouts were connected to the rain garden, traversing under the roots of a very old cherry tree. This street-side rain garden also sports an interepetive sign explaining the rain garden installation.

8818 NE 138th St

Layout and Planting Plan

Qty	Key	Common	Latin
2	VaO	Evergreen Huckleberry	*Vaccinium ovatum*
1	AcC	Vine maple	*Acer cinceratum*
2	Sed Aj	Autumn Joy	*Sedum 'Autumn Joy'*
4	MaN	Low Oregon Grape	*Mahonia nervosa*
2	ViT	High Bush Cranberry	*Viburnam trilobum 'compacta'*
5	C	Great Camas	*Camas leichtinii*
1	PhN	Pacific Ninebark	*Physocarpos nine bark*
2	Cos Y	Dogwood	*Cornus yellow*
2	Cos MWF	Dogwood	*Cornus 'Mid Winter Fire'*
3	CaT	Orange Sedge	*Carex testacea*
5	CaO	Slough Sedge	*Carex obnupta*
11	SyM	Trailing Snowberry	*Smyphoricarpos mollis*
24	Ru 'EC'	Rubus	*Rubus calcinoides 'Emerald Carpet'*
7	ScM	Small flowered bullrush	*Scirpus microcarpus*
11	SiS	Blue Eyed Grass	*Sisyrinchium idahoense*
8	IrD	Douglas Iris	*Iris douglassii*



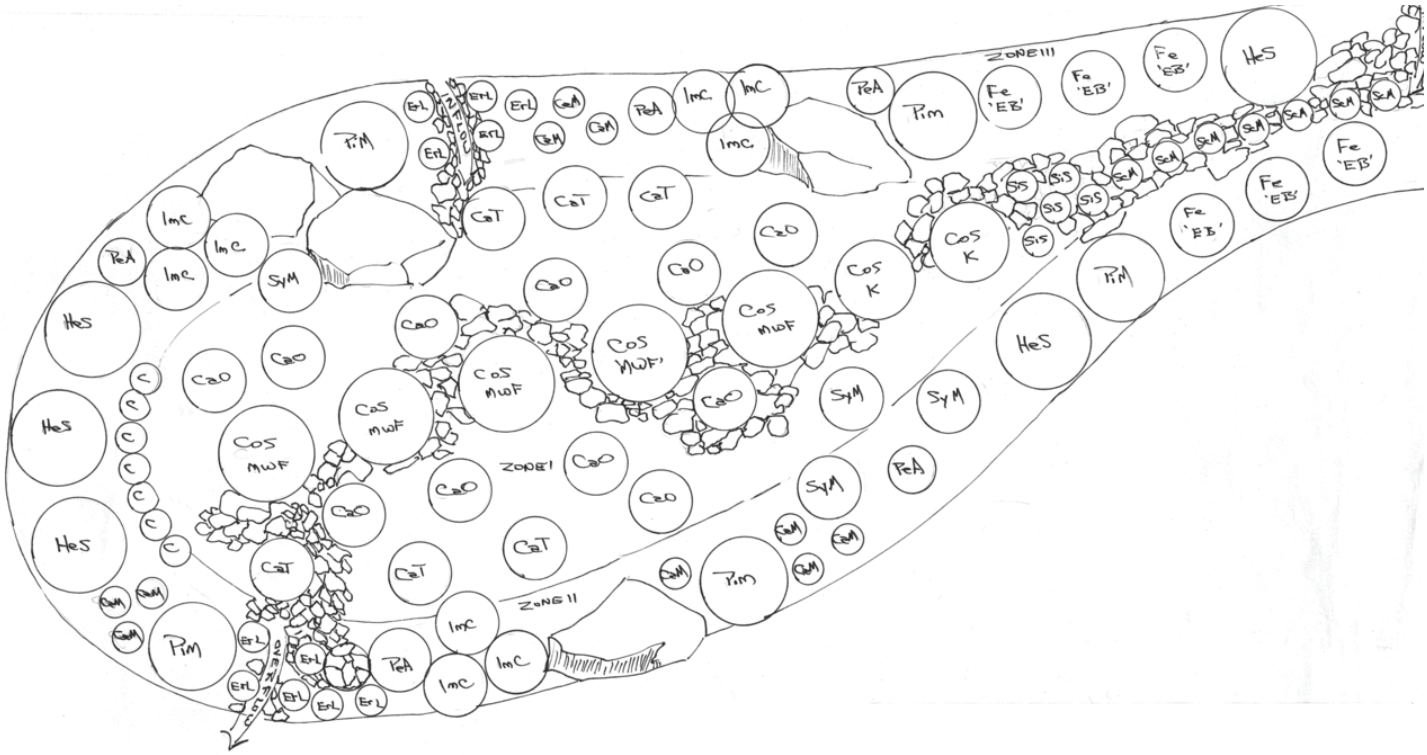
8826 NE 138th St

Dimensions and Installation Details

Outside Dimensions	10’ width x 23’ length
Inside Dimensions	7’ width x 16’ length; 5’ x 1’
Bottom Dimensions	120 square feet
Side Slopes	3:1, approximate
Downspouts Connected	3
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	2100 square feet
Total Roof Area Treated	1175
Total Sidewalk Area Treated	Approx 200 square feet of driveway into rain garden
Pond Bottom Area	120 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.75 CY
Comments	Two left and one right downspout were connected to rain garden. A portion of the asphalt driveway was removed to bring right side downspout into rain garden. It was replaced with pervious pavers and allows some driveway flow into rain garden at low point. Homeowner sponsored additional rain garden in rear to disconnect and infiltrate remaining roof surface.

8826 NE 138th St

Layout and Planting Plan



Qty	Key	Common	Latin
5	HeS	Blue Oat Grass	*Helictirchon sempervirens*
5	PiM	Dwarf Mugo Pine	*Pinus mugo 'Slowmound'*
9	ImC	Japanese Blood Grass	*Impert cylindrica*
10	Erl	Wolly Sunshine	*Eriophylllum lanatum*
5	PeA	Russian Sage	*Pervskia atrplicifolia*
6	Fe'EB'	Blue Fescue	*Fescue 'Elija Blue'*
2	CaM	Paradise Manzanita	*Arctostaphylos pajaroensis*
2	Cos MWF	Dogwood	*Cornus 'Mid Winter Fire'*
11	CaO	Slough Sedge	*Carex obnupta*
6	CaT	Orange Sedge	*Carex testacea*
7	ScM	Small flowered bullrush	*Scirpus microcarpus*
5	CoS K	Dogwood	*Cornus kelysei*
5	Sis	Blue Eyed Grass	*Sisyrinchium idahoense*
7	ScM	Small flowered bullrush	*Scirpus microcarpus*
11	SyM	Trailing Snowberry	*Smyphoricarpos mollis*
7	C	Great Camas	*Camas leichtinii*
36	FrC	Lipstick Strawberry	*Fragaria chiloensis 'lipstick'*

8836 NE 138th St

Dimensions and Installation Details (1 of 2 rain gardens)

Outside Dimensions	7’ width x 15’ length
Inside Dimensions	3’ width x 11’
Bottom Dimensions	33 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	1450 square feet
Total Roof Area Treated	1450 square feet
Total Sidewalk Area Treated	None treated
Pond Bottom Area	33 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.50 CY
Comments	This is the West side rain garden and collects from downspouts in front and rear of the house. This rain garden was installed to disconnect and infiltraton rain water that often collected in the adjacent property. 8836 is completely disconnected from the stormwater system.

8836 NE 138th St

Layout and Planting Plan (West Rain Garden)

Qty	Key	Common	Latin
3	Cos MWF	Dogwood	*Cornus 'Mid Winter Fire'*
4	CaO	Slough Sedge	*Carex obnupta*
8	IcD	Dougas Iris	*Iris douglassii*
8	MaN	Creeping Oregon Grape	*Mahonia repens*
3	SyM	Creeping Snowberry	*Symphoricarpos mollis*
3	SyM	Snowberry	*Symphoricarpos albus*
2	PiM	Mugo Pine	*Pinus mugo 'Slow Mound'*
6	Fe'EB'	Blue Fescue	*Fescue 'Elija Blue'*
2	CaT	Orange Sedge	*Carex testacea*
6	ErL	Wolly Sunshine	*Eriophyllum lanatum*
5	HeS	Blue Oat Grass	*Helictirchon sempervirens*
18	FrC	Coastal Strawberry	*Fragaria chiloensis*
18	FrC	Lipstick Strawberry	*Fragaria chiloensis 'Lipstick'*

8836 NE 138th St

Dimensions and Installation Details (2 of 2 rain gardens)

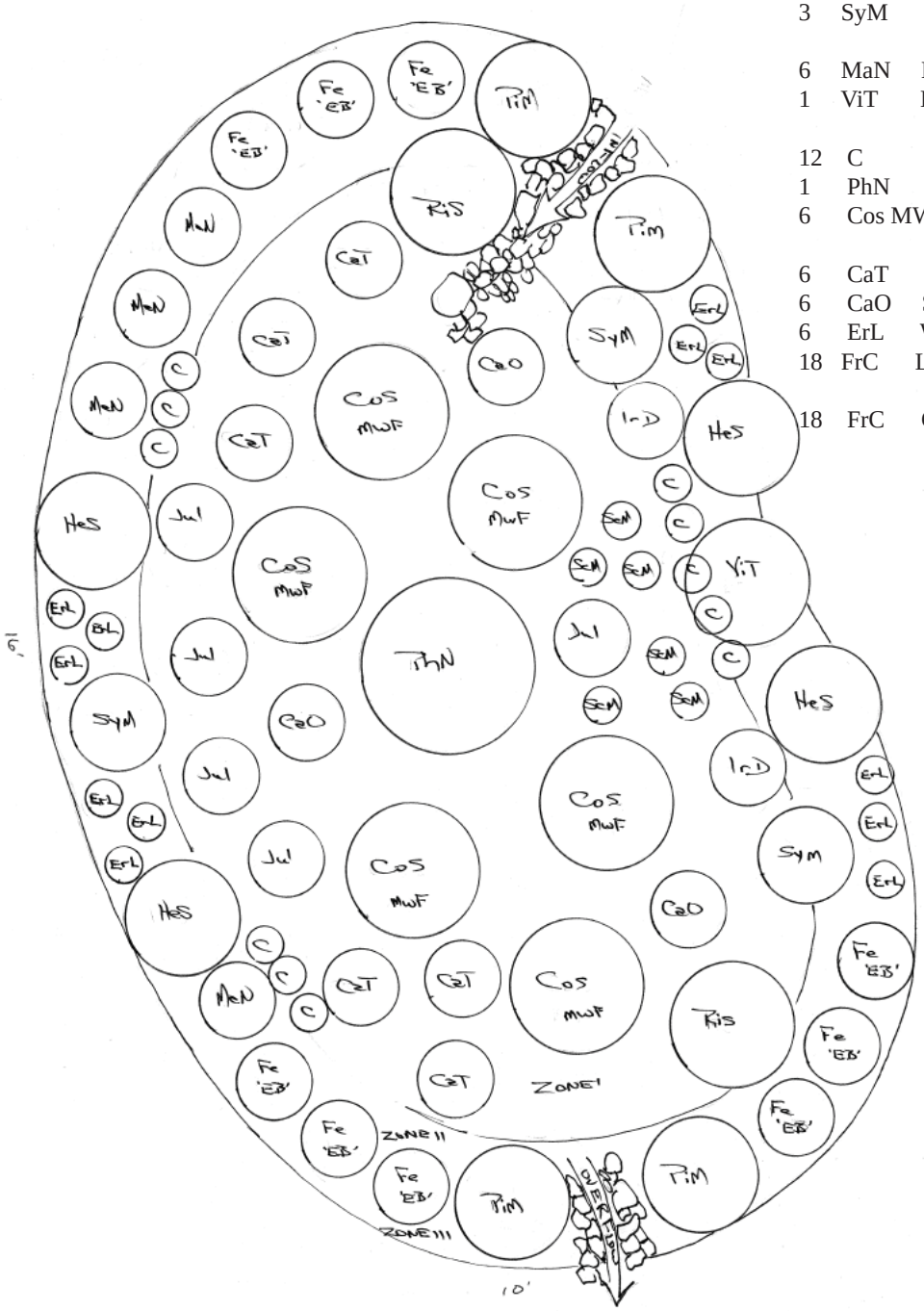

Before


After

Outside Dimensions	10’ width x 16’ length
Inside Dimensions	8’ width x 12.5’
Bottom Dimensions	100 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	1450 square feet
Total Roof Area Treated	1450
Total Sidewalk Area Treated	None treated
Pond Bottom Area	100 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.50 CY
Comments	This is the East side rain garden and collects from downspouts in front and rear of the house. The other rain garden on the West side was installed to disconnect and infiltraton rain water that often collected in the adjacent property. 8836 is completely disconnected from the stormwater system.

8836 NE 138th St

Layout and Planting Plan (East Rain Garden)



Qty	Key	Common	Latin
4	Pim	Mugo Pine	*Pinus mugo 'Slow Mound'*
7	Fe'EB'	Blue Fescue	*Fescue 'Elija Blue'*
1	RiS	Currant	*Ribes sanquineum*
3	SyM	Snowberry	*Symphoricarpos mollis*
6	MaN	Low Oregon Grape	*Mahonia nervosa*
1	ViT	High Bush Cranberry	*Viburnam trilobum 'compacta'*
12	C	Great Camas	*Camas leichtinii*
1	PhN	Pacific Ninebark	*Physocarpos diablo*
6	Cos MWF	Dogwood	*Cornus 'Mid Winter Fire'*
6	CaT	Orange Sedge	*Carex testacea*
6	CaO	Slough Sedge	*Carex obnupta*
6	ErL	Wolly Sunshine	*Eriophyllum lanatum*
18	FrC	Lipstick Strawberry	*Fragaria chiloensis 'lipstick'*
18	FrC	Coastal Strawberry	*Fragaria chiloensis*

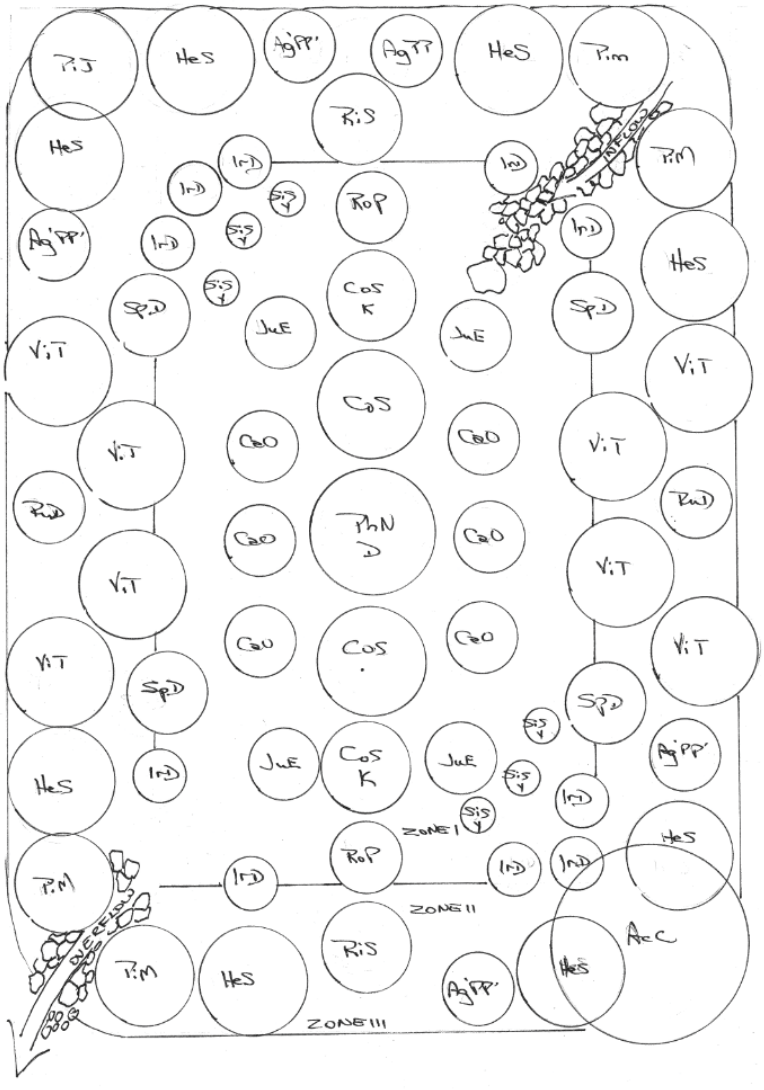
8842 NE 138th St

Dimensions and Installation Details

Outside Dimensions	10’ width x 14’ length
Inside Dimensions	6’ width x 10’
Bottom Dimensions	60 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	1250 square feet
Total Roof Area Treated	625 square feet
Total Sidewalk Area Treated	None treated
Pond Bottom Area	60 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.50 CY
Comments	A front and rear downspouts equal half of the roof surface and are now connected into the rain garden at this home. Moving the rain water from the rear to the front reduces water pooling in the back yard.

8842 NE 138th St

Layout and Planting Plan



Qty	Key	Common	Latin
2	PiM	Mugo Pine	*Pinus mugo 'Slow Mound'*
1	AcC	Vine Maple	*Acer circinatum*
5	HeS	Blue Oat Grass	*Helictirchon sempervirens*
1	PiJ	Pieris	*Pieris japonica*
5	Ag'PP'	Lily of the Night	*Agapantha 'Peter Pan'*
6	ViT	Viburnum	*Virbunum trilobum 'compacta'*
4	SpD	Alpine Spirea	*Spirea densifloria*
10	IcD	Douglas Iris	*Iris douglassii*
6	CaO	Slough Sedge	*Carex obnupta*
6	SyM	Creeping Snowberry	*Symphoricarpos mollis*
2	RoP	Clustered Rose	*Rosa pisocarpa*
1	PhN	Pacific Ninebark	*Physocarpus diablo*
5	Sis	Blue Eyed Grass	*Sisyrinchium idahoense*
2	RuD	Black Eyed Sussan	*Rudbeckia hirtia*
36	Ru 'EC'	Rubus	*Rubus calycinoides 'Emerald Carpet'*

8835 NE 138th St

Dimensions and Installation Details


Before


After

Outside Dimensions	10’ width x 15’ length
Inside Dimensions	8’ width x 13’ length
Bottom Dimensions	104 square feet
Side Slopes	3:1, approximate
Downspouts Connected	2
Infiltration Rate	>0.5”/ hour (well draining)
Total Roof Area	1580 square feet
Total Roof Area Treated	740 square feet
Total Sidewalk Area Treated	None treated
Pond Bottom Area	104 square feet
Excavation Depth	24 inches
Soil Mix	50% compost/50% native soil
Mulch Maintenance (1” Depth)	0.50 CY
Comments	A front and rear downspouts and are now connected into the rain garden at this home.

8835 NE 138th St

Layout and Planting Plan

Qty	Key	Common	Latin
4	PiM	Mugo Pine	*Pinus mugo 'Slow Mound'*
6	Fe'EB'	Blue Fescue	*Fescue 'Elija Blue'*
8	IcD	Douglas Iris	*Iris douglassii*
2	ViT	High Bush Cranberry	*Viburnum trilobum 'compacta'*
5	PeA	Russian Sage	*Pervskia atrplicifolia*
9	Sis	Blue Eyed Grass	*Sisyrinchium idahoense*
4	CaO	Slough Sedge	*Carex obnupta*
2	Cos MWF	Dogwood	*Cornus 'Mid Winter Fire'*
1	LoI	Black Twinberry	*Lonicera involucrata*
36	FrC	Coastal Strawberry	*Fragaria chiloensis*