

## Summary Findings

Write a story for what design data compares to baseline data (either parcel averages or specific parcel data). Descriptions should be heavy on data!

THEME Compare/Contrast Claims between baseline and design

### COVERAGES

- 1 Baseline performance: 98.3% of vegetated area = turf Design performance: 9% of vegetated area = turf. Claim 1/Coverage theme: Urban Farmer design resulted in a drastic decrease in the total % vegetated area covered with turf grass.
- 2 Baseline performance: 57.4% of total site area = impervious surfaces. Design performance: 48% of total site area = impervious surfaces. Claim 2/Coverage theme: Urban Farmer design resulted in a nearly 10% decrease of impervious surfaces on site. Only areas on site that are impervious in the Urban Farmer design are the roof and existing patios/sidewalks.

### VEGETATION & SOIL

- 1 Baseline performance: .21% of total plants = Human health value - therapeutic, 0% edible/medicinal, 0%(F???). Design performance: 69% of the total plants = edible/medicinal. Claim 1/Vegetation & soil theme: Urban Farmer design resulted in a 68.79% increase of edible plants on site.
- 2 Baseline performance: .7% of total plants = bee-friendly. 0% = butterfly friendly. Design performance: 40% of total plants = bee friendly. 46% of total plants = butterfly friendly. Claim 2/Vegetation & soil theme: Urban Farmer greatly improved the habitat needed for pollinators.
- 3 Baseline performance: Stormwater interception (National Tree Benefit Calculator)(assuming trees at maturity)- 6,523 gal. Design performance: 7782 gal. Claim 3/Vegetation & soil theme: over 1000 more gallons of water is being intercepted on the Urban Farmer site compared to the baseline site due to the simple addition of 3 fruit trees.

### WATER

- 1 25157 gal = total monthly required gallons for baseline. 10134 gal = total monthly required for design performance. Claim 1/water theme: Huge reduction in monthly gallon needs for site.
- 2 \$122/ month water costs with baseline site. \$52/ month water costs with Urban Farmer Design. Claim 2/water theme: Money savings when implementing design strategies set forth by Urban Farmer.
- 3 Below total monthly allowance (10919 gal) with the urban farmer design. The baseline performance indicates it was above the total monthly allowance however I will need to run the figures on the epa tool to verify.

### MATERIALS & ENERGY

- 1 Hours total yearly mowing time - 220 hours spent mowing says the baseline (doesn't seem accurate?) 4.5 hours spent mowing/yr with Urban Farmer Design. Claim 1/materials and energy - Urban farmer greatly reduces the amount of time spent mowing/weed eating the lawn/year.
- 2 22 gal of gas consumed to mow the baseline site/yr. 1.3 gal of gas consumed/yr to mow the Urban farmer. Claim 2/materials and energy- great reduction in gas costs associated with mowing the lawn
- 3 433 lbs CO2 emitted from mowing the lawn/yr for baseline. 27 lbs CO2 emitted from mowing the lawn/yr for Urban Farmer. Claim 3/materials and energy - huge drop in CO2 emissions /yr from mowing the lawn

### HUMAN HEALTH & WELL BEING

- 1 Lounge area under fruiting trees (creates a comfortable outdoor microclimate) in the Urban Farmer Design. Baseline performance provides no area to enjoy the yard within the yard. Claim 1/human health and well being - Urban Farmer provides a place to sit, relax and enjoy the yard.
- 2 Design encourages site users to explore the landscape more fully: smelling & tasting vegetation, listening to birds, feeling sun's warmth, hearing plants rustle. The baseline performance landscape misses out on these experiences due to the lack of species richness & diversity.
- 3 Baseline performance does not provide informal or formal paths to allow for landscape connectivity. Design performance- Formal pathway connecting road to house; informal pathway allowing for conveyance from road to front of house to backyard.

70 sf in turf area

ADDITIONAL OVERALL (as needed)

A4 Design Performance

COVERAGES

STUDENT: Maggie  
 Parcel ID: 3

Key:  
 included in baseline summary  
 automated formula in cell - check for correct range  
 manually enter value

SURFACE TYPE (total)	Area (SF)	% of Site
Entire Parcel	<b>9852</b>	100%
Vegetated (all)	<b>4318</b>	44%
Turfgrass	895	9%
Shrub/Perennial Zones (includes vegetable and herb beds (in-ground & raised-beds) that demand high water needs)	832	8%
Waterwise Zones (includes shrub/perennial/edible areas (in-ground as well as raised-beds) that require some additional watering but are fairly drought tolerant)	527	5%
Natural Rainfall/Drought Tolerant Zones (includes native seed mixes and some shrub beds that are exclusively drought tolerant)	2064	21%
Roof(s) (includes house roof and shed roof)	3128	32%
Other paving, concrete, decking, etc.	1591	16%
Pervious paving/hardscape	1892	19%
Pervious total (include pervious hardscape surfaces)	6210	63%
Impervious	4719	48%

Vegetation

Total Parcel Size (SF)	9852
Total Vegetated (SF):	4318

Plant Inventory (list each plant separately)

Total number of plants:	482
unique species (species richness):	54

Type	Scientific Name	Common Name	DBH (in)	Crown Width (ft)	Coverage (SF)	MT Nativity	Drought Tolerance	Wildlife Value	(C-value) we will calc. later as option	Ecological function values	Human health values	Other values (plant ranks)	Pop: Total Qty by species (enter by hand in 1 row/species)	Abundance: Species % by Richness	Sum of Coverage for each species (calc by hand or create formula) SF	Density/Evenness: Species % by Veg Cover (do not calc. for trees)	
Trees	Picea pungens	Colorado Spruce	10	14	154	0	1 Bd						1	0%	154		
	Populus tremuloides	Quaking Aspen	10	14	154	1	0 Bd							0%			
	Populus tremuloides	Quaking Aspen	10	14	154	1	0 Bd							0%			
	Populus tremuloides	Quaking Aspen	10	14	154	1	0 Bd						3	1%	462		
	Prunus cerasus 'North Star'	Dwarf North Star Cherr	10	9	64	0	0 Be, Bd, Bf				EM		1	0%	64		
	Prunus domestica 'Mount Ro	Mount Royal Plum	10	9	64	0	0 Bd, Be				EM		1	0%	64		
	Prunus hybrida 'Lydecker'	Black Ice Cherry Plum	10	9	64	0	0 Bd, Be				EM		1	0%	64		
	Prunus pumila v. besseyi	Western Sandcherry	10	16	201	1	3 Bd, Bf				EM		1	0%	201		
	Syringa reticulata	Japanese Tree Lilac	10	16	201	0	3 Bf, Hummingbirds								0%		
	Syringa reticulata	Japanese Tree Lilac	10	16	201	0	3 Bf, Hummingbirds							3	1%	603	
Shrubs	1 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	2 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	3 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	4 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	5 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	6 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	7 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	8 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	9 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	10 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	11 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	12 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	13 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	14 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	15 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	16 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	17 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	18 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	19 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	20 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	21 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	22 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			0%		0%	
	23 Chrysothamnus viscidiflorus	Green Rabbitbrush		3.5	10	1	3 Bf, Dr, Ma				EM			23	5%	230	5%
	1 Philadelphus lewisii	Lewis's Mockorange		6	28	1	3 Dr, Be			EC				0%		0%	
	2 Philadelphus lewisii	Lewis's Mockorange		6	28	1	3 Dr, Be			EC				0%		0%	
	3 Philadelphus lewisii	Lewis's Mockorange		6	28	1	3 Dr, Be			EC				0%		0%	
	4 Philadelphus lewisii	Lewis's Mockorange		6	28	1	3 Dr, Be			EC				4	1%	112	3%
	1 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
	2 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
	3 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
	4 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
	5 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
	6 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							0%		0%	
7 Physocarpus malvaceus	Ninebark		4	13	1	3 Be, Bd, Ma							7	1%	91	2%	
1 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
2 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
3 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
4 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
5 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
6 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
7 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
8 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		
9 Ribes aureum	Golden Currant		4	13	1	3 Bf, Hummingbirds				EM			0%		0%		

	10	Ribes aureum	Golden Currant	4	13	1	3 Bf, Hummingbirds	EM		0%		0%
	11	Ribes aureum	Golden Currant	4	13	1	3 Bf, Hummingbirds	EM		0%		0%
	12	Ribes aureum	Golden Currant	4	13	1	3 Bf, Hummingbirds	EM		0%		0%
	13	Ribes aureum	Golden Currant	4	13	1	3 Bf, Hummingbirds	EM	13	3%	169	4%
	1	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	2	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	3	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	4	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	5	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	6	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	7	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	8	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	9	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	10	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM		0%		0%
	11	Ribes inerme	Gooseberry	3	7	1	3 Bd	EM	11	2%	77	2%
	1	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	2	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	3	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	4	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	5	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	6	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	7	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	8	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	9	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM		0%		0%
	10	Rubus spp.	Raspberry	2.5	5	0	0 Bd, Be	EM	10	2%	50	1%
	1	Shepherdia argentea	Silver Buffaloberry	7	38	1	3 Bd, Be, Ma, Dr,	EC, windbreak, NF EM		0%		0%
	2	Shepherdia argentea	Silver Buffaloberry	7	38	1	3	EC, windbreak, NF EM		0%		0%
	3	Shepherdia argentea	Silver Buffaloberry	7	38	1	3	EC, windbreak, NF EM		0%		0%
	4	Shepherdia argentea	Silver Buffaloberry	7	38	1	3	EC, windbreak, NF EM	4	1%	152	4%
Grasses												
seed		Bouteloua gracilis	Blue Grama		202	1	3 Bd, Ma, Dr, Bf	EC	1	0%	202	5%
seed		Elymus trachycaulus ssp. tra	Slender Wheatgrass		621	1	3 Bd, Ma, Dr	EC	1	0%	621	14%
seed		Festuca idahoensis	Idaho Fescue		202	1	2 Bd, Ma, Dr	EC	1	0%	202	5%
seed		Leymus cinereus	Basin Wildrye		419	1	3 Bd, Ma, Dr	EC	1	0%	419	10%
seed		Pseudoroegneria spicata ssp.	Bluebunch Wheatgrass		419	1	3 Bd, Ma, Dr	EC	1	0%	419	10%
Other Perennials (include kentucky bluegrass turf in list)												
	1	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	2	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	3	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	4	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	5	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	6	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	7	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	8	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	9	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	10	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	11	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	12	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	13	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	14	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	15	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	16	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	17	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	18	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	19	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM		0%		0%
	20	Achillea millefolium	Yarrow	2	3	1	3 Bf, Be	EM	20	4%	60	1%
	1	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	2	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	3	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	4	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	5	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	6	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	7	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	8	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	9	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	10	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	11	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	12	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	13	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	14	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%
	15	Arnica cordifolia	Heartleaf Arnica	2	3	1	1 Bd, Be, Bf, Dr, Ma			0%		0%





	17	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	18	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	19	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	20	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	21	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	22	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	23	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	24	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	25	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	26	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	27	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be					0%		0%
	28	Heuchera cylindrica	Roundleaf Alumroot	2	3	1	3 Be				28	0%	84	2%
	1	Humulus lupulus	Common Hops	3	7	0	1 Bd, Be, Bf, Ma		EM			0%		0%
	2	Humulus lupulus	Common Hops	3	7	0	1 Bd, Be, Bf, Ma		EM			0%		0%
	3	Humulus lupulus	Common Hops	3	7	0	1 Bd, Be, Bf, Ma		EM			0%		0%
	4	Humulus lupulus	Common Hops	3	7	0	1 Bd, Be, Bf, Ma		EM		4	1%	28	1%
	1	Levisticum officinale	Lovage	2.5	5	0	0		EM			0%		0%
	2	Levisticum officinale	Lovage	2.5	5	0	0		EM			0%		0%
	3	Levisticum officinale	Lovage	2.5	5	0	0		EM		3	1%	15	0%
	1	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	2	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	3	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	4	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	5	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	6	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	7	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	8	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	9	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	10	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	11	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	12	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	13	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	14	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	15	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	16	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	17	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	18	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	19	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC			0%		0%
	20	Linum lewisii	Lewis's Flax	2	3	1	3 Bd, Be		EC		20	4%	60	1%
	1	Melissa officinalis	Lemon Balm	2.5	5	0	2 Be		EM			0%		0%
	2	Melissa officinalis	Lemon Balm	2.5	5	0	2 Be		EM			0%		0%
	3	Melissa officinalis	Lemon Balm	2.5	5	0	2 Be		EM		3	1%	15	0%
	1	Nepeta cataria	Catnip	3	7	0	3 Bf, Ma (cats)		EM			0%		0%
	2	Nepeta cataria	Catnip	3	7	0	3 Bf, Ma (cats)		EM		2	0%	14	0%
	1	Poa pratensis	Kentucky Blue Turf		895	0	0		Open Space		1	0%		0%
	1	Vitis riparia	Riverbank Grape	4	13	1	1 Be, Dr, Ma		EM			0%		0%
	2	Vitis riparia	Riverbank Grape	4	13	1	1 Be, Dr, Ma		EM		2	0%	26	1%
Annuals														
(Biennial grown as annual)														
		Allium cepa	Onion	1	1	0	0		EM			0%		0%
	2	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	3	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	4	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	5	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	6	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	7	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	8	Allium cepa	Onion	1	1	0	0		EM			0%		0%
	9	Allium cepa	Onion	1	1	0	0		EM		9	2%	9	0%
	1	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	2	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	3	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	4	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	5	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	6	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	7	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	8	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	9	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	10	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	11	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	12	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	13	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	14	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%
	15	Allium sativum	Garlic	1	1	0	0 Bf		EM			0%		0%



16	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
17	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
18	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
19	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
20	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
21	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
22	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
23	Allium sativum	Garlic	1	1	0	0 Bf	EM	0%		0%
24	Allium sativum	Garlic	1	1	0	0 Bf	EM	5%	24	1%
1	Allium schoenoprasum	Chives	2	3	0	0	EM	0%		0%
2	Allium schoenoprasum	Chives	2	3	0	0	EM	0%	6	0%
1	Anethum graveolens	Dill	2.5	5	0	0 Be, Bf	EM	0%		0%
2	Anethum graveolens	Dill	2.5	5	0	0 Be, Bf	EM	0%	10	0%
1	Citrullus lanatus	Watermelon	3	7	0	0 Be	EM	0%		0%
2	Citrullus lanatus	Watermelon	3	7	0	0 Be	EM	0%	14	0%
1	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
2	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
3	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
4	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
5	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
6	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
7	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
8	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
9	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
10	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
11	Cucumis sativus	Cucumber	1	1	0	0	EM	0%		0%
12	Cucumis sativus	Cucumber	1	1	0	0	EM	2%	12	0%
1	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
2	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
3	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
4	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
5	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
6	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
7	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
8	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
9	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
10	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
11	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
12	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
13	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
14	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
15	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
16	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
17	Cucurbita pepo	Pumpkin	4	13	0	0	EM	0%		0%
18	Cucurbita pepo	Pumpkin	4	13	0	0	EM	4%	234	5%
(biennial grown as annual)	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
2	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
3	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
4	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
5	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
6	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
7	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
8	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
9	Daucus carota var. sativus	Carrot	1	1	0	0	EM	0%		0%
10	Daucus carota var. sativus	Carrot	1	1	0	0	EM	2%	10	0%
1	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
2	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
3	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
4	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
5	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
6	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
7	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
8	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
9	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
10	Lactuca sativa	Lettuce	1	1	0	0	EM	0%		0%
11	Lactuca sativa	Lettuce	1	1	0	0	EM	2%	11	0%
1	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	0%		0%
2	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	0%		0%
3	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	0%		0%
4	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	0%		0%
5	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	0%		0%
6	Lycopersicon lycopersicum	Tomato	2.5	5	0	0	EM	1%	30	1%

	1	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	2	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	3	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	4	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	5	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	6	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	7	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	8	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM		0%		0%
	9	Matricaria recutita	Chamomile	1	1	0	2 Be, Bf		EM	9	2%	9	0%
	1	Origanum vulgare	Oregano	1	1	0	3 Bf		EM		0%		0%
	2	Origanum vulgare	Oregano	1	1	0	3 Bf		EM	2	0%	2	0%
	1	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	2	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	3	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	4	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	5	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	6	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	7	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	8	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	9	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	10	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	11	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM		0%		0%
	12	Phaseolus vulgaris	Pole Bean	4	13	0	0	NF	EM	12	2%	156	4%
	1	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	2	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	3	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	4	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	5	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	6	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	7	Pisum sativum	Garden Pea	1	1	0	0	NF	EM		0%		0%
	8	Pisum sativum	Garden Pea	1	1	0	0 Bd, Bf, Be, Ma	NF	EM	8	2%	8	0%
	1	Salvia officinalis	Sage	2	3	0	3 Bf		EM		0%		0%
	2	Salvia officinalis	Sage	2	3	0	3 Bf		EM	2	0%	6	0%
(Perennial grown as annual)		Solanum tuberosum	Irish Potato	2	3	0	0		EM		0%		0%
	2	Solanum tuberosum	Irish Potato	2	3	0	0		EM		0%		0%
	3	Solanum tuberosum	Irish Potato	2	3	0	0		EM		0%		0%
	4	Solanum tuberosum	Irish Potato	2	3	0	0		EM		0%		0%
	5	Solanum tuberosum	Irish Potato	2	3	0	0		EM		0%		0%
	6	Solanum tuberosum	Irish Potato	2	3	0	0		EM	6	1%	18	0%
	1	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	2	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	3	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	4	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	5	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	6	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	7	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	8	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	9	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	10	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	11	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	12	Spinacea oleracea	Spinach	1	1	0	0		EM		0%		0%
	13	Spinacea oleracea	Spinach	1	1	0	0		EM	13	3%	13	0%
	1	Thymus vulgaris	Thyme	1	1	0	3 Bf		EM		0%		0%
	2	Thymus vulgaris	Thyme	1	1	0	3 Bf		EM	2	0%	2	0%
	1	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	2	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	3	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	4	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	5	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	6	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	7	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	8	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	9	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	10	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	11	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	12	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	13	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	14	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	15	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	16	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	17	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM		0%		0%
	18	Zea mays var. saccharata	Sweet Corn	2	3	0	0		EM	18	4%	54	1%

Descriptive Stats

Nativity	Freq	% of total plants	% coverage of veg area
# of plants=0		225	47%
# of plants=1		257	53%
# of plants=2		0	0%

Drought Tolerance	Freq	% of total plants	% coverage of veg area
# of plants=0		173	36%
# of plants=1		26	5%
# of plants=2		98	20%
# of plants=3		181	38%

Wildlife Value	Freq	% of total plants	Key Reference
# of plants=Bd		172	36% Bd
# of plants=Bf		221	46% Bf
# of plants=Be		193	40% Be
# of plants=Dr		82	17% Dr
# of plants=Ma		92	19% Ma

Ecological Funct.	Freq	% of total plants	Key Reference
# of plants=EC		33	0.06846473 EC
# of plants=NF		24	0.049792531 NF
# of plants=BT		0	0 BT
other?		53	?

Human Health	Freq	% of total plants	Key Reference
# of plants=EM		332	0.68879668 EM
# of plants=F		0	0 F
# of plants=TH		0	0 TH
other?		333	?

FQI	Freq	% of total plants	Key Reference
Floristic Quality Index			

Summary of Tree and Shrub Benefits based National Tree Benefits Calculator:

(Need to retroactively run these values for all existing/baseline trees)

Tree Species	Existing/Baseline (B) or Added/Design (D)	Overall Benefits Notes	Yearly Benefits							
			Storm Water Interception (gal)	Property Value (\$)	Energy - Conserves Electricity for cooling (kilowatt)	Energy - Reduces consumption of oil/natural gas (therms)	CO2 - Reduces atmospheric carbon (lbs)			
Picea pungens	B		10	\$117	1,626	90	42	4.95 \$0.35	203	
Populus tremuloides	B		10	\$113	1,000	87	71	7.59 NO2 \$0.50 avoidance	304	
Populus tremuloides	B		10	\$113	1,000	87	71	7.59 NO2 \$0.50 avoidance	304	
Populus tremuloides	B		10	\$113	1,000	87	71	7.59 NO2 \$0.50 avoidance	304	
Prunus cerasus 'North Star'	D		10	\$69	299.00	57	35	3.6 of O3 \$0.48 deposition	194	
Prunus domestica 'Mount Royal'	D		10	\$22	661.00	8	26	3.14 of O3 \$0.60 deposition	90	
Prunus hybrida 'Lydecker'	D		10	\$69	299.00	57	35	3.6 of O3 \$0.48 deposition	194	
Prunus pumila v. besseyi	B		10	\$113	1,000.00	87	71	7.59 \$0.50 NO2 avoidance \$0.48 deposition	304	
Syringa reticulata	B		10	\$69	299.00	57	35	3.6 of O3	194	
Syringa reticulata	B		10	\$69	299.00	57	35	3.6	194	
Syringa reticulata	B		10	\$69	299.00	57	35	3.6	194	
<b>TOTALS</b>					<b>7,782 \$</b>	<b>731.00</b>	<b>527 \$</b>	<b>56.45</b>	<b>2479</b>	
		baseline only			4,626	351	255	28	0	1,115

## A4 Design Performance

### Soils

Communicate any information related to soil conditions necessary for design features/areas/plant communities to be sustainable

Tips for soil amendments, drainage, nutrients, etc.

Current soil type:

Meadowcreek Loam

Category:	Value	
Slope	0-4%	
A	11"	loam
Bg	14"	silt loam
2C	35"	gravelly sand
pH	Generally higher than 6.5	
Surface Permeability	Mild	

### VEGETABLES / HERBS

Vegetables and herbs often require extensive soil prep in order to achieve a fruitful harvest.

**The following highlights requirements for soil based on Guide to Rocky Mountain Vegetable Gardening by Robert Gough and Cheryl Moore-Gough. ©2009.**

Onion (*Allium cepa*) - onions grow best in rich soil high in organic matter and nutrients; work in composted manure & compost & broadcast preplant fertilizer

Garlic (*Allium sativum*) - softneck garlic enjoys soil that is loose & rich; heavy soils cause irregularly shaped bulbs (cosmetic issue)

Watermelon (*Citrullus lanatus*) - nothing specific on soil; receive enough fertilizer to sustain uninterrupted growth throughout the season

Cucumber (*Cucumis sativus*) - respond well to a handful or two of manure (per plant); broadcast preplant fertilizer and sidedress once

Pumpkin (*Cucurbita pepo*) - grow well when supplied with high amounts of organic matter & moisture; add a spadeful of composted manure or compost to base of each hill

Carrot (*Daucus carota* var. *sativus*) - light, sandy soils produce early crops; stone-free soils produce most uniformly shaped roots; compacted soils cause roots to grow short and curve

Lettuce (*Lactuca sativa*) - NA

Tomato (*Lycopersicon lycopersicum*) - respond well to moderately high fertility but excess nitrogen delays maturity & results in vineyness

Pole Bean (*Phaseolus vulgaris*) - NA

Garden Pea (*Pisum sativum*) - well-drained soil high in organic matter

Irish Potato (*Solanum tuberosum*) - need well-drained, well-aerated soil

Spinach (*Spinacea oleracea*) - does well in moist soil; ideal pH 5.5-6.5; best with high fertility-spread manure

Sweet Corn (*Zea mays var. saccharata*) - fertile soil; doesn't tolerate flooding or drought

**The following highlights requirements for  
soil based on MSU EXTENSION-Herbs for  
Montana Gardens**

[store.mstuextension.org/publications/YardandGarden/MT200003AG.pdf](http://store.mstuextension.org/publications/YardandGarden/MT200003AG.pdf)

Catnip (*Nepeta cataria*) - well-drained soils

Chives (*Allium schoenoprasum*) - NA

Dill (*Anethum graveolens*) - NA

Lemon Balm (*Melissa officinalis*)- moist soil

Lovage (*Levisticum officinale*) - moist, fertile well-drained

Oregano (*Origanum vulgare*) - well-drained; neutral-slightly alkaline pH

Sage (*Saliva officinalis*)- well-drained soil

Thyme (*Thymus vulgaris*) - NA

## KEY

**MT Nativity:** Not native to MT = 0; MT native= 1; exotic/invasive =2

**Drought Tolerance:** 0=no drought tolerance, 1=low drought tolerance, 2=medium drought tolerance, 3=high drought tolerance

**Wildlife Value:** Bd = bird, Bf = butterfly, **Be** = bees, **Dr** = deer, Ma = Mammal (General)

**Ecosystem Function Values:** BT = bioremediation ability, EC = erosion control, NF = nitrogen fixer,

**Light Needs:** **F** = full sun, **PS** = partial sun, **PSh** = partial shade, **Sh** = shade

**Light Needs:** F = full sun, PS = partial sun, PSh = partial shade, Sh = shade

**Soil Moisture (the dominant condition is shown first):** D = dry, DM = dry to moist, MD = moist to dry, M = moist, MW = moist to wet, WM = wet to moist, W = wet, WMD = plant can do all three conditions

**Bloom Time:** Jn = January, F = February, Mr = March, A = April, My = May, Jn = June, Jl = July, Ag = August, S = September, O = October, N = November, D = December

**Bloom Color:** B = blue, Br = brown, G = green, L = lavender, O = orange, P = pink, Pr = purple, R = red, Ro = rose, S = silver, W = white, Y = yellow, Cr = Cream

**Other:** Info to save until there enough data to warrant additional columns

A4 Design Performance

Water

Total Parcel Size (SF)	9852
Total Vegetated Area (SF)	4318
Total Landscape Area (SF)	6210

**\*\*Irrigation Required - EPA Water Budget Tool. Save Report!\*\* ...this will be the key irrigation metric we compare/contrast between baseline and design**

Name/Location (Hydrozone, plant community, area)	Area (SF)	Plant Type (Zone/Feature)	Water Demand (high, med, low; current or assume long-term, post establish.)	Irrigation Type (need to make assumptions! You can play with these assumptions in design scenarios)	Monthly Req. Water (gal./month). (Tool will calculate)	Total Monthly Allowance	Above/Below Allowance
Turfgrass	895	Kentucky Blue Grass Edibles, vegetables, pollinators in shrub/perennial beds and raised	High	Rotor	4687	21,053	Below allowance: 10,919
Shrub / perennial beds	832	beds Waterwise Zones (includes shrub/perennial/edible areas (in-ground as well as raised-beds) that require some additional watering	High	Drip (standard)	3781		
Waterwise Zones	527	but are fairly drought tolerant) Natural Rainfall/Drought Tolerant Zones (includes native seed mixes and some shrub beds that are	Med	Drip (standard)	1666		
Drought tolerant areas	2064	exclusively drought tolerant)	Low	No irrigation	0		
Permeable hardscape	1892	pervious paving / hardscape	NA	NA	0		
<b>Total (gal.month)</b>					10,134		
<b>Equivalent 16 oz. water bottles</b>					81072		
<b>~Seasonal Req. Total (4.5 months)</b>					45603		

Roof Re-use Volumes & Rain Garden Sizing

Design storm criteria/assumptions: City of Bozeman Stormwater Ordinance: LID use, 1/2" rain, recommendation for lots over 1 acre.

Downspout Outlet Location	Catchment Area (SF)	1/2" Rainfall Volume (cf)	Surface Area for 12" Deep Rain Garden	Surface Area for 9" Deep Rain Garden	Surface Area for 6" Deep Rain Garden
North	1,600.00	63.35	63.35	95.03	126.70
South	1,800.00	71.27	71.27	106.90	142.54
East	100	3.96	3.96	5.94	7.92
		0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00
<b>Totals</b>		3500	138.5785853		
Totals (gallons)			1036.639879		

A4 Design Performance

Water Utility Costs

Base on EPA Water Budget Tool Total Water Required Monthly for baseline and design.

**DESIGN**

	Gal	HCF (1 HCF/748 gal)					Monthly Utility Bill - design	
EPA Water Budget. Total Monthly Water Required for DESIGN	10134	13.5481283						
<b>COB WATER UTILITY RATES</b>								
Year	Service Charge for 5/8" pipe	Rates /HCF. (0-7)	Rates /HCF. (8-15)	Rates/HCF (>15)	ONE MONTH	~Total Yearly Cost for Outdoor Water Required (4.5 months)		
2016	15.39	2.5	2.69	3.17	\$ 51.83	233.2550936		

**BASELINE**

	Gal	HCF (1 HCF/748 gal)					Monthly Utility Bill - baseline	
EPA Water Budget. Total Monthly Water Required for Baseline	25175	33.6564171						
<b>COB WATER UTILITY RATES</b>								
Year	Service Charge for 5/8" pipe	Rates /HCF. (0-7)	Rates /HCF. (8-15)	Rates/HCF (>15)	ONE MONTH	~Total Yearly Cost for Outdoor Water Required (4.5 months)		
2016	15.39	2.5	2.69	3.17	\$ 122.08	549.3637901		



A4 Design Performance

Materials & Energy

Fertilizer Use Per Year

Turfgrass Veg Zone Area (SF)	895
Fertilizer Applied/Year (lbs)	5.37
Total Yearly Fertilizer Costs (\$)	8.592

Mowing and Energy

Turfgrass Veg Zone Area (SF)	895
Total Yearly Mowing Time (15 min/1000sf; 20x)(hrs)	4.475
Mowing Gas Consumed (gal) Honda self propelled GCV190 Engine	1.3536875
Yearly CO2 Emissions from Mowing (lbs)	26.62703313

Tree Benefits Atmospheric Carbon Reduction - Equivalency to Burning Gasoline Emissions

Total CO2 Reduction from trees on parcel, from calculator (lbs/year)	\$ 2,479.00
Total CO2 Reduction from trees on parcel, from calculator (metric tons)	1.2395
Equiv. CO2 released by burning # gallons of gasoline (gallons)	126.0294865

Maintenance & People Energy

Task	Estimated Yearly Time (hrs)	Year/Season = 20 weeks
Weed management until establishment of drought tolerant grass mixes	20	
Mow strip around perimeter of grass mixes and to define paths	1	
Design of in-ground veg beds / season (crop rotation)	5	
In-ground veg beds & raised-herb bed prep at beginning of season	5	
Planting of vegetables	5	
IPM	5 to 10	
Mowing + weed eating of turf area in back yard	5 to 7	
Harvesting fruit from fruiting trees and shrubs	10	
Harvesting of vegetables	5 to 10	
Harvesting of herbs	1 to 5	
Pruning trees and shrubs	0 to 20	
Reseeding (if necessary)	1 to 2	

Reference Values ( LPS, Capitol Valley Methodology)

CO2 Emissions/gallon of gasoline (metric tons)	0.00892
CO2 Emissions/gallon of gasoline (lbs)	19.67
lbs/ton	2000
Turfgrass fertilizer/1000 SF (lbs)	2
Turfgrass fertilizer applications/year	3
Turfgrass fertilizer, average Home Deport (\$/lb)	\$ 1.60

**Restorative Spaces**

List features/spaces

Lounge area under fruiting trees (creates a comfortable outdoor microclimate)	70 sf in turf area
View of natural landscape settings (especially "meadow") from indoor windows	Dependent on location/view from window
Opportunities to view wildlife throughout entirety of site due to the creation of habitat for wildlife. As well as sources of food, shelter, and water	Entire site - species dependent (where the mammals/ birds will go)
raised bed by back porch accompanied with in-ground beds with varying plant heights - to create a sense of enclosure design encourages site users to explore the landscape more fully: smelling & tasting vegetation, listening to birds, feeling sun's warmth, hearing plants rustle	located in back yard off of concrete patio  found throughout entire site
ease of movement defined with clear pathways	formal pathway connecting road to house; informal pathway allowing for conveyance from road to front of house to backyard

**Culturally Significant Plants**

List features/spaces

Green Rabbit brush - sage brush steppe plant	occurs mainly at view of front of house
Bluebunch Wheatgrass = State grass	419 sf (dispersed sporadically in tall native grass mix)
Native shrubs that have edible fruit	Occuring mainly in backyard of site

**Signage; Learning Opportunities**

List features/spaces	<i>Frequency</i>
"Tea Time" Plug and Play DIY	Occurs at front of house, right of drive way
Raised herb bed (yet to be named) Plug and Play DIY	Occurs at junction of back porch/patio/entrance to southside of house
Work area - including DIY compost tumb	Occurs near shed on site

"Strawberry Side Salad" DIY

Mixed in with in-ground bed of native edible shrubs

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### Human Comfort Zones

List features/spaces

Front porch - private 140 sf

Back porch - enclosed entertainment area that connects to the vegetable area, workspace area and the open turf area

200 sf in back yard. Off of bottom right-hand corner of house.

Social interaction with passers-by Users can sit on front porch (140 sf w/ moveable seating) and engage in conversation with people on sidewalk

Work area - allows for hobbyists and DIY Area located with shed in lower left corner of site

All edible areas - relaxation / hobby to work on vegetable beds

located in back yard of house

---

### Play Spaces/Features

List features/spaces

Open turf area - conducive area for children and pets. Turf area is located in an area visible from within the house/ outdoor patio.

895 sf

Mosaic of vegetation used to encourage versatile play and opportunities for exploration, creativity, and improved motor fitness

entire site

Landscape attracts wildlife and allows for children to interact and learn from the wildlife

entire site

A4 Design Performance

**Cost Estimate**

DESIGN NAME: Urban Farmer

Date: 11/07/16

IN GENERAL:note: Blake Nursery = higher end costs. Cashman Nursery = mid costs. Westscape Nursery = low costs.

MATERIAL COSTS ONLY. Should not include demolition, irrigation retrofits, or installation labor costs.

**TAKE-OFFS**

**COST ESTIMATE**

**PLANTS/PLANT ZONES**

Refer to '\$Reference'. All applicable costs will likely not be referenced. Accurate estimates will also mean making some local phone calls on material pricing.

Botanical name	Common name	Qty	Units or Size (sf/ac/lf/sy/caliper)	Stock Type	Notes (candidate plants; symbol, abbreviation, manufacturer/supplier, etc.)	Unit Cost	Total Item Cost
<u>Trees</u>							
Prunus cerasus 'North Star'	Dwarf North Star Cherry	1	5'	Bare root	ref: Cashman Nursery	\$ 39	\$ 39
Prunus domestica 'Mount Royal P	Mount Royal Plum	1	5'	Bare root	ref: Cashman Nursery	\$ 39	\$ 39
Prunus hybrida 'Lydecker'	Black Ice Cherry Plum	1	5'	Bare root	ref: Cashman Nursery	\$ 39	\$ 39
						\$ -	\$ -
						\$ -	\$ -
<u>Shrubs</u>							
Chrysothamnus viscidiflorus	Green Rabbitbrush	23	#5	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$ 40	\$ 920
Philadelphus lewisii	Lewis's Mockorange	4	#5	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$ 40	\$ 160
Physocarpus malvaceus	Ninebark	7	#5	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$ 40	\$ 280
Ribes aureum	Golden Currant	13	#5	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$ 40	\$ 520
Ribes inerme	Gooseberry	11	#1	Bare root	ref: Cashman Nursery	\$ 15	\$ 165
Rubus spp.	Raspberry	10	#1	Bare root	ref: Cashman Nursery	\$ 5	\$ 50
Shepherdia argentea	Silver Buffaloberry	4	#5	Pot	ref: Blake Nursery, Westscape Nursery	\$ 40	\$ 160
<u>Perennials, Grasses, Other</u>							
Short Native Mix - Festuca Idahoensis, Bouteloua gracilis, Elymus trachycaulus ssp. trachycaulus	Idaho Fescue, Blue Grama, Slender Wheatgrass	3	lb	Seed	ref: Blake Nursery, Circle S Seed	\$ 17	\$ 51

Tall Native Mix - Pseudoroegneria spicata ssp. spicata, Leymus cinereus, Elymus trachycaulus ssp. trachycaulus	Bluebunch Wheatgrass, Basin Wildrye, Slender Wheatgrass	6	lb	Seed	ref: Blake Nursery, Circle S Seed	\$	17	\$	102
Achillea millefolium	Yarrow	20	#1	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$	9	\$	180
Arnica cordifolia	Heartleaf Arnica	20	#1	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$	9	\$	180
Aster laevis	Smooth Aster	30	#1	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$	9	\$	270
Aquilegia coerulea	Colorado Blue Columbine	28	#1	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$	9	\$	252
Echinacea angustifolia	Pale Purple Coneflower	34	#1	Pot	ref: Cashman Nursery, Blake Nursery, Westscape Nursery	\$	9	\$	306
Escobaria missouriensis	Pincushion Cactus	2	4"	Pot		\$	5	\$	10
Escobaria vivipara	Pincushion Cactus	2	4"	Pot		\$	5	\$	10
Fragaria spp.	Strawberry	27	#1/1yr	Bare root	ref: Blake Nursery (Fort Laramie ever-bearing strawberry) ref: Cashman	\$	1	\$	29
Heuchera cylindrica	Roundleaf Alumroot	28	#1	Pot		\$	9	\$	252
Humulus lupulus	Common Hops	4	#1	Bare root	ref: Cashman Nursery	\$	5	\$	20
Levisticum officinale	Lovage	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Linum lewisii	Lewis's Flax	20	4"	pot	ref: Westscape Nursery	\$	5	\$	90
Melissa officinalis	Lemon Balm	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Nepeta cataria	Catnip	1	seed packet	Seed	ref: Burpee	\$	4	\$	4
Vitis riparia	Riverbank Grape	2	#1/2yr	Bare root	ref: Cashman Nursery	\$	17	\$	34
Allium cepa	Onion	1	bunch	plant	ref: Burpee	\$	25	\$	25
Allium sativum	Garlic	6	bulb	bulb	ref: Burpee	\$	16	\$	96
Allium schoenoprasum	Chives	2	plant	plant	ref: Burpee	\$	7	\$	14
Anethum graveolens	Dill	1	seed packet	seed	ref: Burpee	\$	5	\$	5
Citrullus lanatus	Watermelon	1	seed packet	seed	ref: Burpee	\$	5	\$	5
Cucumis sativus	Cucumber	1	seed packet	seed	ref: Burpee	\$	6	\$	6
Cucurbita pepo	Pumpkin	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Daucus carota var. sativus	Carrot	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Lactuca sativa	Lettuce	1	seed packet	seed	ref: Burpee	\$	7	\$	7
Lycopersicon lycopersicum	Tomato	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Matricaria recutita	Chamomile	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Origanum vulgare	Oregano	1	seed packet	seed	ref: Burpee	\$	5	\$	5
Phaseolus vulgaris	Pole Bean	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Pisum sativum	Garden Pea	1	seed packet	seed	ref: Burpee	\$	4	\$	4
Salvia officinalis	Sage	1	seed packet	seed	ref: Burpee	\$	6	\$	6
Solanum tuberosum	Irish Potato	1	pack	tuber	ref: Burpee	\$	20	\$	20

Spinacea oleracea	Spinach	1	seed packet	seed	ref: Burpee	\$ 6	\$ 6	
Thymus vulgaris	Thyme	1	seed packet	seed	ref: Burpee	\$ 5	\$ 5	
Zea mays var. saccharata	Sweet Corn	1	seed packet	seed	ref: Burpee	\$ 7	\$ 7	
							\$ -	\$ 4,401

**FURNISHINGS**

Lounge area furniture		1	NA	Chair, chair & table, etc.	Purchase from second hand store or make base out of wood pallets and furnish with cushions and pillows made by hand or found at secon hand store	\$ 150	\$ 150
Compost tumbler		1		base - varies. Tumbler - old garbage can	reuse old metal garbage can or buy one for cheap at local hardware store. Drill holes into it. Base = optional ref: Home Depot (ALTERNATIVELY, visit a scrap metal yard or use rebar you have that isn't being used otherwise) Cut 10' rebar into lengths appropriate for plant it is supporting	\$ 40	\$ 40
Rebar for Staking Vining Vegetables		38	10' x 1/2" diam		ref: reuse! Buy a table or old dresser from a second hand store and convert it into a workable plant bench. Cheaper: utilize scrap wood and pallets to make your work bench. Choose the aesthetic appropriate for you and your yard.	\$ 6	\$ 228
Plant work bench		1	6-8' long x 2-4' wide			\$ 100	\$ 100
Raised "Tea Time" bed	onlinemetals.com	1	2' ht x 3' w x 27' long	reclaimed / reused wood veneered with scrap metal	Reuse fencing wood or other types of lumber to make your own raised raspberry bed. Ref: Home Depot or local lumber yard for common board costs~ \$10/8'x6"x1" board. Façade: scrap metal or metal/ aluminum color or rust color	\$ 1,400	\$ 1,400



<b>TOTAL MATERIALS</b>	
<b>ESTIMATE</b>	\$ 9,433



## Summary Findings

Write a story for what design data compares to baseline data (either parcel averages or specific parcel data). Descriptions should be heavy on data!

THEME Compare/Contrast Claims between baseline and design

### COVERAGES

- 1 The total pervious vs. impervious surface percentages were not changed from the baseline design.
- 2 Vegetated coverage was shifted from primarily turf to primarily drought-tolerant native plantings.

### VEGETATION & SOIL

- 1 The percent native plants went up from 21% in the baseline design to 80% in the new design.
- 2 The drought tolerance rating of the plants present in the design has essentially shifted up a degree from the baseline.
- 3 84% of the plants used in the new design have edible or medicinal characteristics, up from 0% in the baseline.

### WATER

- 1 The water budget for the site has gone from 4700 gal/mo over the monthly allowance to 5097 gal/mo under.
- 2 The roof catchment area was reevaluated, resulting in more downspout locations and, somehow, less overall catchment square footage.
- 3 A total of 416gal would be produced by roof runoff in a 1/2" rain event, dispensed mostly at the north-east corner of the house, where the most water-intensive plants have been placed.

### MATERIALS & ENERGY

- 1 Total yearly mowing time is reduced five-fold from the baseline design in the new design; down from 10 to 2 hours over the course of the season.
- 2 Yearly CO2 emissions are reduced from 162lbs to 11.5lbs.
- 3 The trees added to the site bring the atmospheric carbon reduction of the site (only from trees) up from 155lbs to 1,882lbs.

### HUMAN HEALTH & WELL BEING

- 1 Engagement and learning opportunities are present throughout the design concept.
- 2 Human Comfort and Restorative Spaces were preserved and enhanced.
- 3 Existing Culturally Significant Plants were kept in a more limited capacity while others were added to the mix.

ADDITIONAL OVERALL (as needed)

A4 Design Performance

COVERAGES

STUDENT: Elizabeth Ritchie  
 Parcel ID: 6

Key:  
 included in baseline summary  
 automated formula in cell - check for correct range  
 manually enter value

SURFACE TYPE (total)	Area (SF)	% of Site
Entire Parcel	<b>5484.1284</b>	100%
Vegetated (all)	<b>2503.45</b>	46%
Turfgrass	388.4	7%
Shrub/Perennial Zones	158.2	3%
Waterwise Zones	427.25	8%
Natural Rainfall/Drought Tolerant Zones	1529.6	28%
Roof(s)	2006.6	37%
Other paving, concrete, decking, etc.	413.9	8%
Pervious paving/hardscape	1025.4	19%
Pervious total (include pervious hardscape surfaces)	3528.85	64%
Impervious	2420.5	44%

















# of plants=1	388	80%	124%	hm...
# of plants=2	0	0%	0%	

Drought Tolerance	Freq	% of total plants	% coverage of veg area
# of plants=0	2	0%	0%
# of plants=1	45	9%	6%
# of plants=2	209	43%	0%
# of plants=3	228	47%	79%

# of plants=Bf	5	1%	Bf
# of plants=Be	209	43%	Be
# of plants=Dr	0	0%	Dr
# of plants=Ma	32	7%	Ma

# of plants=F	0	0%	F
# of plants=TH	32	7%	TH
other?	438		?

Ecological Funct.	Freq	% of total plants	Key Reference
# of plants=EC	36	0.074226804	EC
# of plants=NF	0	0	NF
# of plants=BT	0	0	BT
other?	36		?

<b>FQI</b>	
Floristic Quality Index	

**Summary of Tree and Shrub Benefits based National Tree Benefits Calculator:**

(Need to retroactively run these values for all existing/baseline trees)

Tree Species	Existing/Baseline (B) or Added/Design (D)	Overall Benefits Notes	Yearly Benefits				
			Storm Water Interception (gal)	Property Value (\$)	Energy - Conserves Electricity for cooling (kilowatt)	Energy - Reduces consumption of oil/natural gas (therms)	CO2 - Reduces atmospheric carbon (lbs)
Ash, Green	B	10	\$ 1,043.00	154	76	8	329
Aspen, Quaking	B	10	\$ 1,000.00	87	71	8	304
Aspen, Quaking	D	10	\$ 1,000.00	87	71	8	304
Aspen, Quaking	D	10	\$ 1,000.00	87	71	8	304
Chokecherry, Common	D	10	\$ 299.00	57	35	4	194
Chokecherry, Common	D	10	\$ 299.00	57	35	4	194
Chokecherry, Common	D	10	\$ 299.00	57	35	4	194
Chokecherry, Common	D	10	\$ 299.00	57	35	4	194
Chokecherry, Common	D	10	\$ 299.00	57	35	4	194
<b>TOTALS</b>			4,495 \$	546.00	388	44	1,882
			2,043 \$	241.00	147	16	633

*Yearly Benefits DBH (use 10" to calc. benefits for what is considered "established" life stage). You could also run calculator with install size, 1.5-2.5" to compare*

#### A4 Design Performance

##### Soils

Communicate any information related to soil conditions necessary for design features/areas/plant communities to be sustainable

Tips for soil amendments, drainage, nutrients, etc.

*More organic matter is recommended, generally.*

Better drainage can be achieved through the addition of organic matter and sand.

## KEY

**MT Nativity:** Not native to MT = 0; MT native= 1; exotic/invasive =2

**Drought Tolerance:** 0=no drought tolerance, 1=low drought tolerance, 2=medium drought tolerance, 3=high drought tolerance

**Wildlife Value:** Bd = bird, Bf = butterfly, **Be** = bees, **Dr** = deer, Ma = Mammal (General)

**Ecosystem Function Values:** BT = bioremediation ability, EC = erosion control, NF = nitrogen fixer,

**Light Needs:** **F** = full sun, **PS** = partial sun, **PSh** = partial shade, **Sh** = shade

**Light Needs:** F = full sun, PS = partial sun, PSh = partial shade, Sh = shade

**Soil Moisture (the dominant condition is shown first):** D = dry, DM = dry to moist, MD = moist to dry, M = moist, MW = moist to wet, WM = wet to moist, W = wet, WMD = plant can do all three conditions

**Bloom Time:** Jn = January, F = February, Mr = March, A = April, My = May, Jn = June, Jl = July, Ag = August, S = September, O = October, N = November, D = December

**Bloom Color:** B = blue, Br = brown, G = green, L = lavender, O = orange, P = pink, Pr = purple, R = red, Ro = rose, S = silver, W = white, Y = yellow, Cr = Cream

**Other:** Info to save until there enough data to warrant additional columns

A4 Design Performance

Water

Total Parcel Size (SF)	5484.1284
Total Vegetated Area (SF)	2503.45

**\*\*Irrigation Required - EPA Water Budget Tool. Save Report!\*\*** ....this will be the key irrigation metric we compare/contrast between baseline and design

Name/Location (Hydrozone, plant community, area)	Area (SF)	Plant Type (Zone/Feature)	Water Demand (high, med, low; current or assume long-term, post establish.)	Irrigation Type (need to make assumptions! You can play with these assumptions in design scenarios)	Monthly Req. Water (gal./month). (Tool will calculate)	Total Monthly Allowance	Above/Below Allowance
Turf		388 Turfgrass	High	Fixed Spray	2060	8049	-5097
Shrub/Perennial Bed		158 Shrubs & Grasses	Medium	Drip (standard)	468		
Water-wise Beds (including vegetable be		424 Perennials & Annuals	Low	Micro-spray	424		
Drought-Tolerant Beds		1530 Perennials & Shrubs	None	None	0		
<b>Total (gal.month)</b>					2952		
<b>Equivalent 16 oz. water bottles</b>					23616		
<b>~Seasonal Req. Total (4.5 months)</b>					13284		

**Roof Re-use Volumes & Rain Garden Sizing**

Design storm criteria/assumptions: City of Bozeman Stormwater Ordinance: LID use, 1/2" rain, recommendation for lots over 1 acre.

Downspout Outlet Location	Catchment Area (SF)	1/2" Rainfall Volume (cf)	Surface Area for 12" Deep Rain Garden	Surface Area for 9" Deep Rain Garden	Surface Area for 6" Deep Rain Garden
Front Right	69.33	2.75	2.75	4.12	5.49
Front Left	80.15	3.17	3.17	4.76	6.35
Right Flipper	24	0.95	0.95	1.43	1.90
Left Flipper	17.87	0.71	0.71	1.06	1.42
Left Main	409.96	16.23	16.23	24.35	32.46
Everything Else	803.36	31.81	31.81	47.71	63.62
<b>Totals</b>		1404.67	55.61633753		
Totals (gallons)			416.0391252		

A4 Design Performance

Water Utility Costs

Base on EPA Water Budget Tool Total Water Required Monthly for baseline and design.

**DESIGN**

	Gal	HCF (1 HCF/748 gal)					Monthly Utility Bill - design	
EPA Water Budget. Total Monthly Water Required for DESIGN	2952	3.94652406						
<b>COB WATER UTILITY RATES</b>								
Year	Service Charge for 5/8" pipe	Rates /HCF. (0-7)	Rates /HCF. (8-15)	Rates/HCF (>15)	ONE MONTH	~Total Yearly Cost for Outdoor Water Required (4.5 months)		
2016	15.39	2.5	2.69	3.17	\$ 25.26	113.6533957		

**BASELINE**

	Gal	HCF (1 HCF/748 gal)					Monthly Utility Bill - baseline	
EPA Water Budget. Total Monthly Water Required for Baseline	14647	19.5815508						
<b>COB WATER UTILITY RATES</b>								
Year	Service Charge for 5/8" pipe	Rates /HCF. (0-7)	Rates /HCF. (8-15)	Rates/HCF (>15)	ONE MONTH	~Total Yearly Cost for Outdoor Water Required (4.5 months)		
2016	15.39	2.5	2.69	3.17	\$ 77.46	348.5858222		

A4 Design Performance

Materials & Energy

Fertilizer Use Per Year

Turfgrass Veg Zone Area (SF)	388.4
Fertilizer Applied/Year (lbs)	2.3304
Total Yearly Fertilizer Costs (\$)	3.72864

Mowing and Energy

Turfgrass Veg Zone Area (SF)	388.4
Total Yearly Mowing Time (15 min/1000sf; 20x)(hrs)	1.942
Mowing Gas Consumed (gal) Honda self propelled GCV190 Engine	0.587455
Yearly CO2 Emissions from Mowing (lbs)	11.55523985

Tree Benefits Atmospheric Carbon Reduction - Equivalency to Burning Gasoline Emissions

Total CO2 Reduction from trees on parcel, from calculator (lbs/year)	\$ 1,882.00
Total CO2 Reduction from trees on parcel, from calculator (metric tons)	0.941
Equiv. CO2 released by burning # gallons of gasoline (gallons)	95.67869853

Maintenance & People Energy

Task	Estimated Yearly Time (hrs)	Year/Season = 20 weeks
Weeding	60	
Pruning	10	
Harvest	12	
Deadheading	30	
Mowing	2	

Reference Values ( LPS, Capitol Valley Methodology)

CO2 Emissions/gallon of gasoline (metric tons)	0.00892
CO2 Emissions/gallon of gasoline (lbs)	19.67
lbs/ton	2000
Turfgrass fertilizer/1000 SF (lbs)	2
Turfgrass fertilizer applications/year	3
Turfgrass fertilizer, average Home Deport (\$/lb)	\$ 1.60

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**Restorative Spaces**

List features/spaces	Area
Backyard forage zone w/ gently meandering path	back yard continuing to alley
Enclosed patio	north of house, accessible by walk
Front porch	west side of house, overlooking front yard

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**Culturally Significant Plants**

List features/spaces	Area
bitterroot	state flower of Montana, by the garage
turfgrass	common, used sparingly

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**Signage; Learning Opportunities**

List features/spaces	Frequency
address	front of house, mailbox
exploration opportunities in forage and food production	throughout the entire design

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**Human Comfort Zones**

List features/spaces	Area
Enclosed patio	north of house, accessible by walk
Front porch	west side of house, overlooking front yard

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**Play Spaces/Features**

List features/spaces	Area
exploration opportunities in forage and food production	throughout the entire design
engagement with food production in various ways	throughout the entire design



A4 Design Performance

**Cost Estimate**

DESIGN NAME:

Date:

**MATERIAL COSTS ONLY.** Should not include demolition, irrigation retrofits, or installation labor costs.

**TAKE-OFFS**

**COST ESTIMATE**

**PLANTS/PLANT ZONES**

*Refer to '\$Reference'. All applicable costs will likely not be referenced. Accurate estimates will also mean making some local phone calls on material pricing.*

Botanical name	Common name	Qty	Units or Size (sf/ac/lf/sy/caliper)	Stock Type	Notes (candidate plants; symbol, abbreviation, manufacturer/supplier, etc.)	Unit Cost	Total Item Cost
<i>Trees</i>							
Populus tremuloides	Aspen, Quaking	2	6-8'	BR	Cashman's	\$ 42	\$ 84
Prunus virginiana	Chokecherry, Common	5	6'	BR	Cashman's	\$ 49	\$ 245
<i>Shrubs</i>							
Amelancier alnifolia	Serviceberry	2	12"	BR	Cashman's	\$ 17	\$ 34
Ribes aurum	Currant, Golden	16	6"	BR	Cashman's	\$ 13	\$ 208
<i>Perennials, Grasses, Other</i>							
Calamagrostis x acutiflora 'Karl Fo	Karl Foerster	7	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 91
Nepeta cataria	Catmint	32	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 416
Heuchera cylindrica	Round-leaf Heuchera	121	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 726
Viola canadensis	Canadian Violet	140	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 840
Arctostaphylos uva-ursi	Kinnickinnic	6	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 78
Mimulus lewisii	Lewis Monkeyflower	20	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 120
Fragaria vesca	Wood Strawberry	19	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 114
Achillea millefolium	Yarrow	1	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 13
Balsamorhiza sagittata	Arrowleaf Balsamroot	3	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 39
Solidago missouriensis	Goldenrod	6	1 gal	pot	Blackfoot Native Plants	\$ 13	\$ 78
Sedum stenopetalum	Stonecrop	6	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 36
Lewisia rediviva	Bitterroot	32	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 192
Origanum vulgare	Oregano	1	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 6
Thymus vulgaris	Thyme	1	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 6
Rosmarinus officinalis	Rosemary	1	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 6
Lavandula angustifolia	Lavender	1	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 6
Basil	Ocimum basilicum	2	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 12
Broccoli	Brassica oleracea var. italica	8	3.5"	pot	Blackfoot Native Plants	\$ 6	\$ 48
Cabbage	Brassica oleracea var. capitata	8	3.5"	pot	Blackfoot Native Plants	\$ 0	\$ 0
Turnip	Brassica rapa subsp. rapa	20	1	seed packet	Burpee	\$ 0	\$ 1
Onion	Allium cepa	20	1	seed packet	Burpee	\$ -	\$ -
							<b>\$ 3,399</b>

**MATERIALS/PAVING/HARDSCAPE**

