Exhibit 3

Final Report Gregory Heights Middle School Stormwater Management Changes 2002-2003

1. Summary of grant activities

There were two major goals of this project. One is to divert strormwater that falls on GHMS property from the sewer into the ground and plants. The other is to educate GHMS students, faculty, parents and neighbors about stormwater mitigation and native plants.

We accomplished two stages of the three-stage plan to save stormwater from the sewer drain and allow the water to go into the ground and to be transpired by native plants.

Stage one disconnected a downspout from a roof system, which drains 5,000 square feet. This water is now directed into a constructed wetland in our courtyard. A Madison High School student designed the courtyard as part of his senior project. His plans were included in the project application to PPS. This approval process is a district policy required to evaluate property changes.

After meeting with district architects and engineers to iron out construction details, the work began with removing pavers and the patio. A parent used a jackhammer to break up the concrete patio. Students removed 10 cubic yards of concrete pieces and gravel from the site into a dumpster. This material went to Gresham Sanitary for recycling. Students then shaped the land into an "S" shape with the downspout redirected with a flexible drain hose screwed onto the end of the underground downspout drainpipe into one end of the "S". The original drain is at the other end of the "S".

The drain was disconnected by unscrewing the connecting pieces of the pipe as it was revealed during digging of the "pond" or deepest part of the swale. We were happy not to need our original plan to build a waterfall at least one foot away from the wall! Students then brought in 10 cubic yards of soil/compost covering the native clay. I picked up the plants on the weekend. Students, Madison High School students, AmeriCorps members planted using a laminated diagram created by Bosky Dell Nursery and myself. The swale was planted spring 2002 and watered over the first summer by an AmeriCorps member, volunteer families and myself. In the fall students put in stones for walking, signage for plants and water flow.

Stage two, entailed removing asphalt in the south parking lot to increase room around the storm drain for plants as a bioswale. We did not have to raise the sewer drain. By taking out the asphalt and gravel the level of the drain just below the parking lot asphalt is a perfect 6-10 inches which is the maximum level allowed level by district policy for standing water in an open area. We essentially repeated the process of the courtyard planting for the parking lot bioswale except that Bosky Dell delivered the plants.

Two Madison High School students drew plans for the bioswale, presented their ideas to my middle school students for their senior projects. These plans formed the outline for the PPS Project Approval application, which I wrote.

Students manually removed asphalt and gravel, dug out the area and planted during about 6 days of class time during the last days of May 2003. On Arbor Day GHMS students from the other 6th grade team planted trees with Friends of Trees along the south edge of the parking lot to provide shade and to prevent runoff from the field. The east drive-planting strip was planted and maintained by ESL classes during the spring of 2003.

Stage three ecoroof cannot be completed. PPS has indefinitely postponed repair on the roof. This stage of the project cannot be attempted at this time.

2. Evaluation and comments

The success of this project can be attributed to the dedication of the PPS Physical Plant department, the AmeriCorps people who work with them, the skills of the project manager gained in other grant funded projects, and the enthusiasm of middle school students to be outside. Metro, Forest Service and BES support like: the availability of the BES Stormwater Management Manual online; education program with Megan Hansen of BES and her skill with students; the Greenspaces and Clean Rivers grant funding; the availability of knowledgeable native plant nursery people and the general awareness of the need in our community helped support this work with students and about cleaning up our watersheds.

The most frustrating aspect of this project has come in this last school year with the uncertainty of basic school funding. We were unable to put in an ecoroof because the district did not have funds to repair our roof. It still leaks and needs repair. Projects like this with a functioning school system are just a matter of having a plan, getting funding, and doing the work with kids. During times of uncertainty long-term site improvement projects are barely possible. I feel that close contact with someone like Nancy is necessary for this kind of project to be successful.

The process of creating and implementing this project has worked out many details of the schools working together with the district office and with government agencies. Grant application request procedures and Project Application, Facilities and Asset Management (Short Form) have been instituted at PPS. These are available on the district web site. We also worked out a partnership with the City's Department of Transportation for the removal of asphalt. We worked out collaboration between the school and the educators at BES to extend the classroom activities to implementing some of the techniques studied. We will continue to be available for helping Lauren disconnect downspouts on homes as long as she has that program. Our classes are taking more notice and responsibility for the school grounds and their impact on the environment.

The majority of the work on the courtyard downspout disconnects and the parking lot bioswale has been during the school day except for planning, purchases, and watering which occurred on weekends, evenings and over the summer.

- This project was mostly done during the school day with the 110 students in my Life Science classes at Gregory Heights Middle School. We worked two full weeks on each phase: the courtyard and the bioswale.

- Helping us were Madison High School senior students: one did the landscape planning for the courtyard downspout disconnect; two did the landscape planning for the bioswale; and a class from the focus class from the Natural Resources Academy came to help us remove cement and gravel from the courtyard.
- The lessons which Megan Hansen from Portland's Bureau of Environmental Services presented on Combined Sewer Overflow, Pervious/Impervious surface runoff and water quality formed the basis of student understanding of the need for stormwater mitigation in Portland.
- Lauren at BES disconnect program took two classes into the neighborhood to help her and her AmeriCorps group to disconnect downspouts in our neigh hood. This activity cemented the student's understanding of the need for all citizens to attend the CSO problem.
- Two teams (110 students) of eighth grade Earth Science students and four classes (80 students) of English-as-a-Second-Language and newcomers helped dig and plant in both the courtyard and bioswale phases of this project.
- One uncle of a student totally broke up the concrete patio on the courtyard, charging only the cost of a bit and rental of the jackhammer.
- Two parents worked one day a week during the fall and winter with students to maintain the courtyard.
- One family watered the courtyard for two weeks while I was on vacation during the summer of 2002.
- AmeriCorps students Becky Hobden, Kevin Kennedy, Nic Cal from PPS Physical Plant were invaluable in their role as liaisons with the district and agencies as well as helping with the digging and planting.
- Nancy Bond at PPS Physical Plant has been an invaluable assistance on technical issues throughout the project.

3. Photo documentation showing how the activity/project was accomplished: see attached documents for courtyard and bioswale.

4. Before/during/after digital photos and map with (photo points with digital photos).

5. Maintenance plans or follow-up activities

   Students will maintain the courtyard and bioswale during the school day and year. I will schedule one or two parents to work on weeding and other maintenance with a few students for an hour each week as needed.

   Watering over the summer will be accomplished by a "drip system". The Friends of Trees and I have worked out a cooperative schedule for watering during the summer months. I will turn it on once a week. The Friends of Trees has agreed to turn it on once a week throughout the summer, 2003, coinciding with watering trees they helped students plant on our school grounds.

   Further work to decrease impervious surface, add vegetation and direct stormwater out of the sewer will continue in 2003-2004 with BES and GHMS students supported by funds from a Clean Rivers Grant from BES.

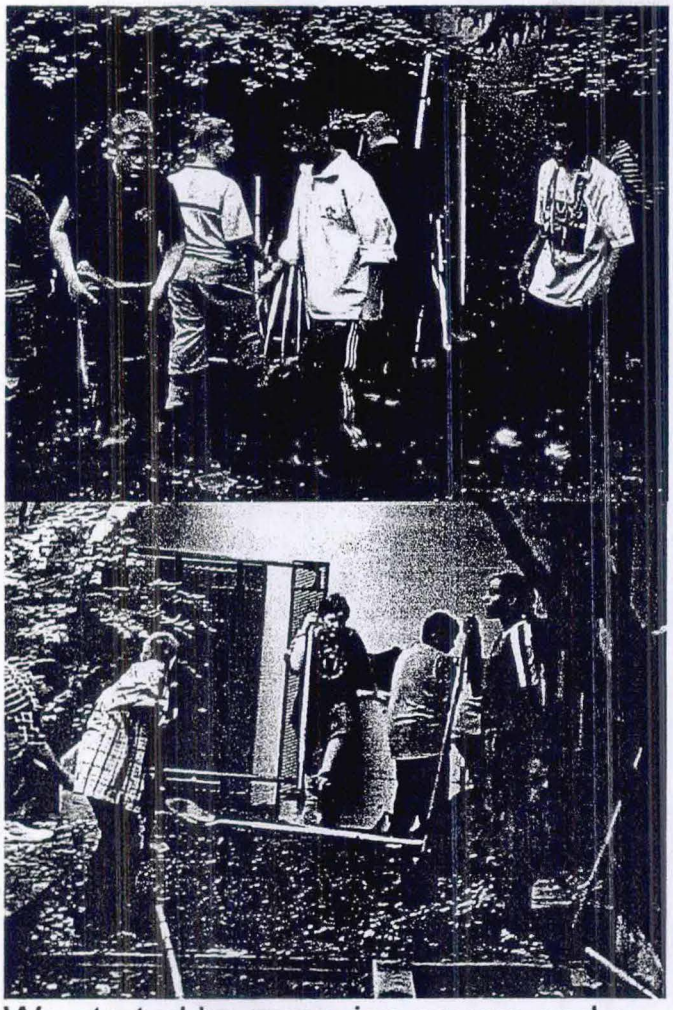
6. See attached documents for the number and species of trees, and, seedling and shrubs planted (BoskyDellOrderMay2003.doc). Accurate numbers and species are listed.

7.Grant outcome

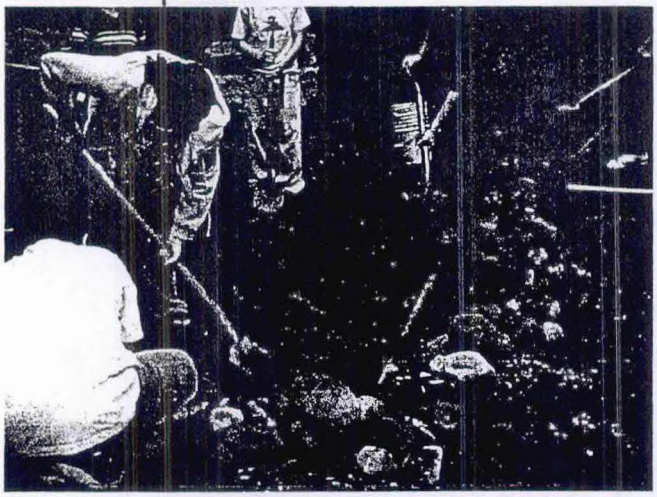
The courtyard downspout disconnects will save approximately 157,080 gallons of water (5,000 square feet of roof area plus 2000 square foot of courtyard area times 3 feet of rain per year times 7.48 [1 cubic foot of water = 7.48 gallons]). The parking lot bioswale (1103 square feet of swale which takes water from a parking lot of 14964 square feet) will save 44892 cubic feet of water (in normal rain years) or 334,356 gallons per year. All this water will go into the ground or be transpired by the native plants. The total is almost 500,000 gallons of water saved from the sewer. Currently BES is disconnecting 5 downspouts in the front of the building onto the lawn. This will conserve even more stormwater.

The two major long-term benefits of this project are the students' and school community's awareness of the need for mitigation and specific techniques as well as the conservation of stormwater from the sewer. Other intangible benefits for the students are the satisfaction they get from helping their community and the training in project process and the understanding of the benefits of native plants. GHMS now has many features to offer the neighborhood as examples for how to manage stormwater at no cost to the environment. This project greatly enhanced the diversity of the living environment for future study by students and the community.

The Frog Team transforms our Courtyard into a native wetland.

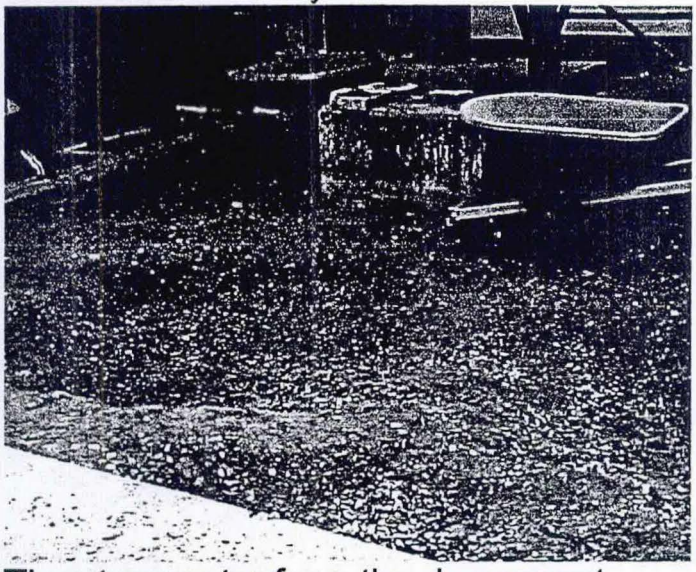


We started by removing pavers and a concrete patio.



Then we dug out all the gravel and made a really big hole.
We removed 10 cubic yards of concrete and gravel in buckets.

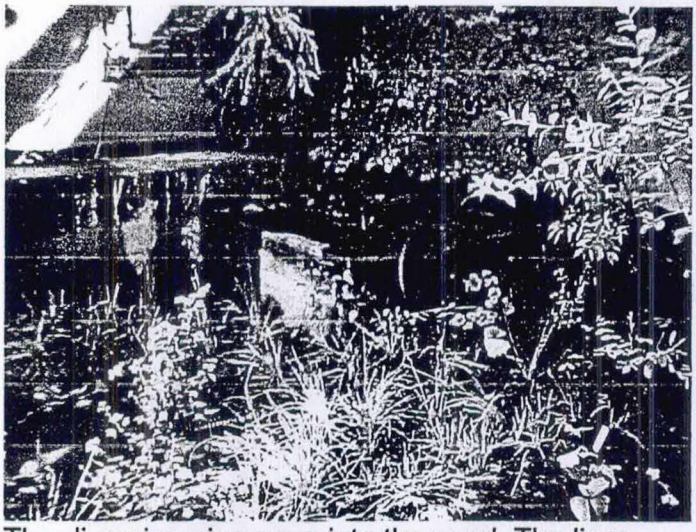
This is the storm water drain in the center of our courtyard.



The stormwater from the downspout will be diverted into this "pond".

No sun or water gets under an overhang on the south side of the courtyard. We want to put in stiff pond liners and plant bog plants.

The Frog Team transforms our Courtyard into a native wetland.

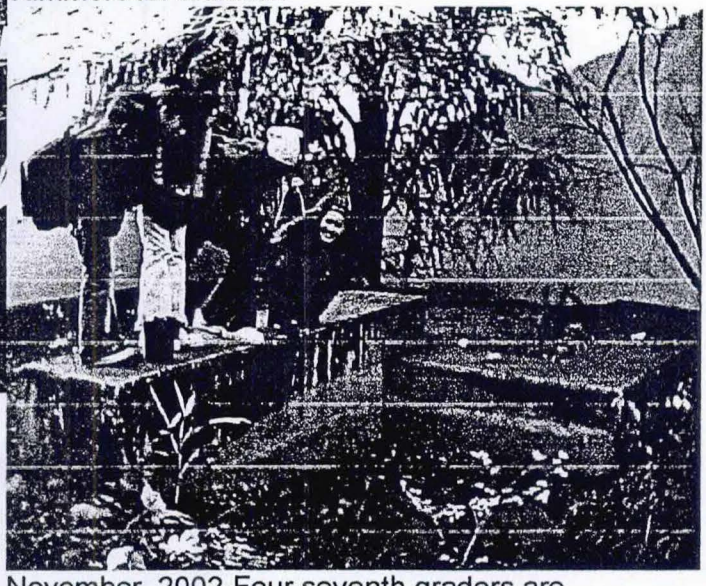


The diversion pipe goes into the pond. The liner will hold some water over the summer for critters.

We left some plants in post. These will be planted in the fall when the rains return.

Water from the downspout drains into a low spot, which is lined with rubber. The liner will hold some moisture during summers for animals.

Our oxalis is doing nicely under the existing Japanese maples.



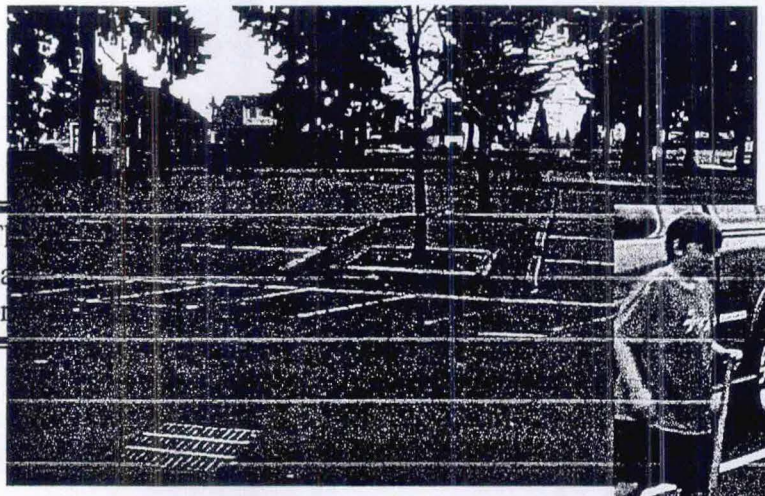
November, 2002-Four seventh graders are happy to see their plants survived and that there is finally water in the "pond".

The Frog Team transforms our Courtyard into a native wetland.

From the "pond" water has to rise above the grasses, around the willow (top right of picture) the up to the drain. The "Japanese" maples have lost their leaves before rain has even gotten over the top of the liner.

The walks are in place. The plants are all in and growing. The system will take rain from the roof into the thirsty ground when it rains.

Bioswale in Parking Lot...



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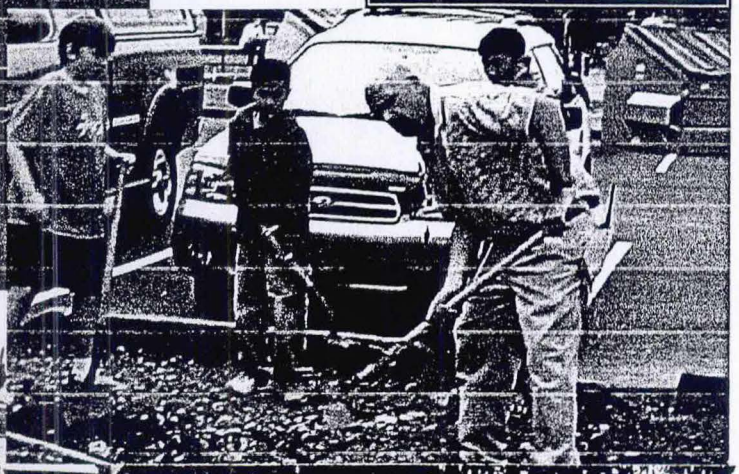
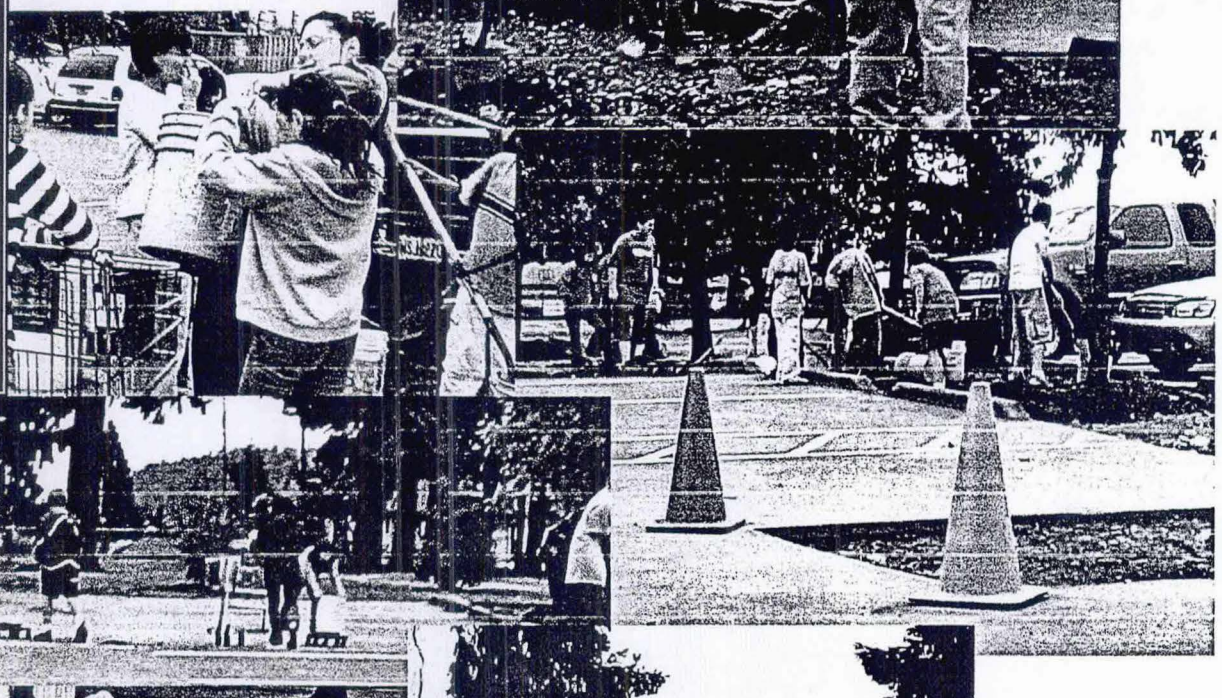
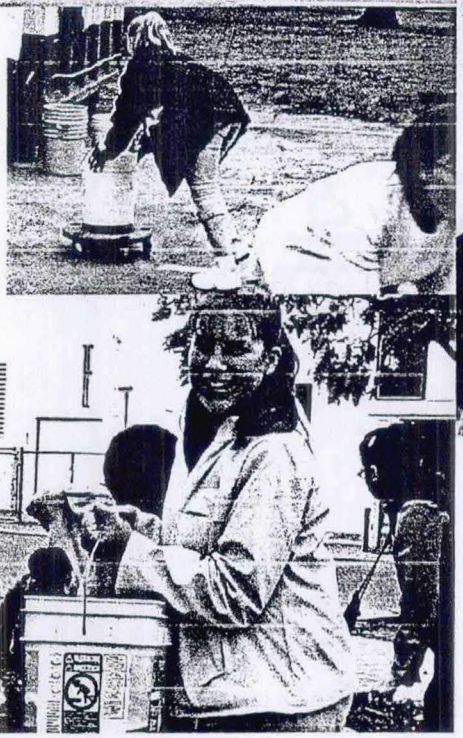
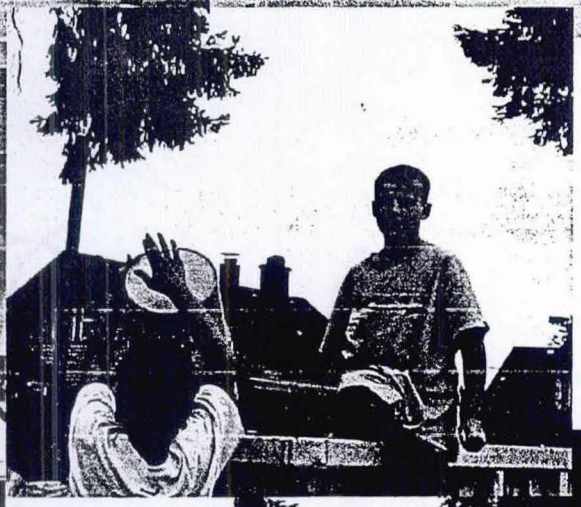
Doug Walters stops by for a digging lesson and a chain gang photo op.

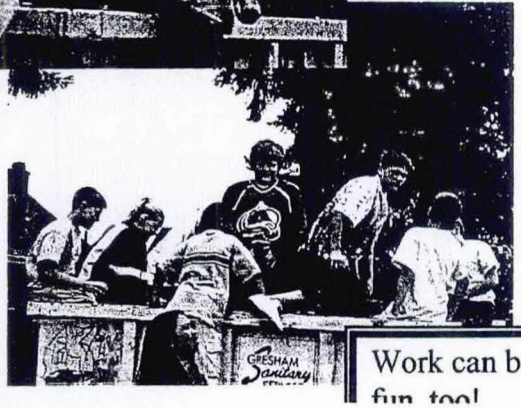


Asphalt and gravel went into buckets, then carts or on wheels to the dumpster which went to Gresham Sanitary for recycling.

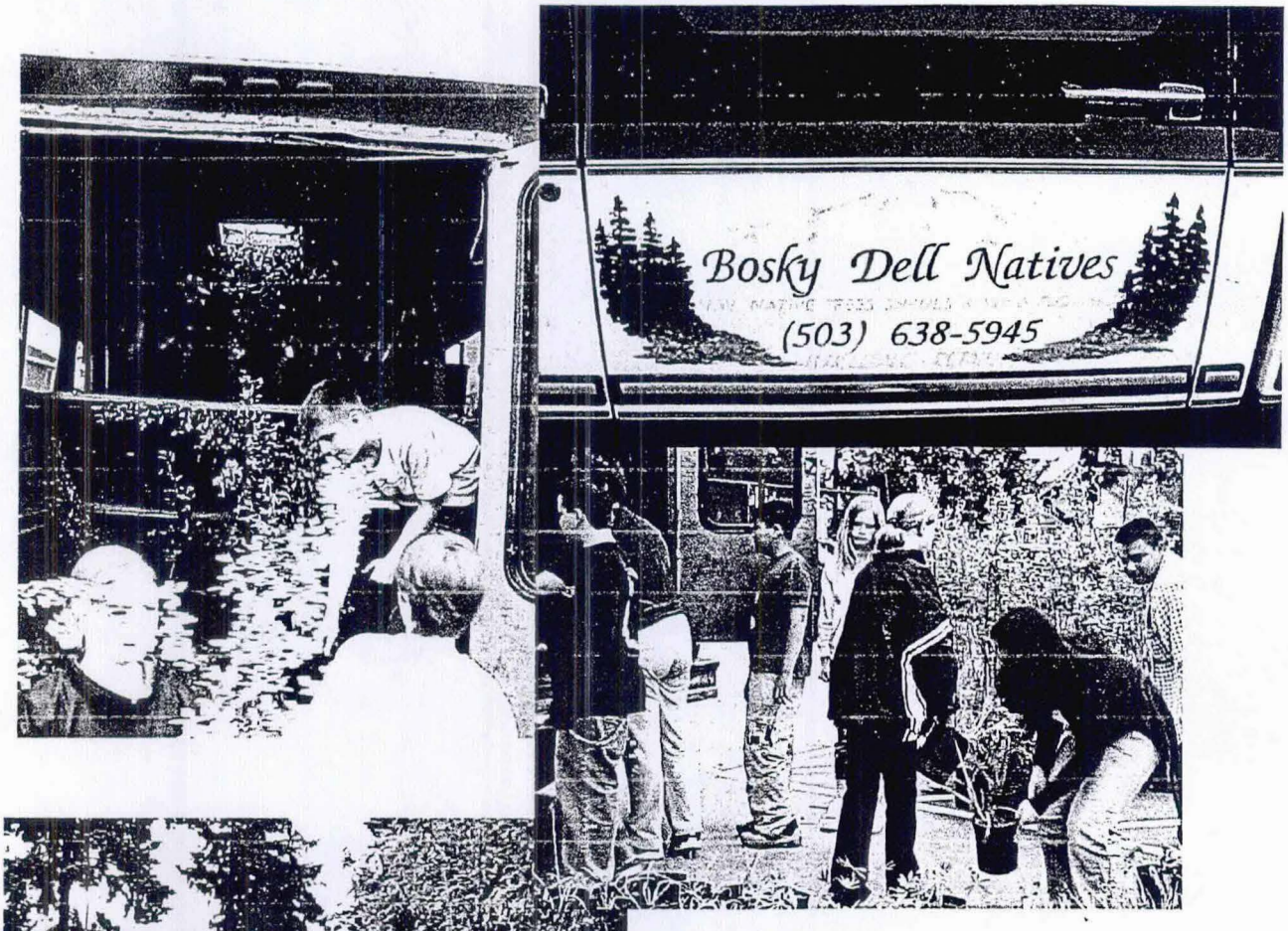








Work can be fun, too!

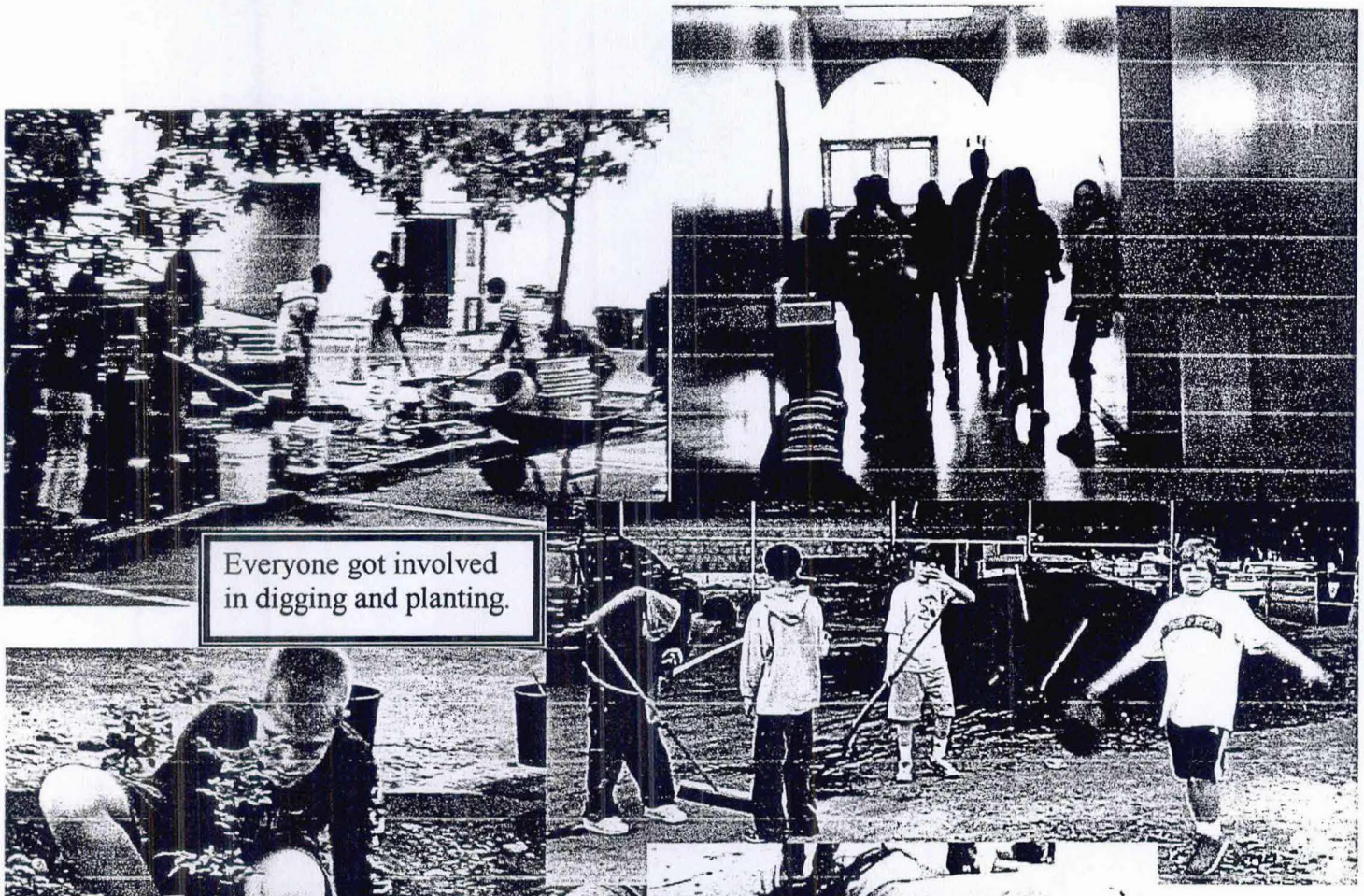


Students made short work of unloading the truck and distributing the pots to seven areas.

Teams took responsibility for planting what they could during their class period. Then another group in the next class took over.

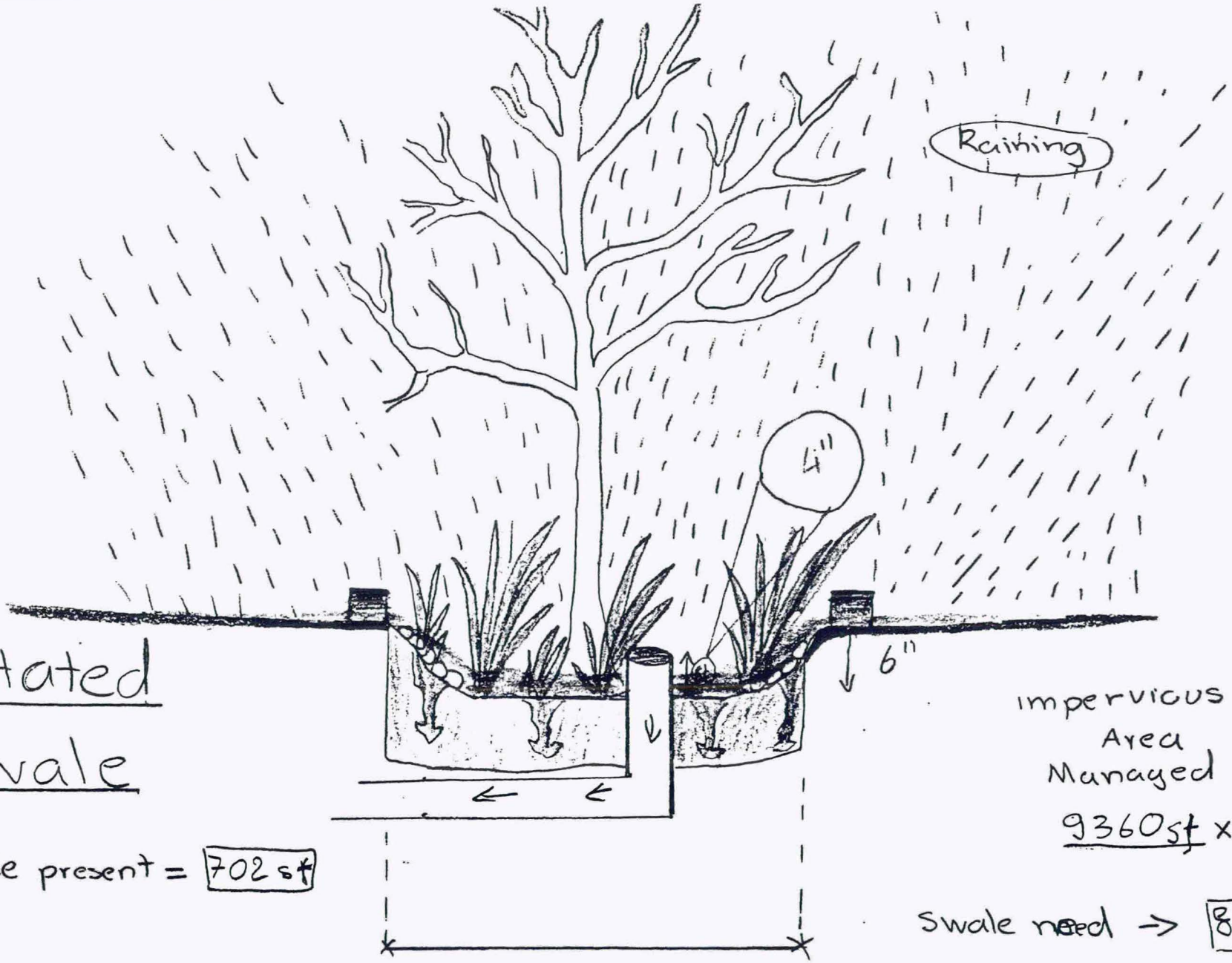
6th graders love to dig and haul.

We learned which end was up and how hard Portland Clay is and how big Missoula flood gravel is.



Everyone got involved in digging and planting.

Our student teacher from Concordia enjoyed the project as much as GHMS 6th graders.



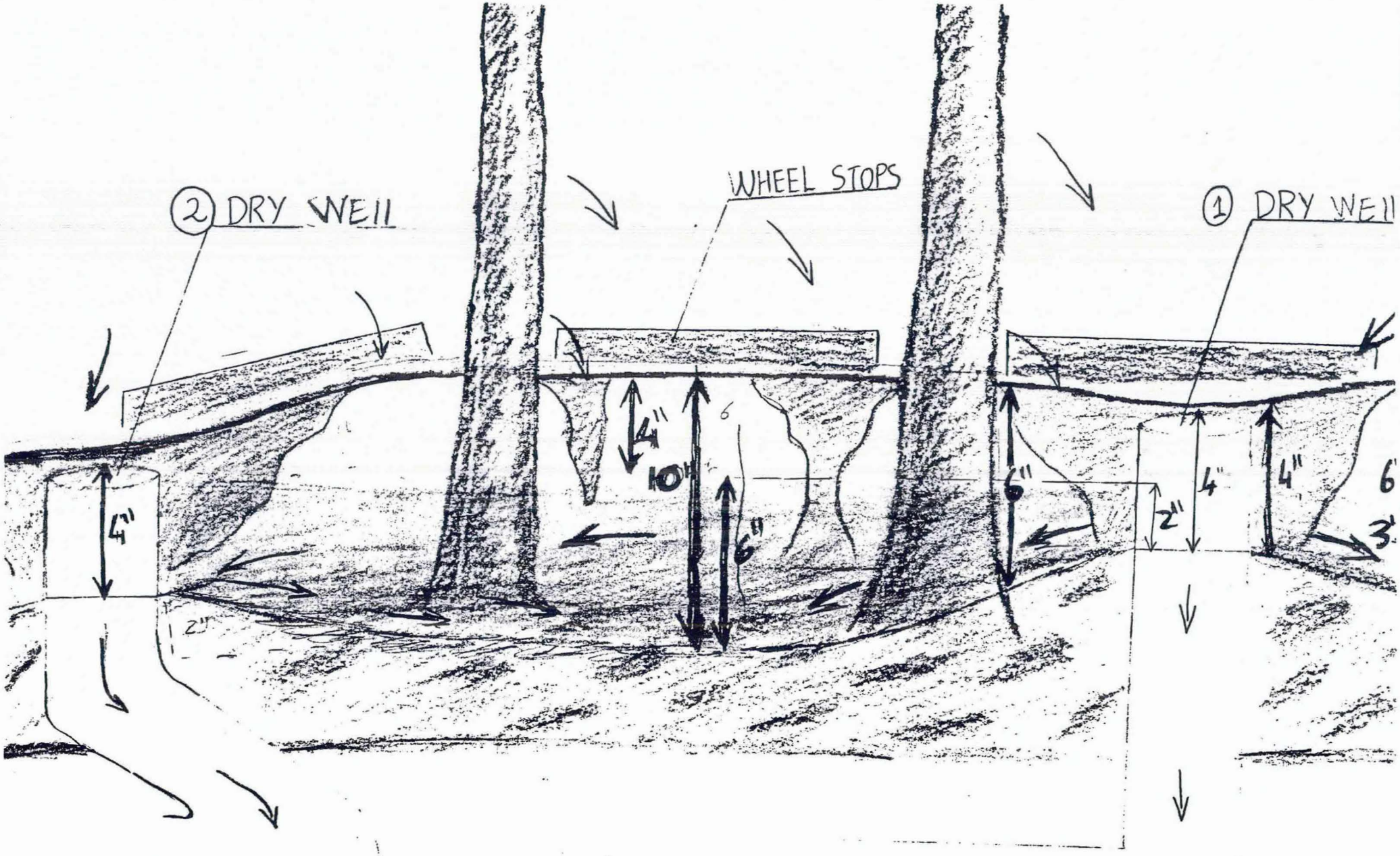
Vegetated Swale

Swale present = 702 sf

impervious Area Managed

9360sf x .09 =

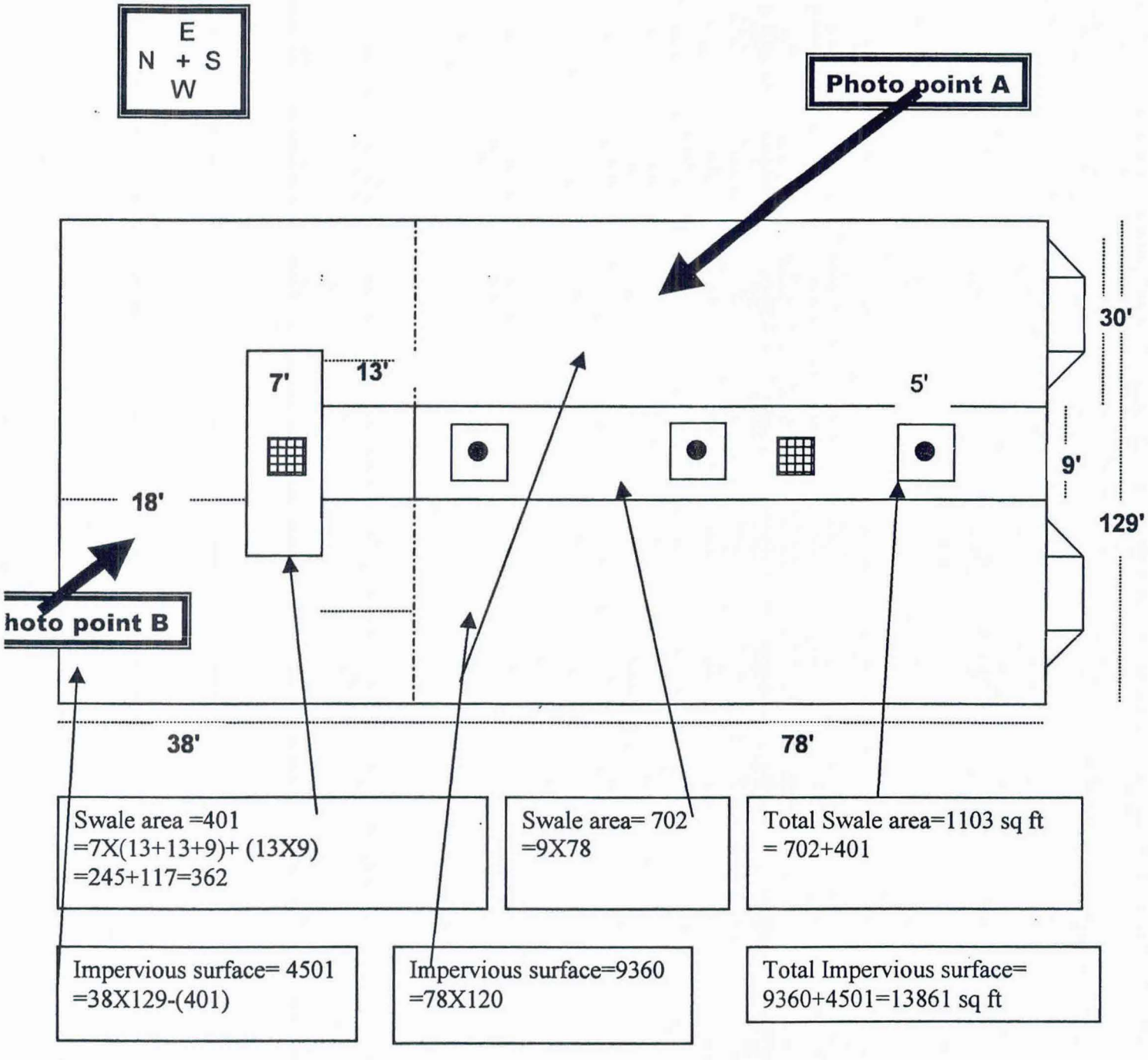
Swale need -> 842.4 s



* Maximum swale water depth under 6 inches

* Maximum swale water depth under 4 inches

Bioswale map with photo points



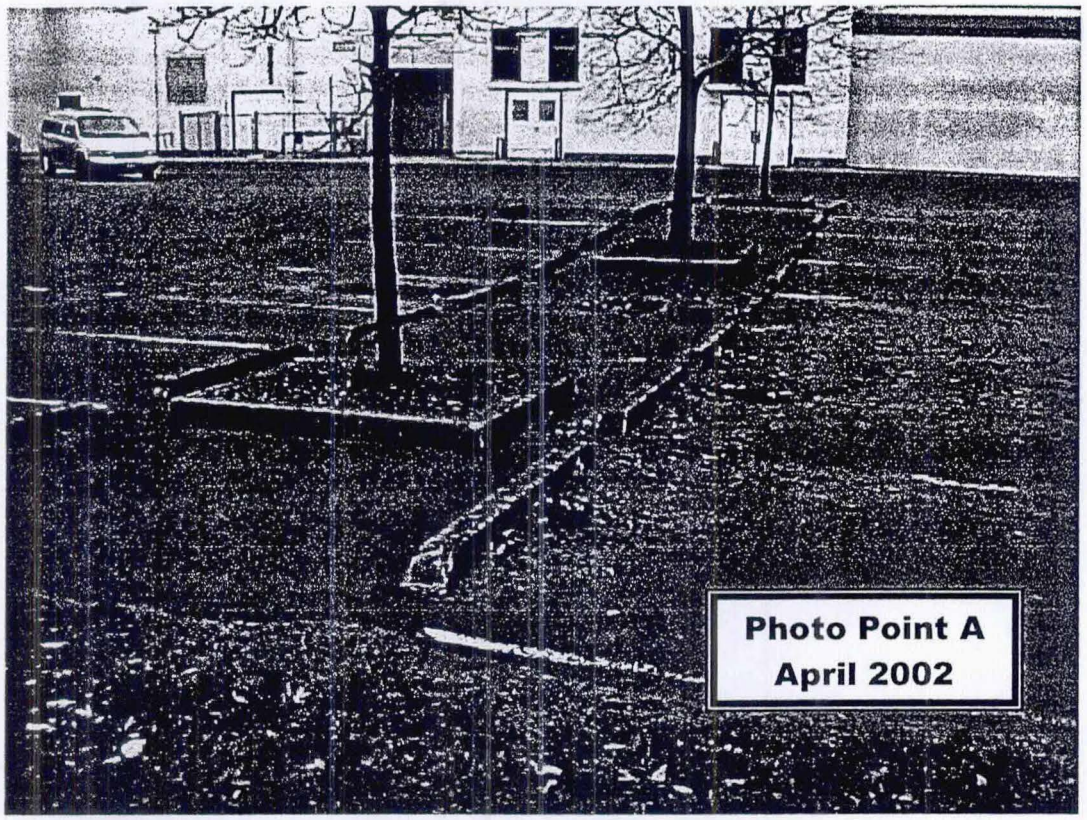


Photo Point A
April 2002

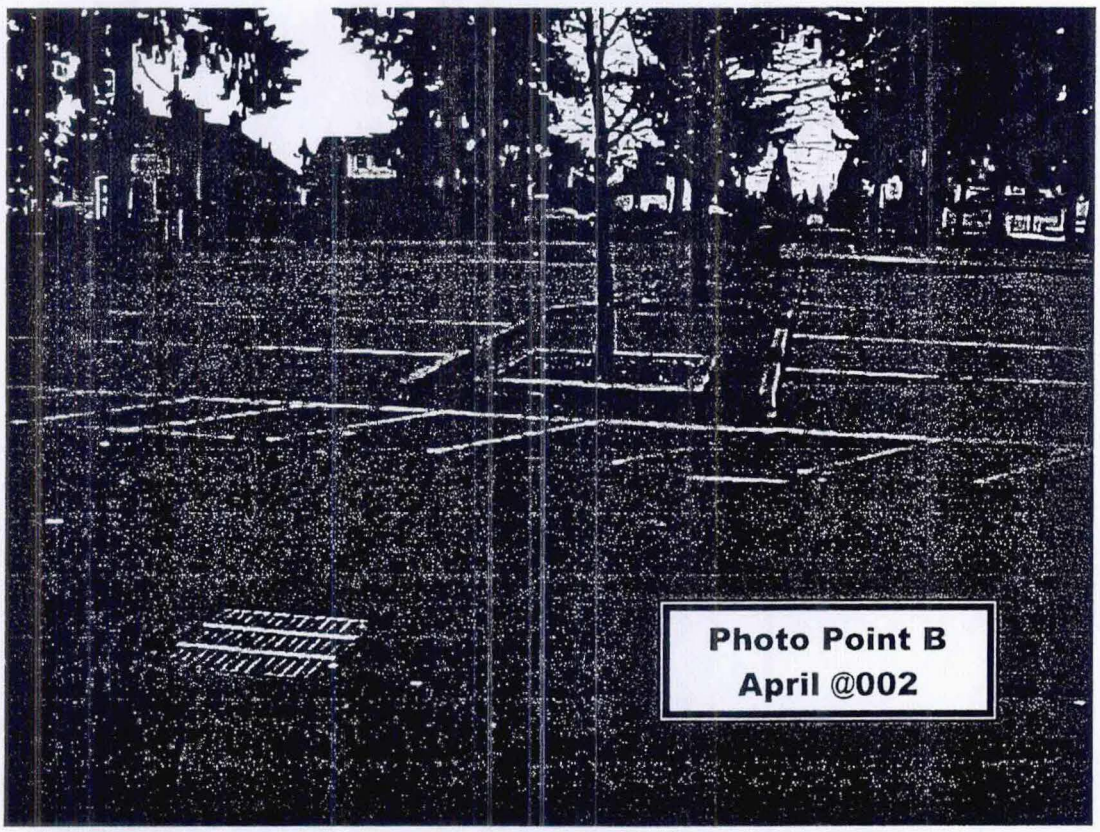


Photo Point B
April @002

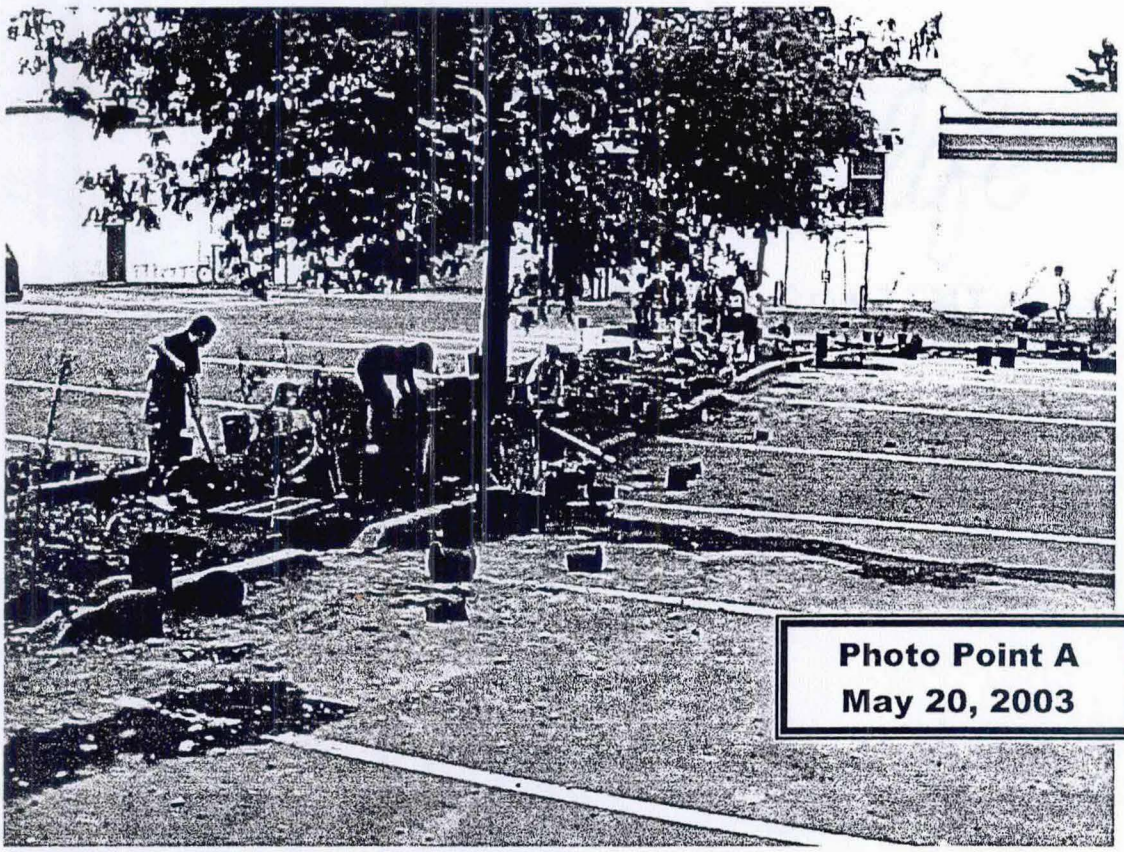


Photo Point A
May 20, 2003

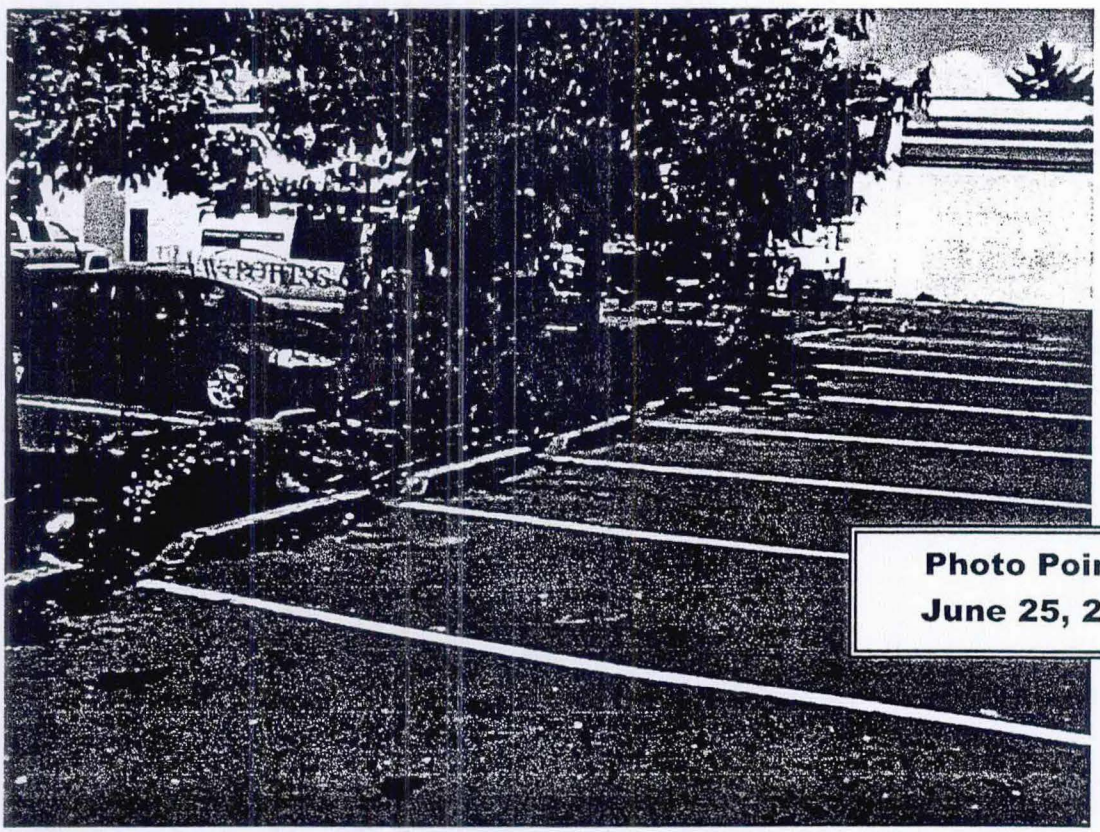


Photo Point A
June 25, 2003

Near Photo Pont B
May 18, 2003

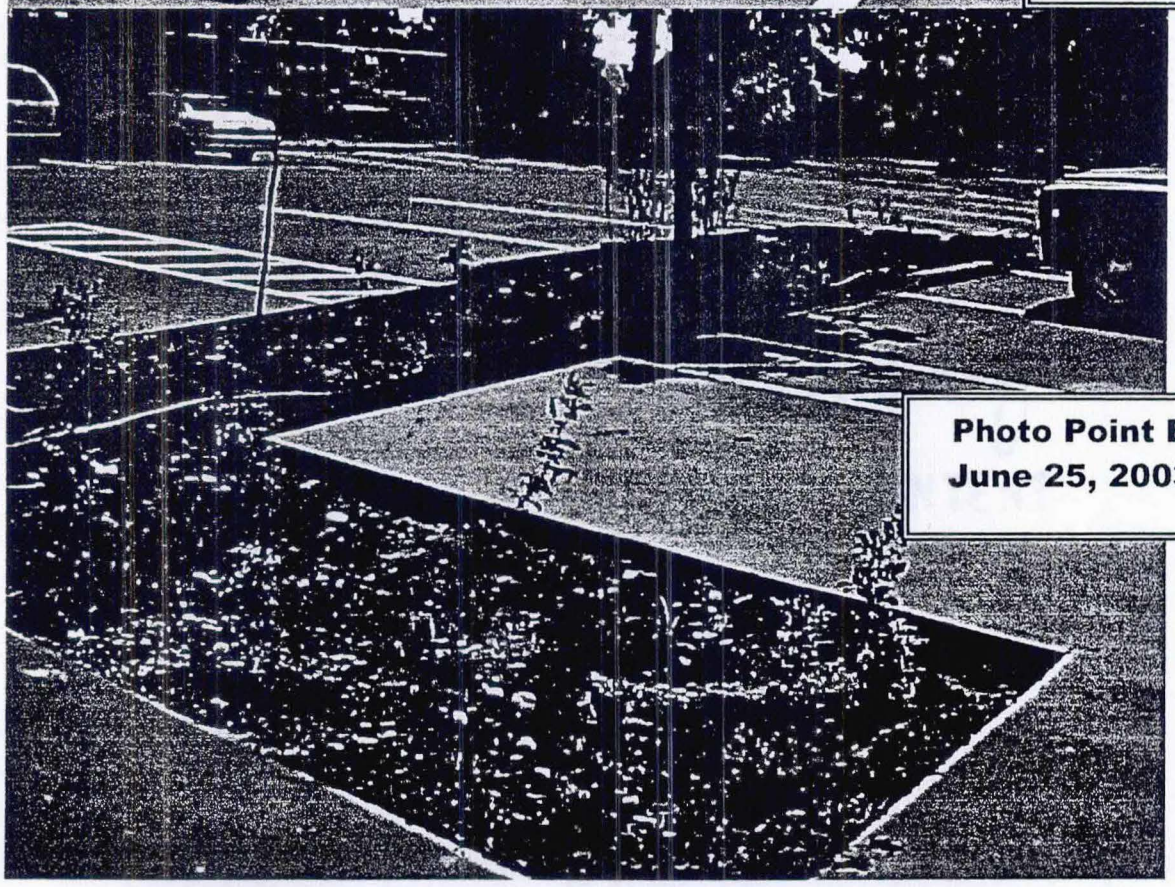


Photo Point B
June 25, 2003

Gregory heights Middle School Courtyard Wetland

Spring/Summer 2002 (Downspout disconnect)

Vender: Northwest Native Plants

49.40	Sedges	76@.65	Lg. plug
	Reeds	**76**	Lg. plug
10.00	Irises	Purple 8@1.25	4"
22.50	Grass	50@.45	Sm. plug
10.00	Blue-eyed grass	8@1.25	4"
2.50	Willow	1@2.50	Pipers? (Tiny) gal.
15.00	Sedum	12@1.25	4"
	~~Stone crop~~	~~30-40~~	
	~~Miners lettuce~~	~~30~~	
	~~Parsley leafed louage~~	~~10~~	
	~~Bunch grass~~	~~6~~	
10.00	Western clematis	4@2.50	Gal.
10.00	Red huckleberry	4@2.50	Gal.
	~~Sage~~	~~2~~	
	~~Succulent~~	~~3-5~~	
	~~Desert fern~~	~~2~~	
	Sword or ~~bracken~~ fern	**4**	4"
129.40	TOTAL		

- plants that need to live in standing water (emergent):**Sedges, reeds and irises**
- plants that can live in standing water, but can take dry summers: **grass, willow, colts foot**
- plants that need to be near water, but can take dry summers: **fringe cup, oxalis**
- plants for the "desert" area: **sage, succulent**
- plants that are small to cover ground for sun, but **can take dry summers: coast strawberry, sedum, kinnikinnik, bunch grass, twin berry**
- plants that are taller, shrubs, but can take dry summers: **huckleberry, gooseberry, currant, bald hip rose, service berry, salal, snowberry, thimbleberry (shade), grape (short), spirea, red-twig dogwood**

Amount Due

6.00	Sword or ~~bracken~~ fern	4@1.25	4"
49.40	Reeds	76@.65	Lg. plug
51.00	Total		

Total amount paid: **$129.40+$51=$180.40** by Jere Fitterman

Gregory heights Middle School Courtyard Wetland

Spring/Summer 2002 (Downspout disconnect)

Vender: Bosky Dell Natives, Inc.

	Greater Boykina	(2)	1 gal.
27.50	Yellow-eyed grass	25	Flat
72.00	colts foot	12? (10) @6	1 gal.
45.00	Monkey flower	15@3	1 gal.
30.00	fringe cup	5@6	1 gal.
27.50	oxalis	25	Flat
18.00	Vanilla leaf	6@3	1 gal.
24.00	Vanilla leaf	16@1.50	3"
21.00	kinnikinnik	7@3	1 gal.
18.00	gooseberry	3@6	2 gal.
18.00	bald hip rose	3@6	2 gal.
18.00	service berry	3@6	2 gal.
9.00	thimbleberry	3@3	1 gal.
15.00	red-twig dogwood	5@3	1 gal.
318.00	Sub total	-10%	
18.00	twin berry	3@6	2 gal.
336.00	Total	-10%	

- plants that need to live in standing water (emergent):**Sedges, reeds and irises**
- plants that can live in standing water, but can take dry summers: **grass, willow, colts foot**
- plants that need to be near water, but can take dry summers: **fringe cup, oxalis**
- plants for the "desert" area: **sage, succulent**
- plants that are small to cover ground for sun, but **can take dry summers: coast strawberry, sedum, kinnikinnik, bunch grass, twin berry**
- plants that are taller, shrubs, but can take dry summers: **huckleberry, gooseberry, currant, bald hip rose, service berry, salal, snowberry, thimbleberry (shade), grape (short), spirea, red-twig dogwood**

To be picked up Saturday June 8, 2002

	Pacific ninebark	4	
	Alder	4	

Total amount paid_____**by** _____

Trees and Shrubs for GHMS property

South of south parking lot & East of east driveway

For the East driveway strip-if any is not available substitute with another from this list

— 2 (3+ gallon)--*Cornus sericea* ssp. *occidentalis*- **red-osier dogwood,** creek dogwood, red-twig dogwood

— 2 (3+ gallon)--*Corylus cornuta* var. *californica* -**beaked hazelnut,** California hazelnut, hazelnut, hazel, filbert

— 2 (3+ gallon)--*Oemleria cerasiformis*- **Indian-plum,** osoberry

— 2 (3+ gallon)--*Ribes sanguineum* var. *sanguineum*-**red flowering currant,** red currant, blood currant

— 2 (3+ gallon)--*Rosa pisocarpa*- **clustered wild rose,** peafruit rose, swamp rose

— 2 (3+ gallon)--*Sambucus cerulea* var. *cerulea*- **blue elderberry**

— 2 (3+ gallon)-*Prunus emarginata* var. *mollis*- **bitter cherry,** narrowleaf cherry

— 2 (3+ gallon)-*Gaultheria shallon,* **salal- dry**

BES Requirements for plants in Swale

Evergreen trees: Minimum height: 6 feet

Deciduous trees: Minimum caliper: 1 ½ inches at 6 inches above base.

Large shrubs/small trees 3-gallon containers or equivalent.

Shrubs/large grass-like plants 1-gallon containers or equivalent

Ground cover plants: 1 per 12 inches on center, triangular spacing, for the ground cover planting area only, unless seed or sod is specified.

Minimum container: 4-inch pot. At least 50 percent of the facility shall be planted with grasses or grass-like plants.

Native wildflowers, grasses, and ground covers used for BES-maintained facilities shall be designed not to require mowing.

Comments:

Nursery: _____

Total cost $_____ signed _____ date _____

For the South Parking lot swale-if any is not available substitute with another from within each list

Trees 5 at least 3+ gallon size

— 2 (3+ gallon)-Crab apple

— 2 (3+ gallon)-*Physocarpus capitatus*- **Pacific ninebark,** ninebark

— ONE of any of these **(5+ gallon)-**that tolerates wet conditions

- *Quercus garryana* Oregon White Oak 4 feet Broadleaf, deciduous. Drought tolerant.
- *Acer macrophyllum* Big Leaf Maple 4 feet Broadleaf, deciduous.
- *Alnus rubra* Red Alder 3 feet Broadleaf, deciduous. Moisture loving
- *Crataegus douglasii, var. douglasii* Black Hawthorn, wetlands form 3 feet Broadleaf, deciduous. A smaller tree, Wetland form tolerates wet areas.
- *Fraxinus latifolia* Oregon Ash 3 feet Broadleaf, deciduous. Tolerates wet conditions.

Tall Shrubs at least one-gallon size 90 all together

— *Mahonia aquifolium*, Tall Oregon Grape- moist -dry

— *Mahonia nervosa*, Dull Oregon Grape- moist-dry

— *Viburnum edule*, Highbush Cranberry; Squashberry- moist -dry

— *Ceanothus sanguinea*, Oregon Redstem Ceanothus- moist-dry

— *Rosa pisocarpa,* Swamp Rose– moist-dry

— *Salix fluviatalis*, Columbia Willow- moist-wet

— *Salix Hookeriana*, Piper's Willow- moist-wet

— *Salix Scouleriana*, Scoulers Willow-moist-wet

Grasses 180 sedges and rushes - Wet to Moist **Minimum 4 inch pots**

— *Carex aperta*, Columbia Sedge

— *Carex obnupta*, Slough Sedge

— *Scirpus microcarpus,* Small flowered (or fruited) Bulrush

— *Hordeum brachyantherum*, Meadow Barley

— *Juncus effusus,* Common/Soft Rush

— *Juncus ensifolius*, Dagger-leaf Rush

— *Juncus oxymeris,* Pointed Rush

— *Juncus tenuis*, Slender Rush

— *Juncus patens,* Grooved Rush; Spreading Rush

Groundcovers 100 (blue or white flower) Wet to Moist **Minimum 4-inch pots**

— *Sisyrinchium idahoense,* Blue-eyed Grass

— *Camassia quamash*, Common Camas

— *Fragaria vesca* or *F. virginiana*, Woodland strawberry or Wild strawberry

— *Lupinus micranthus*, Small Flowered Lupine

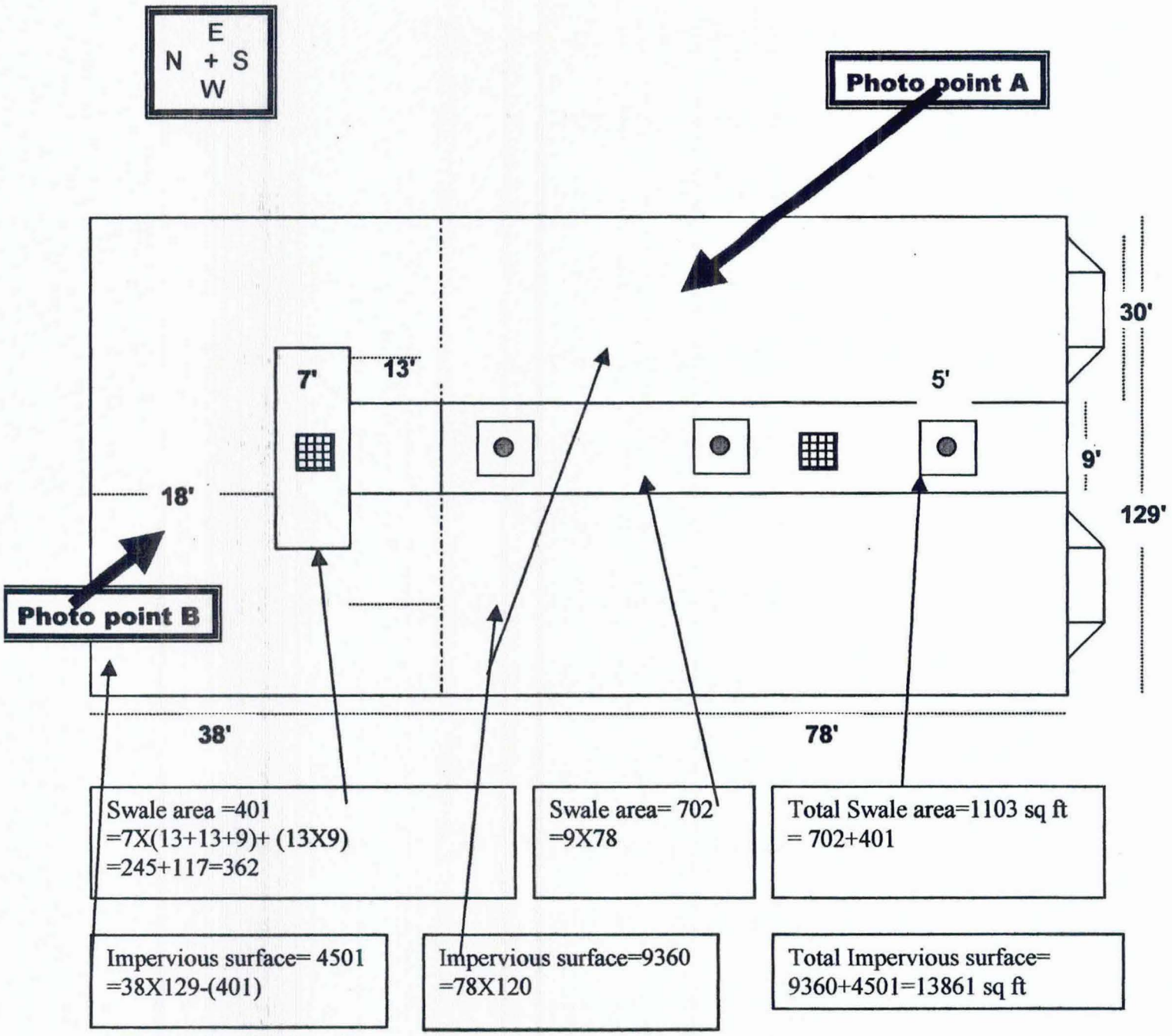
Ferns 20 Moist shade **Minimum 4-inch pots**

— *Blechnum spicant,* Deer Fern

— *Polypodium gycrrhiza,* Licorice Fern

— *Polystichum munitum,* Sword Fern

Bioswale map with photo points



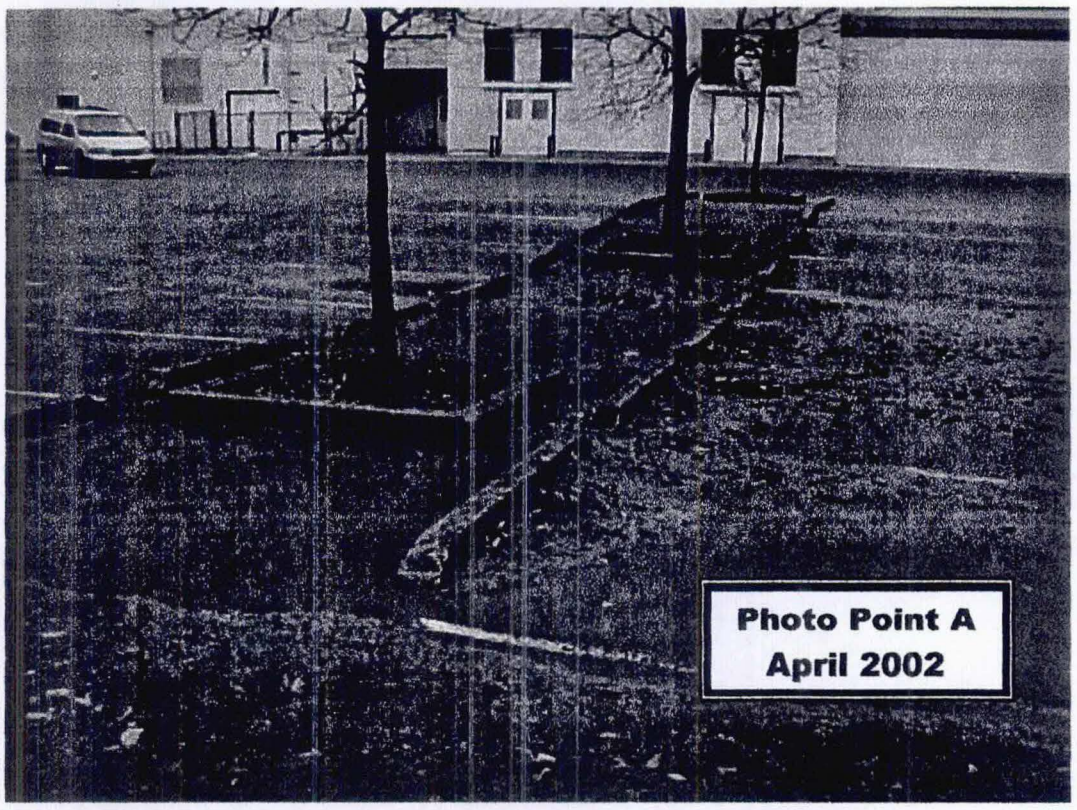


Photo Point A
April 2002

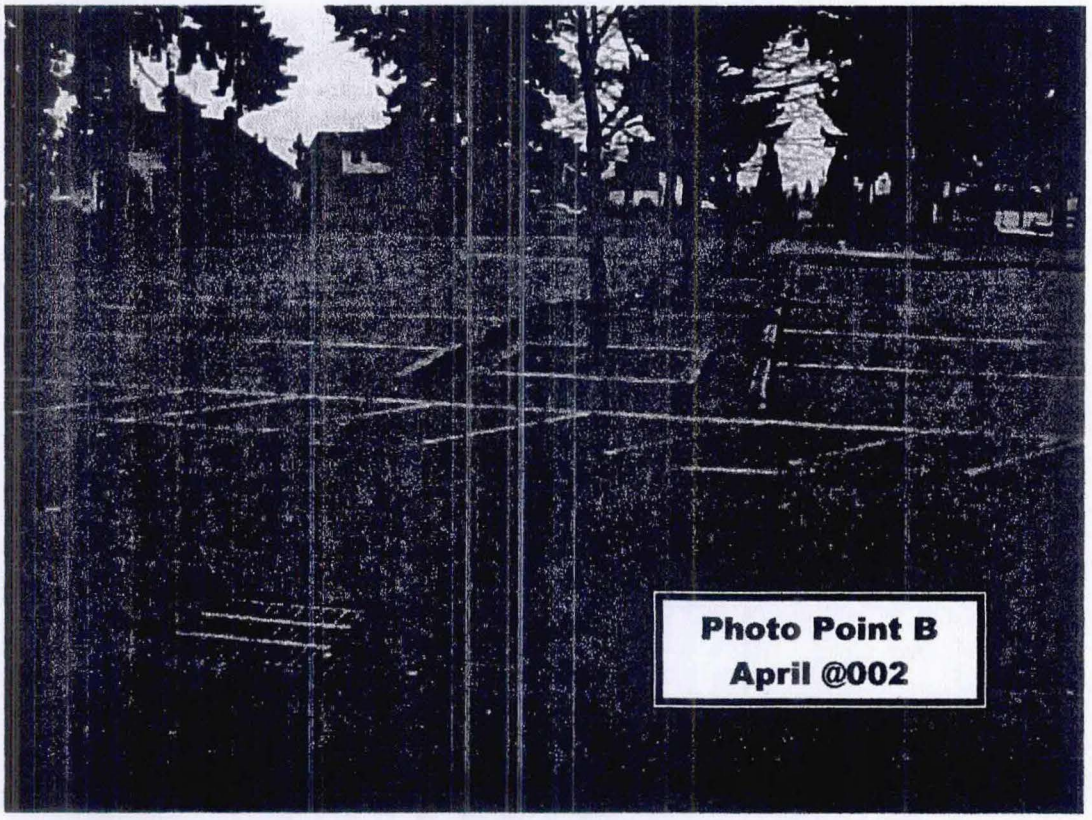


Photo Point B
April @002

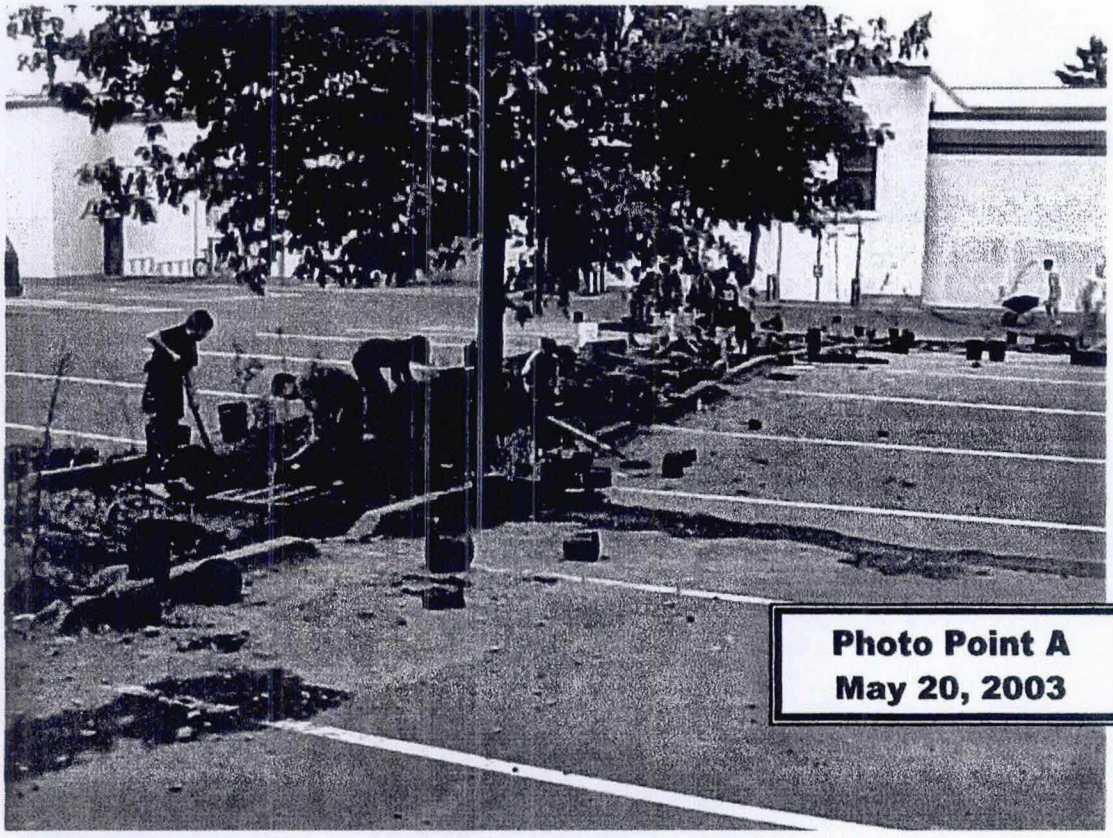


Photo Point A
May 20, 2003

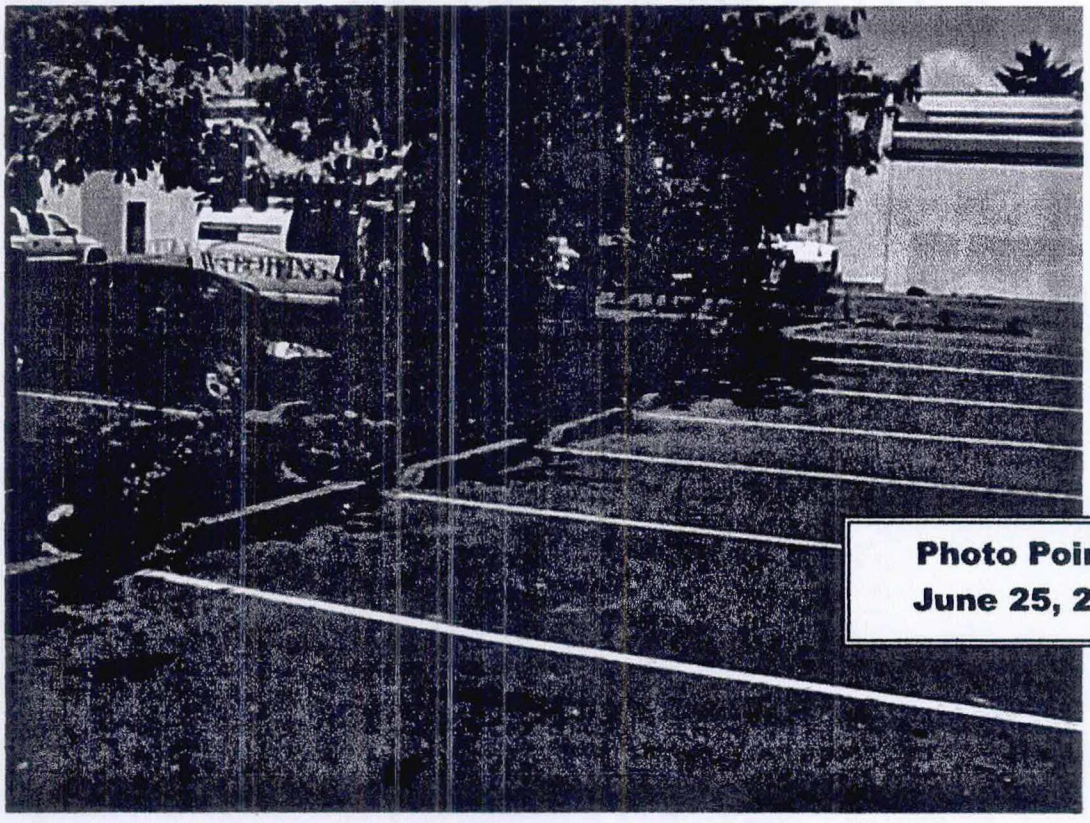


Photo Point A
June 25, 2003

Near Photo Pont B
May 18, 2003

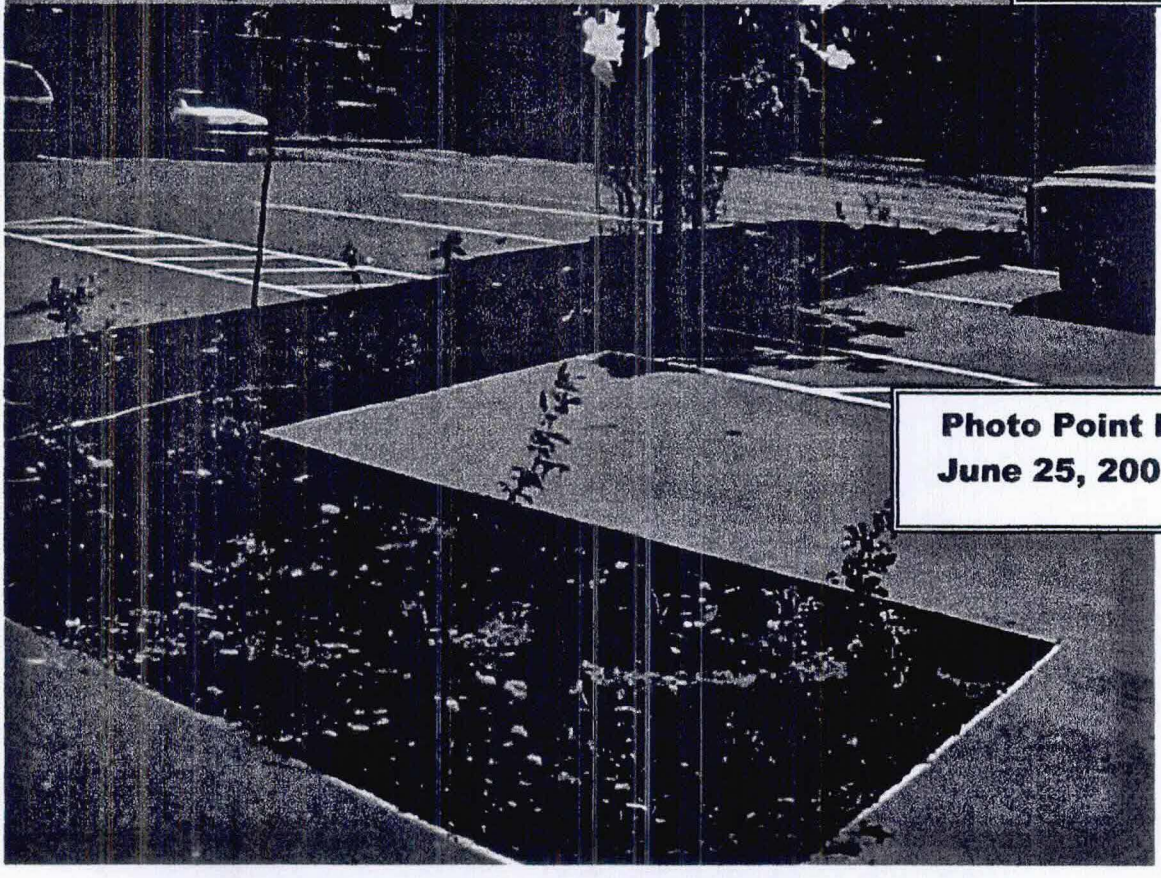
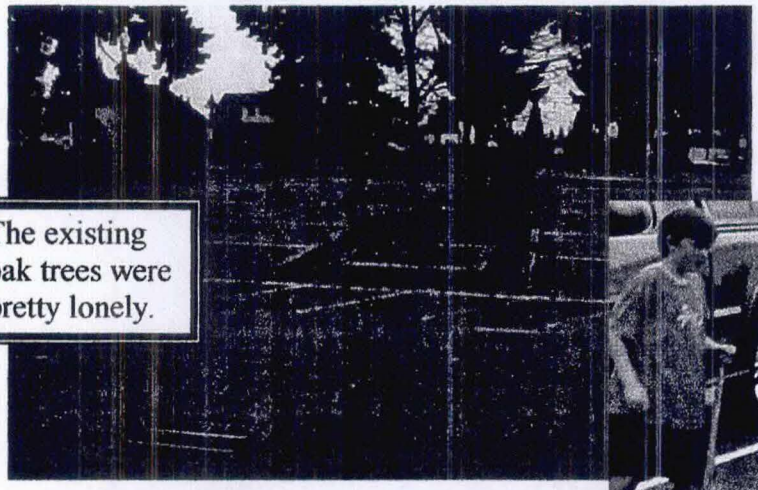
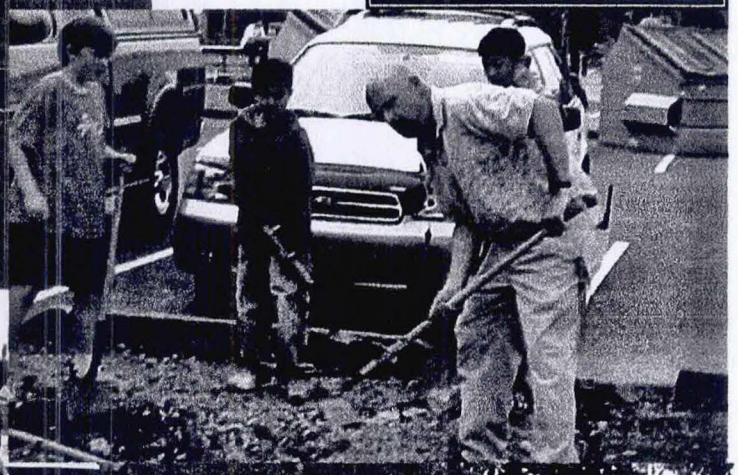


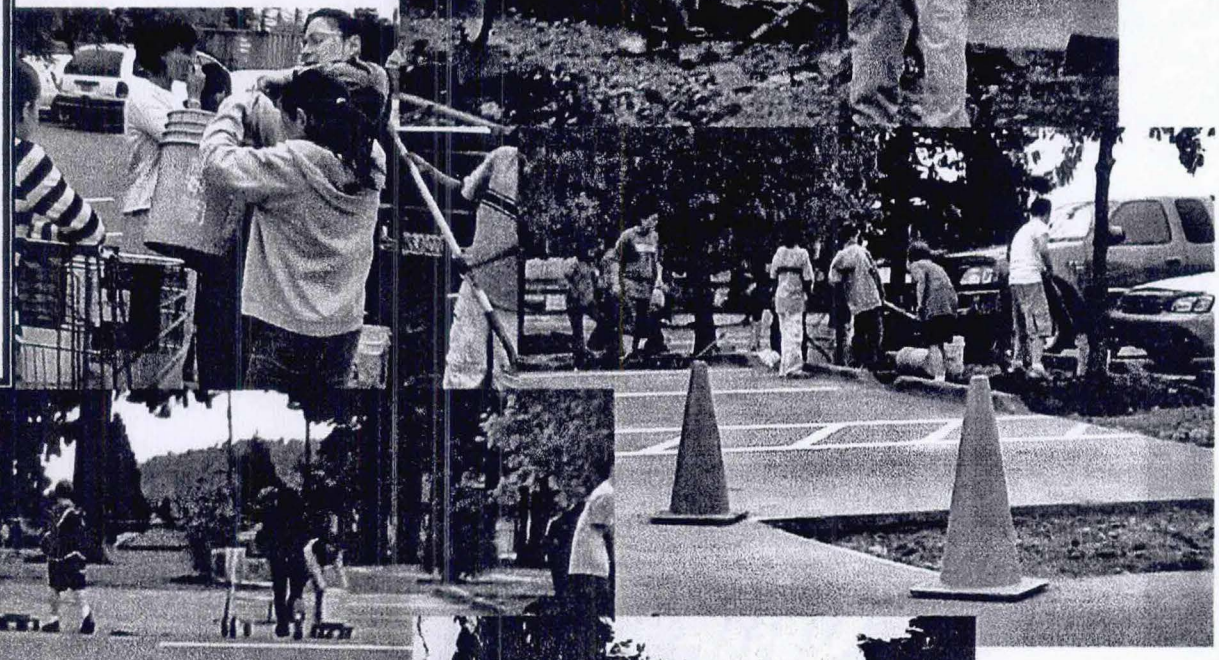
Photo Point B
June 25, 2003



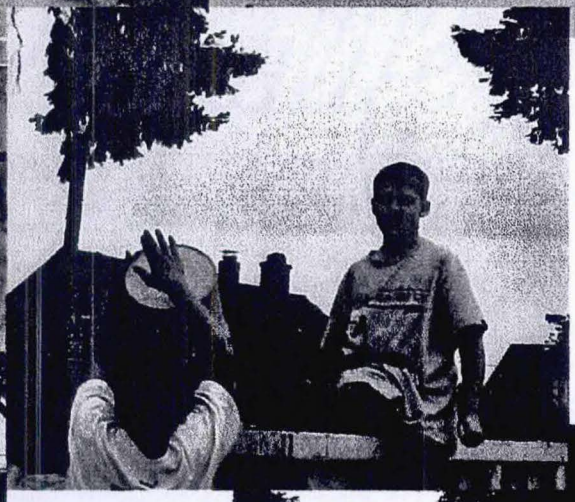
The existing oak trees were pretty lonely.

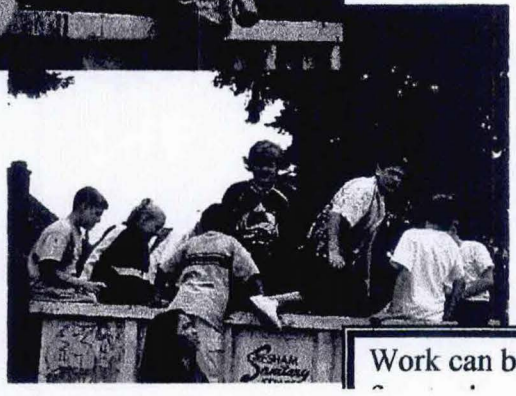


Doug Walters stops by for a digging lesson and a chain gang photo op.

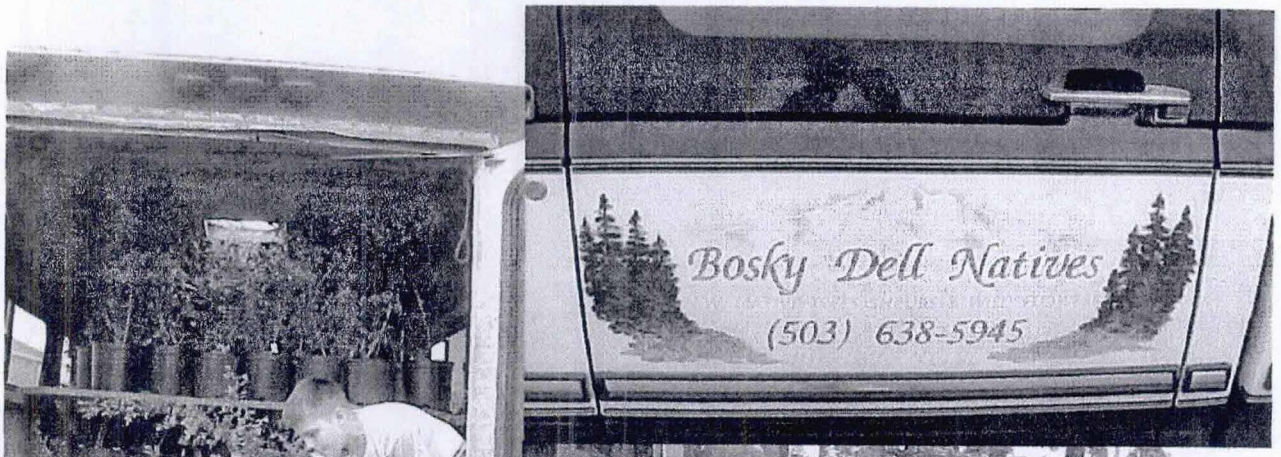


Asphalt and gravel went into buckets, then carts or on wheels to the dumpster which went to Gresham Sanitary for recycling.

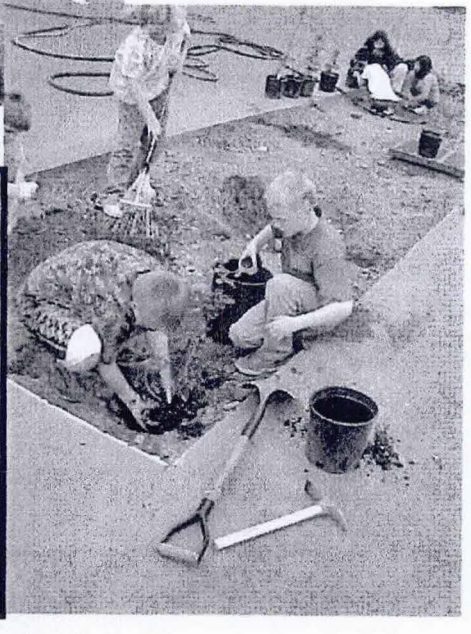




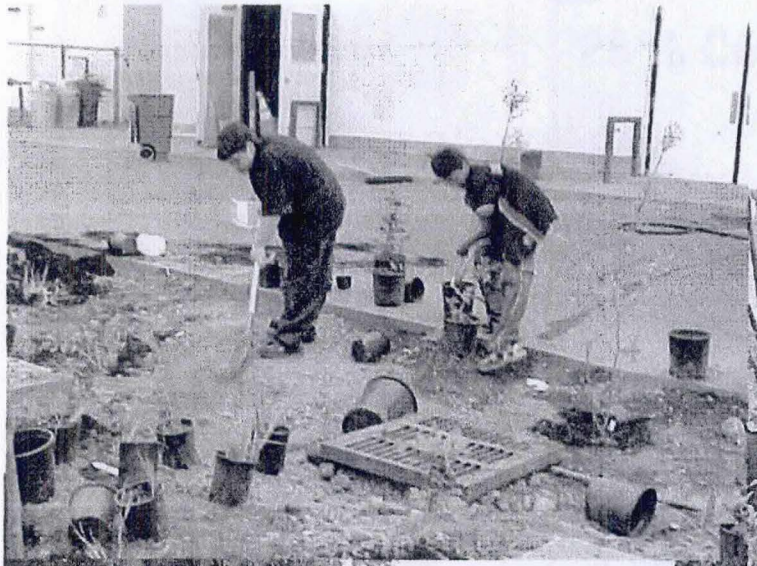
Work can be



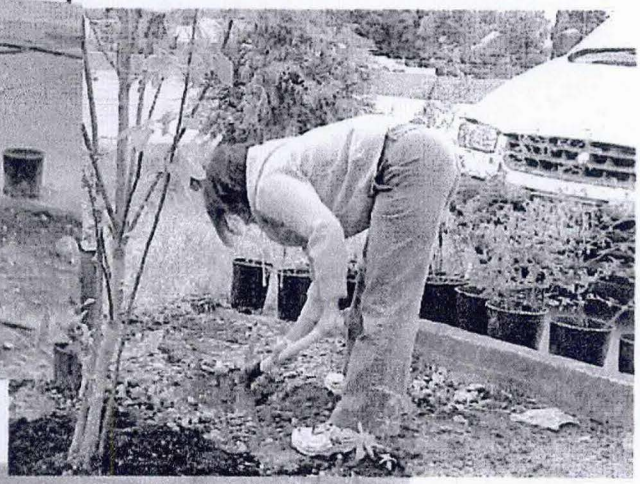
Students made short work of unloading the truck and distributing the pots to seven areas.

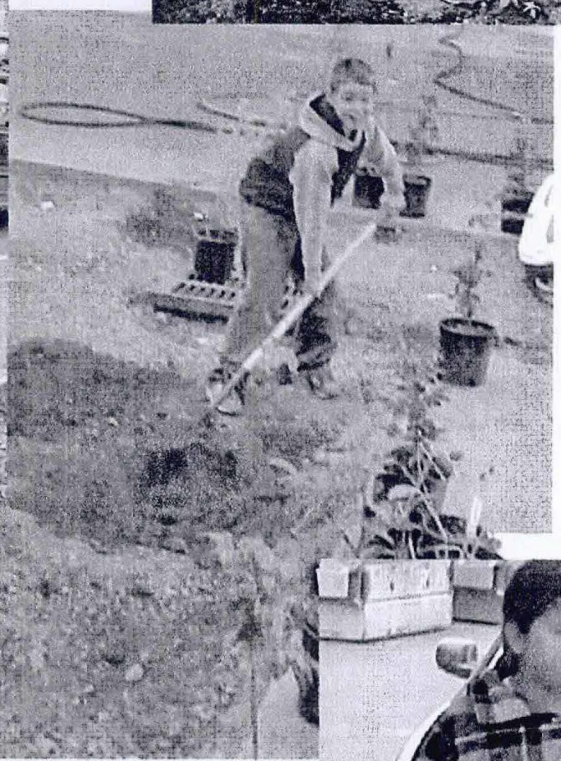


Teams took responsibility for planting what they could during their class period. Then another group in the next class took over.

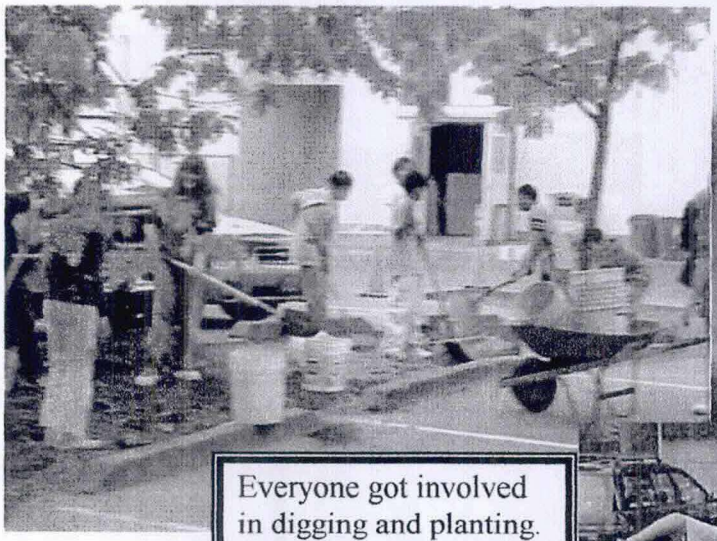


6th graders love to dig and haul.





We learned which end was up and how hard Portland Clay is and how big Missoula flood gravel is.

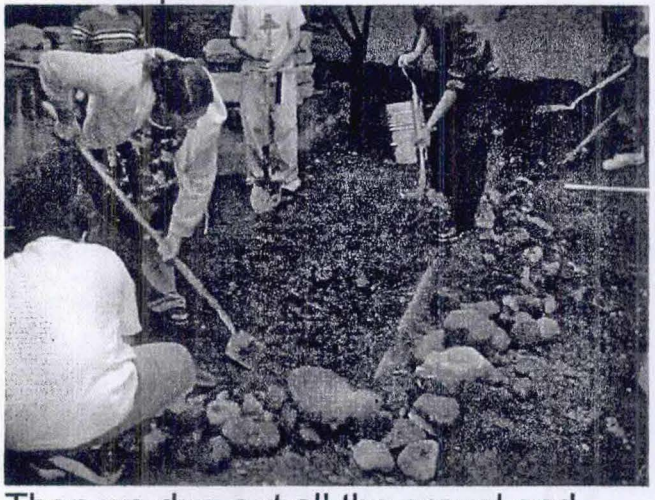


Everyone got involved in digging and planting.

Our student teacher from Concordia enjoyed the project as much as GHMS 6th graders.

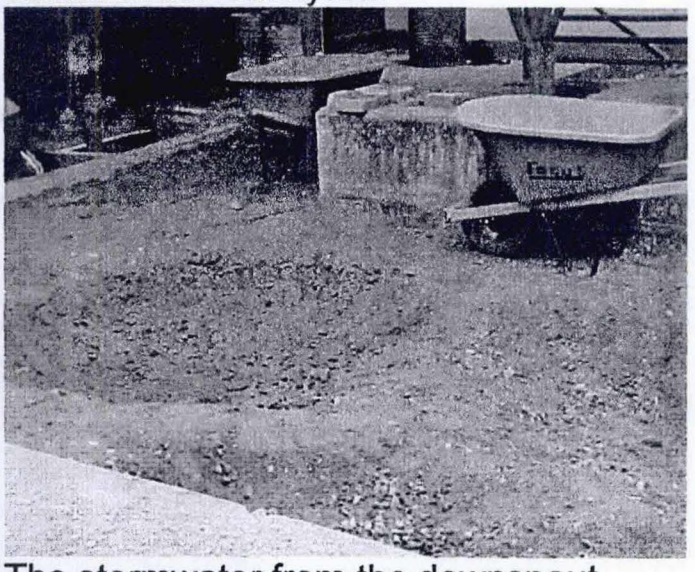
The Frog Team transforms our Courtyard into a native wetland.

We started by removing pavers and a concrete patio.



Then we dug out all the gravel and made a really big hole.
We removed 10 cubic yards of concrete and gravel in buckets.

This is the storm water drain in the center of our courtyard.



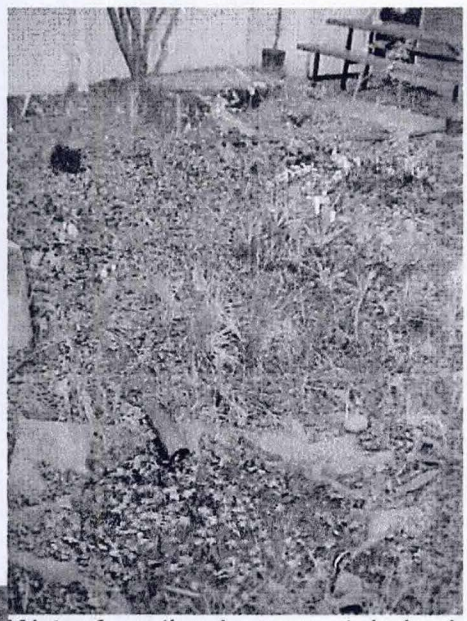
The stormwater from the downspout will be diverted into this "pond".

No sun or water gets under an overhang on the south side of the courtyard. We want to put in stiff pond liners and plant bog plants.

The Frog Team transforms our Courtyard into a native wetland.

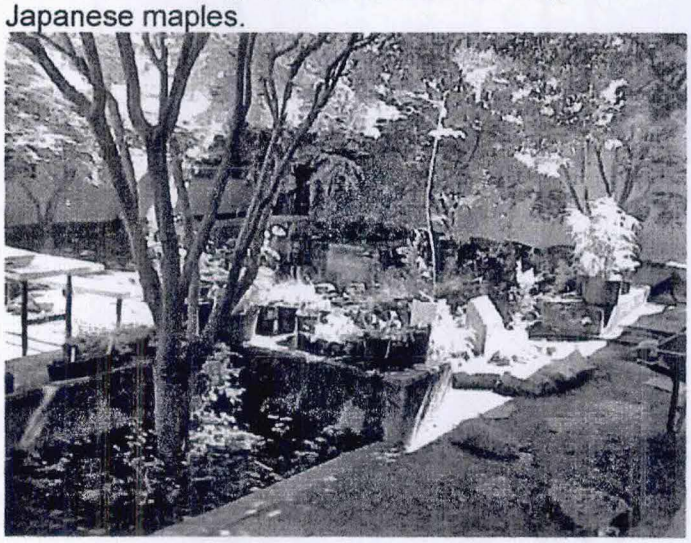
The diversion pipe goes into the pond. The liner will hold some water over the summer for critters.

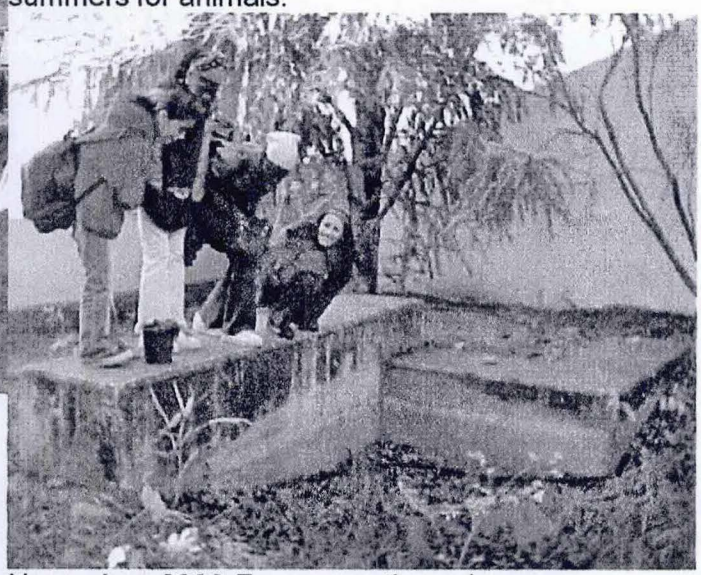
We left some plants in post. These will be planted in the fall when the rains return.



Water from the downspout drains into a low spot, which is lined with rubber. The liner will hold some moisture during summers for animals.

Our oxalis is doing nicely under the existing Japanese maples.





November, 2002-Four seventh graders are happy to see their plants survived and that there is finally water in the "pond".

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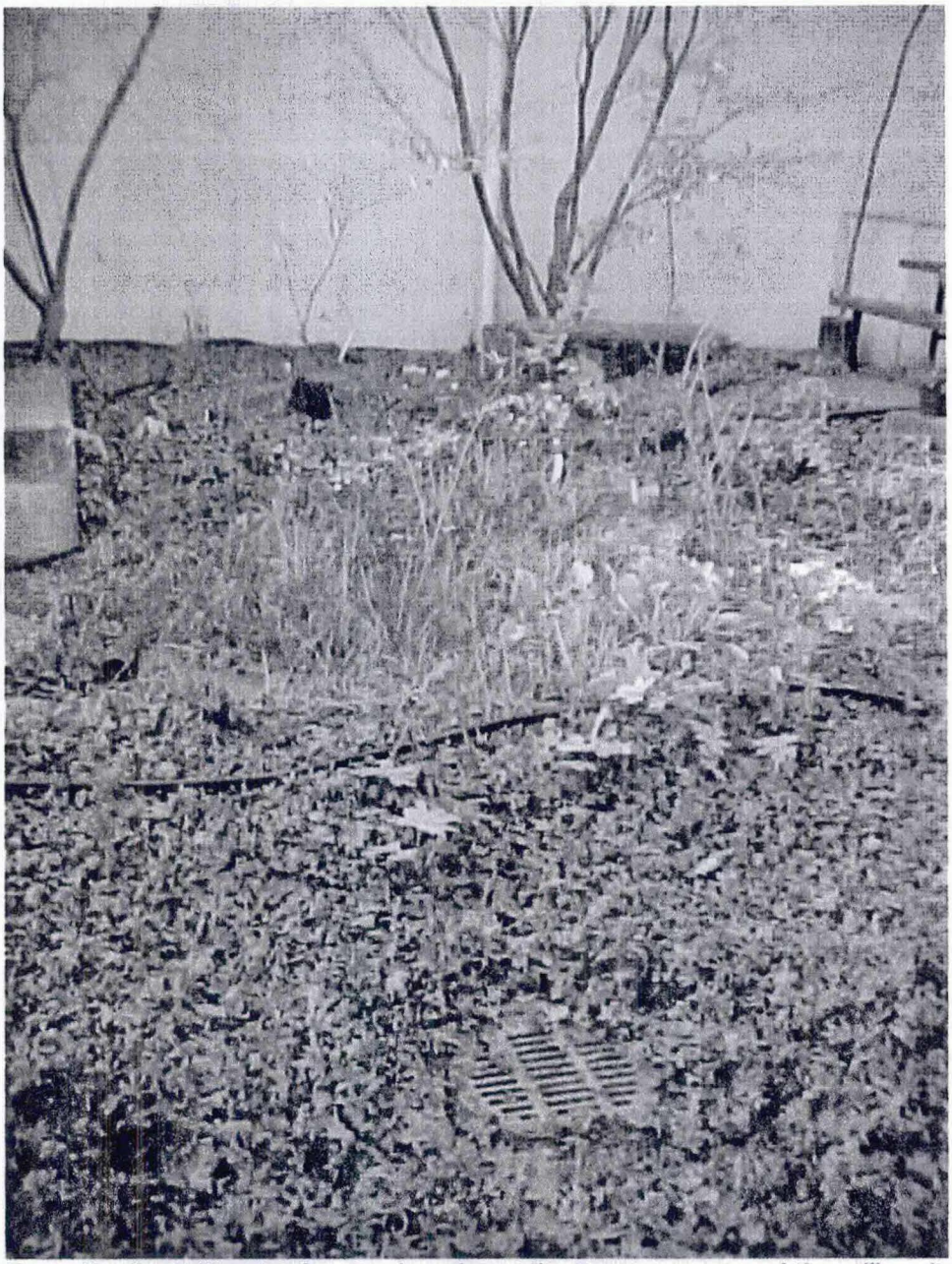

From the "pond" water has to rise above the grasses, around the willow (top right of picture) the up to the drain. The "Japanese" maples have lost their leaves before rain has even gotten over the top of the liner.

The walks are in place. The plants are all in and growing. The system will take rain from the roof into the thirsty ground when it rains.

The Frog Team transforms our Courtyard into a native wetland. Spring-Fall 2002

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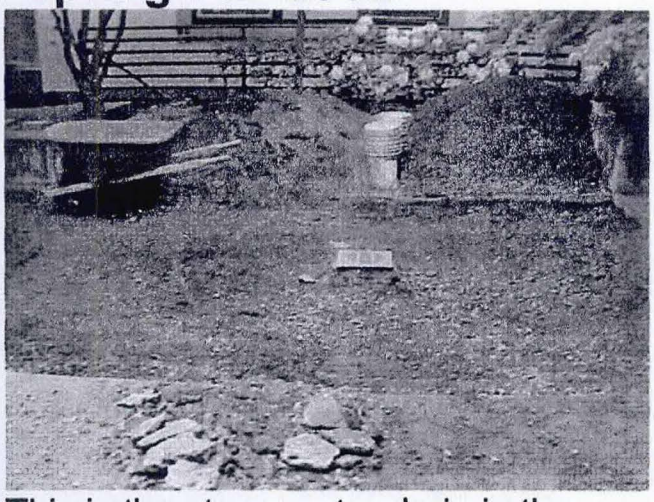

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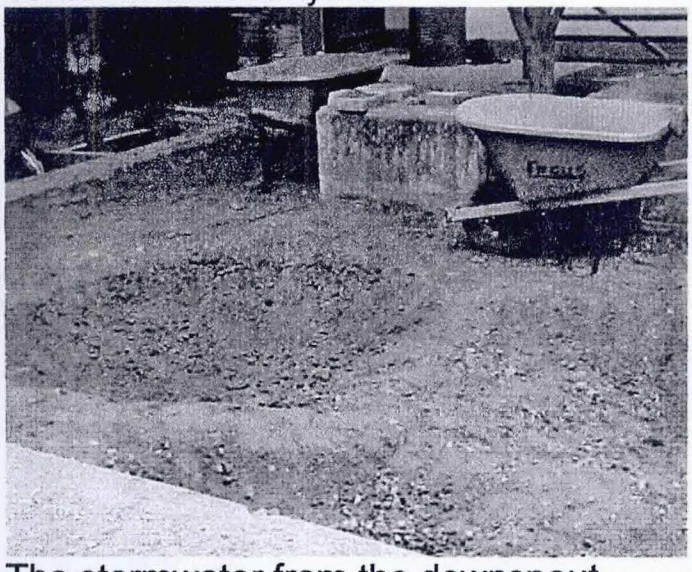

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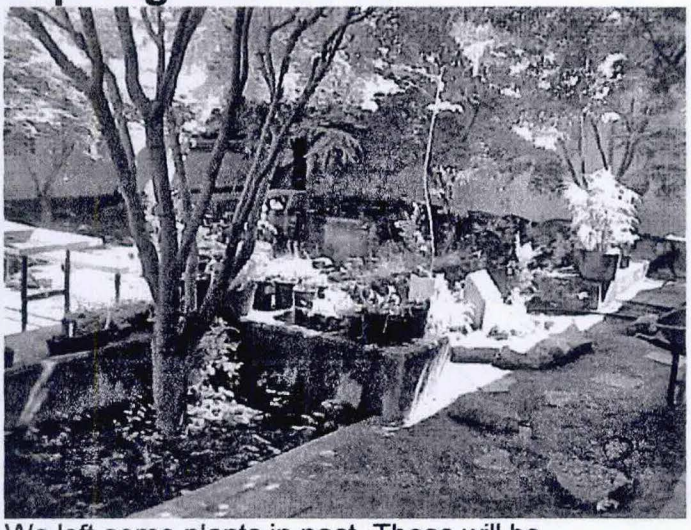

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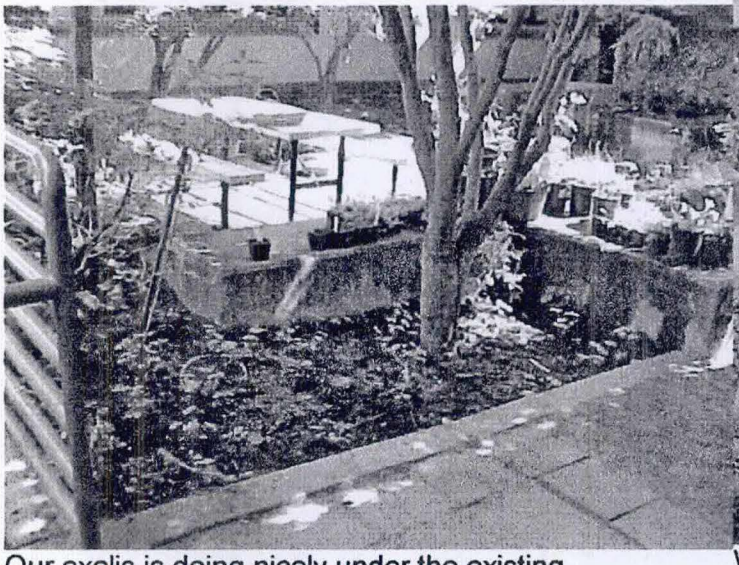

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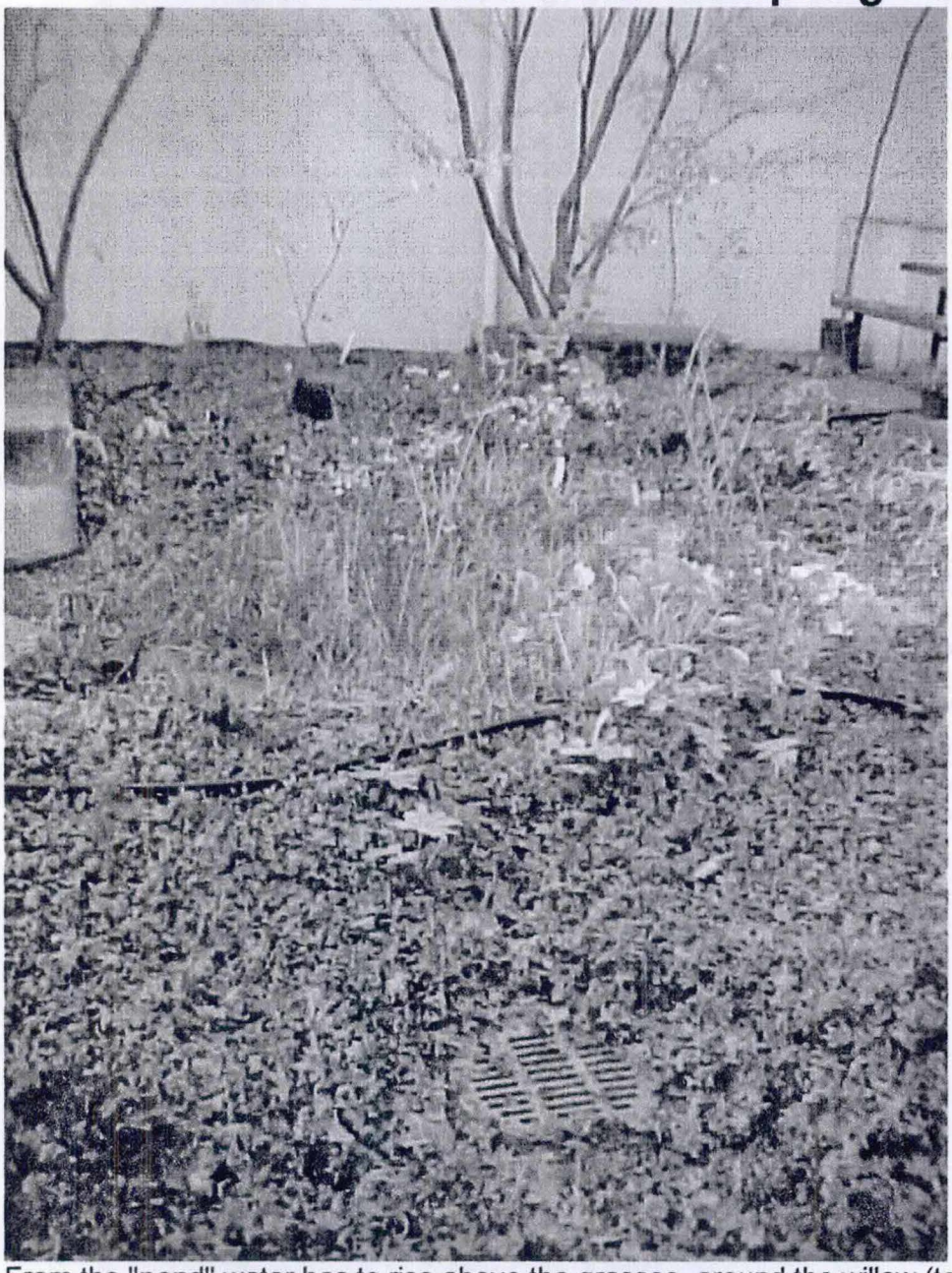

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