



WALKING ON WATER

Presented by: Michael Gubser, Shauna Martin, Sean Murray

Instructor: Phil Lewis

# Presentation Outline

- Introduction
- Team Development
- Project Work
- Achievements and Challenges
- Next Steps For Future IPRO's



# Introduction

# IPRO 344 Overview

## •Our Sponsor-Pentair Water

- Pentair is a global leader in providing innovative products and systems used worldwide in the movement, treatment, storage and enjoyment of water.



## •Team Moto

- “Problems cannot be solved at the same level of awareness that created them.” *Albert Einstein*

## •Other IPRO’s

- No previous IPRO’s
- IPRO 345-Condensation Collection

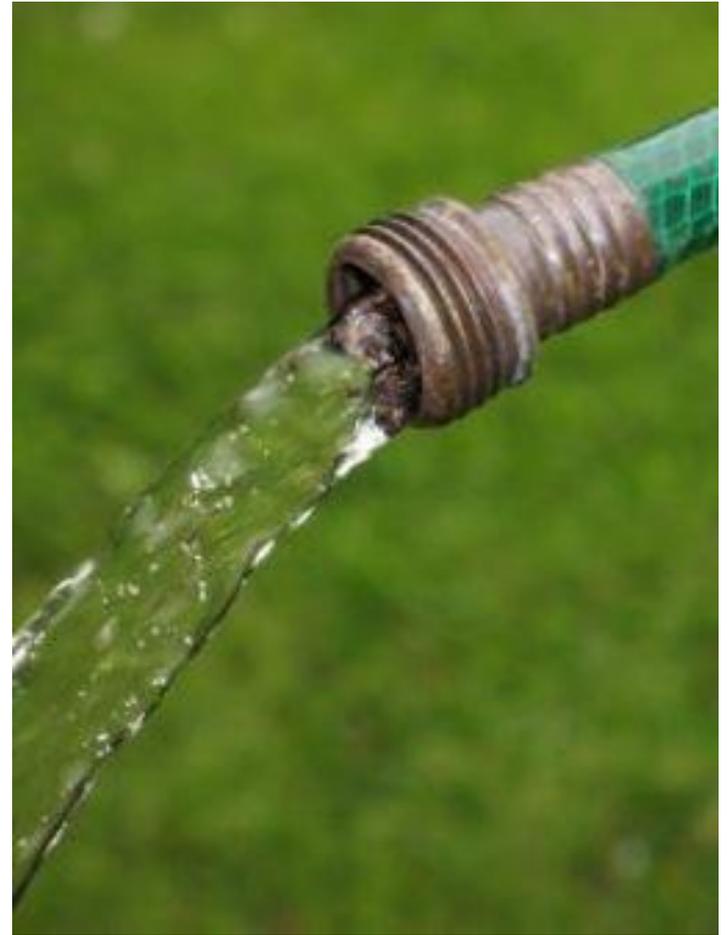


# Statement of the Problem:

The availability of water is a global problem. Over 20% of the world's population does not have access to safe drinking water.

American family uses about 45,000 gals. For gardening alone per year

On average 70% of the drinkable water used everyday is used to water the lawn and washing cars and other uses that do not require clean water



# Goal of the Project:

The intention of this IPRO team is to develop a more innovative system which could become the catalyst for the implementation of many more rainwater harvesting systems in the urban and rural residences on a mass scale, specifically within the United States.



# Team Development



# Organization of the Team:

Team Member	Skills	Learning needs	Expectations	Team Structure and Tasks
Sean Murray (312)-402-8766 smurray2@iit.edu	-Architecture -Problem solving -Graphic design	-To learn how to market a idea that has been through multiple design phases.	To have a learning experience that involves design	Design: Sizes and dimensions prototype building <b>Time Keeper</b>
Declain McCloat (708)-280-0711 dmccloat@iit.edu	-Architecture -Creative -Finding the middle ground	-Essays and develop speeches -Spelling	To continue learning team management skills	Design: build and test prototype <b>Team Leader</b>
Michael Gubser (314)-707-4099 mgubser@iit.edu	-Architecture -Problem solving -Creative	-Learn more about leadership and communication within a team	To create a functional product that can be sold	Marketing: statistical data to support product
Mohammad Al-Sabah (312)-420-6022 malsaba@iit.edu	-Architecture -Rhino -Model making	-How to transition from designing stage to marketing	A great final presentation	Presentation: 3d renderings and drawings
Adam Newman (630)-669-5935 anewman2@iit.edu	-Architecture -Auto CAD -Adobe Suite	-To develop a marketing strategy and presentation	A presentation that teaches consumers how to harvest rainwater	Presentation: 3d model and graphics <b>I-Groups Moderator</b>
Alysa Kirkpatrick (720)-244-2653 akirkpa1@iit.edu	-Architecture -Inventing new ideas -Display of artistic ability	-Selling an idea or product to marketing	To create a product that generates an interest in rainwater harvesting	Design: model making and sample testing
Juan Martinez (773)-510-5623 jmarti21@iit.edu	-Psychology -Creative -Has unorthodox / outside of the box ideas	-Develop an understanding of market aspects	How to test prototype designs	Marketing: research into surveying and demographics
Muqadas Munir (773)-759-0016 mmunir@iit.edu	-Business -Thinking outside of the box -Time management	-Learning to design prototypes	To create a tangible final product	Communications: internal contacting the team and keeping all information current <b>Minute Taker</b>
Shuana Martin (773)-358-0774 smarti5@iit.edu	-Biology -Creative -Problem solving	-To learn how to design and develop communication skills with the design team	To make a project that has the potential impact on society	Communications: Public relations Tasks include contacting business and Pentair <b>Agenda Maker</b>



# Division of Tasks and Team Work Ethic

- Cohesive group that was hard working and worked well while collaborating
- Most tasks tackled by atleast two people
- Work divided into two stages

## Design Phase:

- consideration of alternative materials
- consideration of alternative sizes
- cost comparisons between different iterations
- create drawings,3D model, and renderings
- build and test prototype

## Marketing Phase:

- determine target market
- hand out surveys and document the results
- provide statistical data to support reasons for product
- advertise product and capabilities



# Team Gantt Chart

- o **Project Name** : IPRO 344
- o **Project Description** : Rainwater Harvesting
- o **Project Length** : 8 Weeks
- o **Start Date** : 25-May-10  End Date 16-Jul-10
- o **Number of Weeks**  Number of Weeks 5
- o **Working Days** : Monday - Saturday
- o **Today's Marker** : Yes
- o **Holiday's Marker** : No

Level	Task	PIC	Start Date	Finish Date	WD	DC	DR	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8																		
								(5/24/10 - 5/30/10)	(5/31/10 - 6/6/10)	(6/7/10 - 6/13/10)	(6/14/10 - 6/20/10)	(6/21/10 - 6/27/10)	(6/28/10 - 7/4/10)	(7/5/10 - 7/11/10)	(7/12/10 - 7/18/10)																		
								24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>1</b>	<b>Project Plan</b>		<b>25-May-10</b>	<b>10-Jun-10</b>	<b>15</b>	<b>13</b>	<b>2</b>																										
1.1	Research		25-May-10	2-Jun-10	8	13	-5																										
1.2	Writing		3-Jun-10	10-Jun-10	7	6	1																										
<b>2</b>	<b>Survey</b>		<b>8-Jun-10</b>	<b>1-Jul-10</b>	<b>21</b>	<b>3</b>	<b>18</b>																										
2.1	Compose Survey		8-Jun-10	12-Jun-10	5	3	2																										
2.2	Conduct Survey		12-Jun-10	25-Jun-10	11	-2	13																										
2.3	Analyze Results		25-Jun-10	1-Jul-10	6	-12	18																										
<b>3</b>	<b>Research</b>		<b>25-May-10</b>	<b>17-Jun-10</b>	<b>21</b>	<b>13</b>	<b>8</b>																										
3.1	Initial Visit to Pentair		3-Jun-10	3-Jun-10	1	6	-5																										
3.2	Internet Research		29-May-10	15-Jun-10	14	9	5																										
3.3	Analyze Research		15-Jun-10	17-Jun-10	3	-4	7																										
<b>4</b>	<b>Midterm Prestation</b>		<b>10-Jun-10</b>	<b>17-Jun-10</b>	<b>7</b>	<b>1</b>	<b>6</b>																										
4.1	Compose Presentation		10-Jun-10	15-Jun-10	5	1	4																										
4.2	Practice Prestation		15-Jun-10	15-Jun-10	1	-4	5																										
4.3	Present		17-Jun-10	17-Jun-10	1	-6	7																										
<b>5</b>	<b>Prototype</b>		<b>25-May-10</b>	<b>17-Jun-10</b>	<b>21</b>	<b>13</b>	<b>8</b>																										
5.1	Design		27-May-10	20-Jun-10	21	11	10																										
5.2	Build		20-Jun-10	1-Jul-10	-11	-7	-4																										
5.3	Testing		1-Jul-10	5-Jul-10	30	8	22																										
<b>6</b>	<b>Deliverable for IPRO Day</b>		<b>20-Jun-10</b>	<b>12-Jul-10</b>	<b>19</b>	<b>-7</b>	<b>26</b>																										
6.1	Poster		1-Jul-10	10-Jul-10	9	-16	25																										
6.2	Brochure		15-Jun-10	17-Jun-10	3	-4	7																										
6.3	Pentair Prestation		1-Jul-10	8-Jul-10	7	-16	23																										
6.4	Final Presentation		8-Jul-10	12-Jul-10	4	-21	25																										



# Project Work



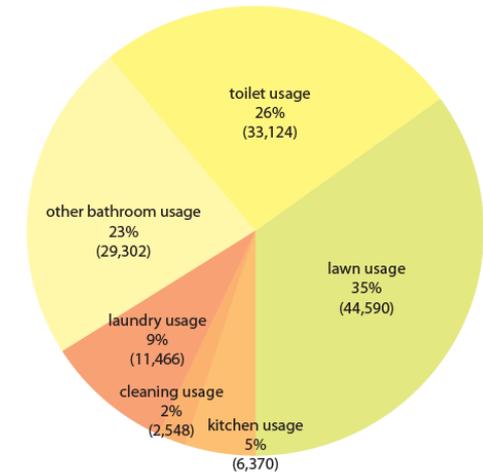
# Research

- Initial internet based searches
- Phone calls to manufacturers of similar products
- Periodicals/ Journals

## Research findings

- The average American's use of water outdoors accounts for 35% of their total annual usage
  - Equivalent to 44,590 gallons per year
- There are many rainwater harvesting products currently on the market
  - Most are costly and visually unattractive

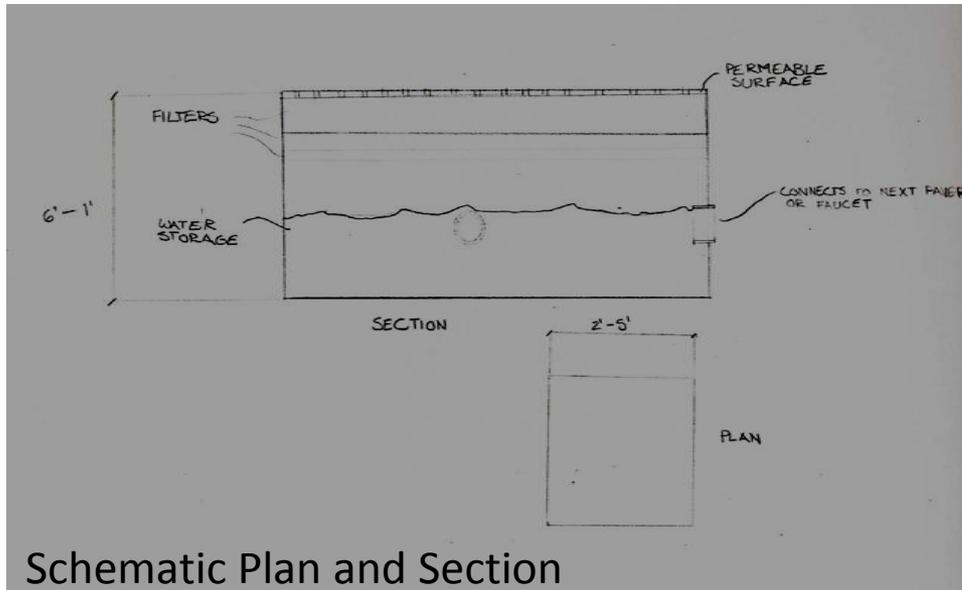
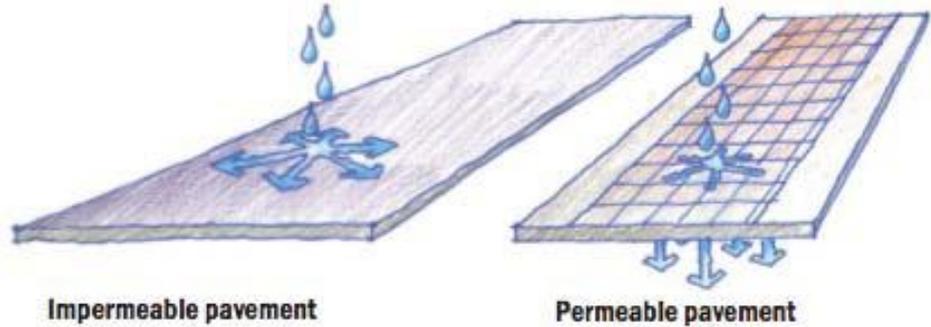
TYPICAL ANNUAL WATER USAGE PER AMERICAN HOUSEHOLD  
(gallons/year)



# Schematic Design

## Walking on Water Concept:

- Individual pavers or paving slabs which allow water to pass through them
- Pavers or slabs sit on top of catchment devices
- Water can be stored to be used at a future time



Schematic Plan and Section



Initial Prototype



# Visit to Pentair/Conference Call to Australia

## Pentair Visit

The Group took a trip out to one of Pentair's facilities in Wisconsin and met with representative.

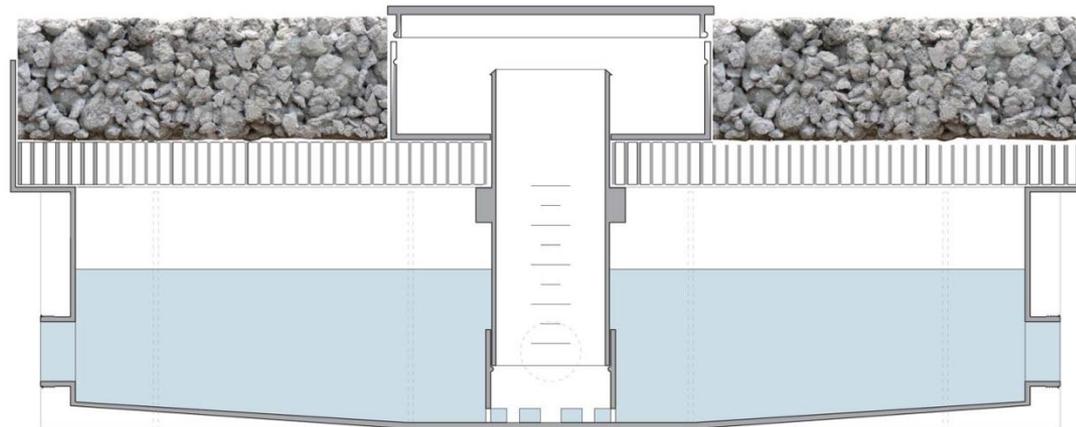
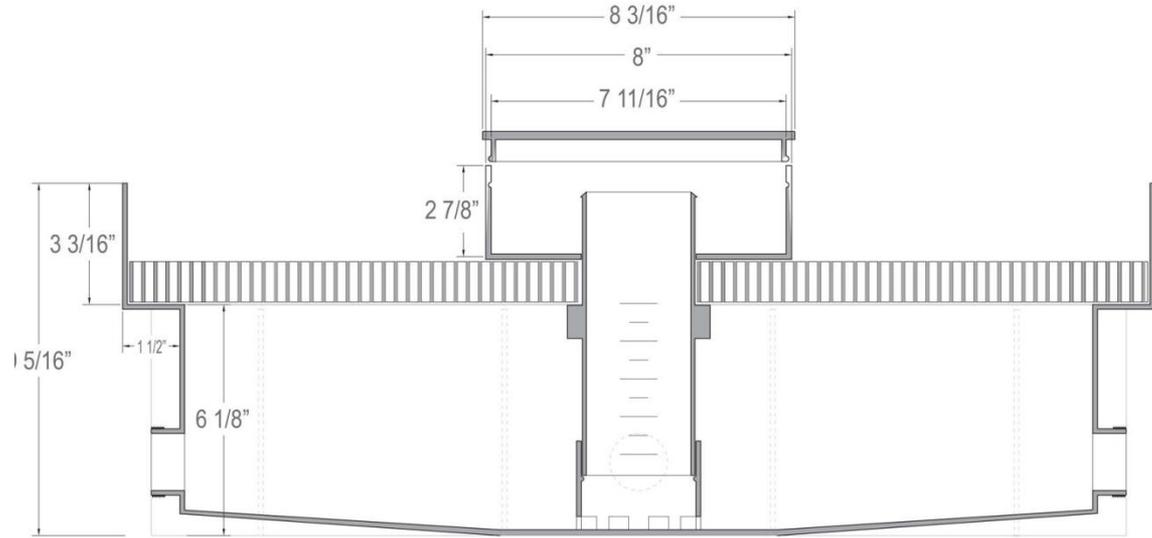
- The group learned Pentair's expectations.
- Got feedback on the initial design
- established lines of connection and received thumbs up on progress of the group.

## Recommendations from Australian office

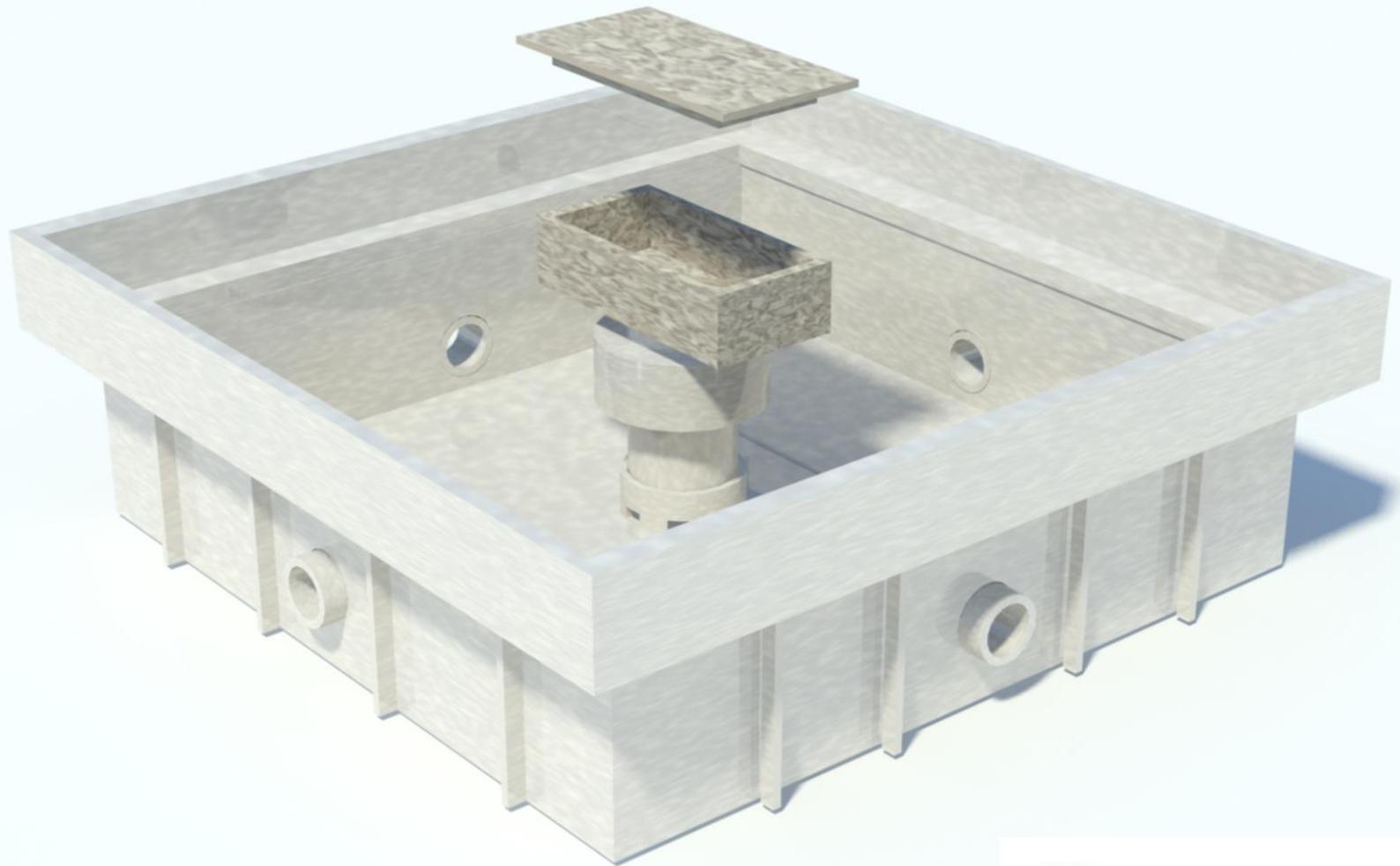
- Sell our product to homebuilders and landscapers because the mass market does not have a 'need' to buy our product. There is no drought in the US and water is cheap.
- After some time (3years) we can try and sell it at Home Depot but they strongly recommend that we don't start out that way.



# Prototype



# Prototype



# Prototype: Installation

## Installation info: Begin with step one

14.) Lay ground nearby flush with paver system

13.) Lay paver system on top of the cisterns

12.) Connect the adjustable access cap box to be flush with the pavers you have selected

11.) Place metal mesh to hold the pavers then a setting bed of gravel

10.) Place pump access tube in the lower holder of the cistern

09.) Put a cap on all other pipes not connected to another cistern

08.) Put down next cistern

07.) Twist and tighten the connector so that it connects both pipes connected to the cistern

06.) Lay the next cistern down

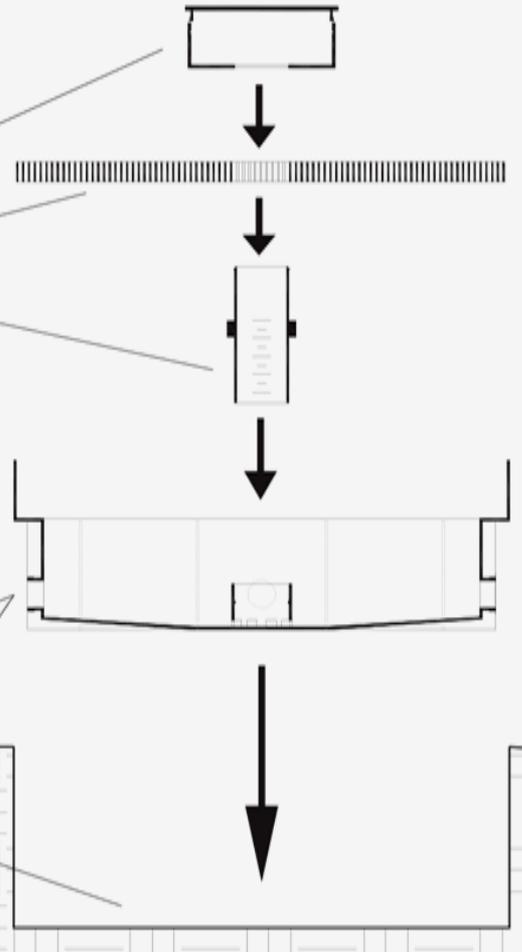
05.) Put connectors onto the pipe that is later going to be connected to the next cistern

04.) Take plastic cistern out of box  
Attach the pipes

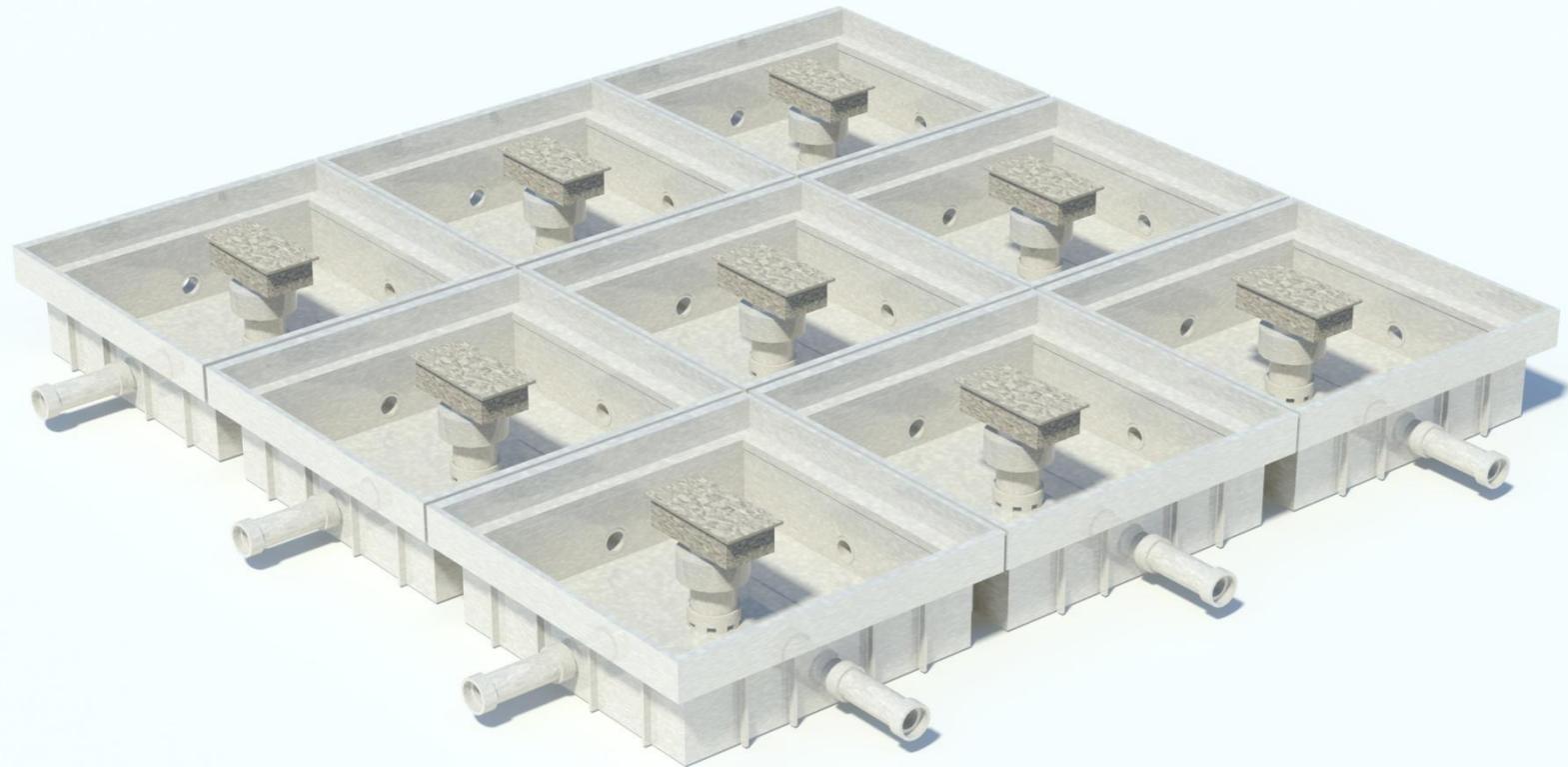
03.) Dig a ditch to put cistern(s) in to the ground

02.) Configure a layout for the boxes

01.) Have a plan and a large area on your property that has access to the downspout from your roof



# Prototype: Networked System



# Prototype: Performance Specs

## •W.O.W. Module Specs

- Dimension of Cistern:
  - length: 2'-0"
  - width: 2'-0"
  - depth: 0'-6"
- Total Volume: 2 cubic feet
  - 1 cubic foot of water = 7.5 ga
  - 1 module = 15 ga of water
- To water 800 sqft of garden:
  - 800 sqft x .5 ga/sqft = 400 ga required
  - 400 ga/ 15 ga per module ~ 27 modules
  - 27 modules (2'-0" x 2'-0" surface area) = 108 sqft of module

- One module of 15 gallons waters >30 sqft of garden  
OR
- Ratio area approximately 1:8 (e.g. 4 sqft of module accomodates ~ 32sqft of garden)

## •Amounts of rainwater collected per module

- 10 inches of water per year:
  - 24" x 24" x 10" = 5760 cubic in
  - 5760 cubic inches/ 1728 cubic inches/ cubic foot = 3.3 cubic feet
  - 3.3 cubic feet x 7.48 ga/ cubic foot = 24.684 ga
- 25 ga of rainwater collected per module every year in an area that receives 10 in of rainfall per year

- 20 in = 50 ga/module
- 30 in = 75 ga/module
- 40 in = 100 ga/module
- 50 in = 125 ga/ module

# Marketing: Plan

- Introduction/Middle Marketing-
- Targeting Middle Market merchants like Ace Hardware and Hardware Hank.
- WHY?
- They require less product for shelf life, and it serves as a field test for popularity of the product.
- The plan is to create the desire in the public with advertisements and information, then point them to the merchant.



## Possible Partner Channels

- Homebuilders
- Landscaping
  - Valley Crest Landscaping company
- Contracting Companies
  - Bachtel Contracting company



**Take a Step in the Right  
Direction!!**

**Start Harvesting Rain Water Today!  
W.O.W!**

**(Walking.On.Water)  
TXT "RAIN" to 443445**



**DID YOU KNOW?**

**The Average American uses 176  
Gallons of water a day?!?!?**

**That's about 5 Full bath Tubs!!!**



# DID YOU KNOW?

70% of the United State's  
fresh water supply comes from the  
Great Lakes?

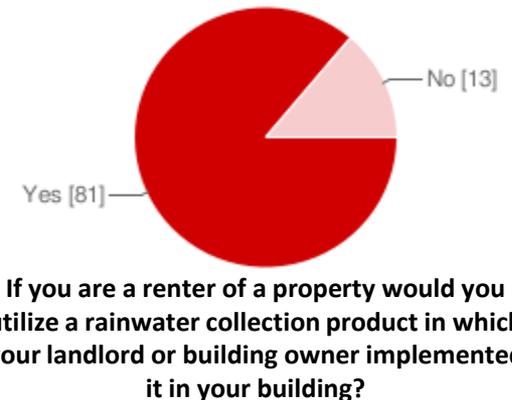
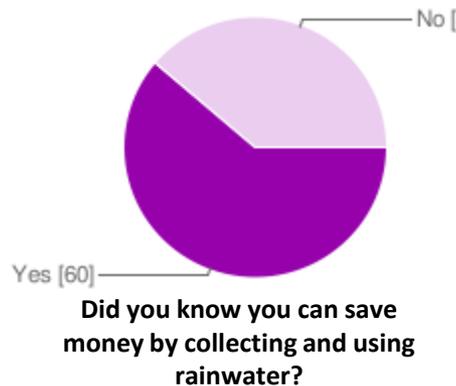
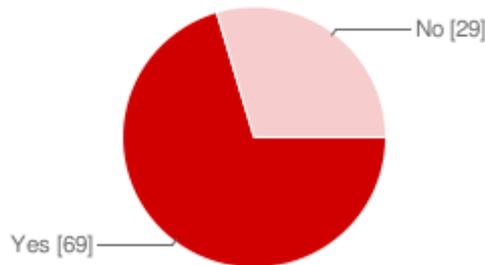
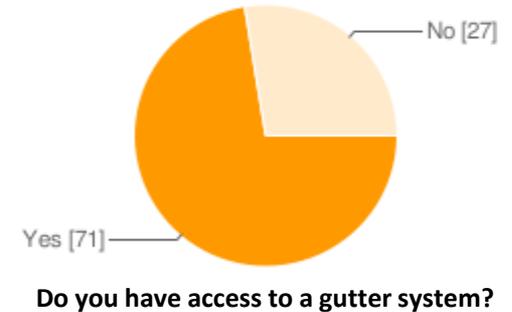
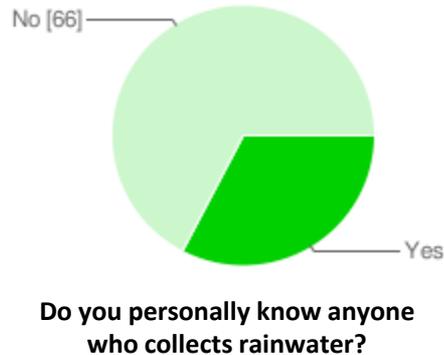
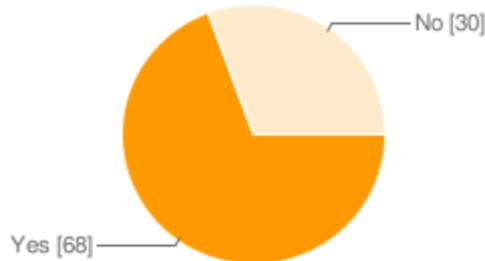
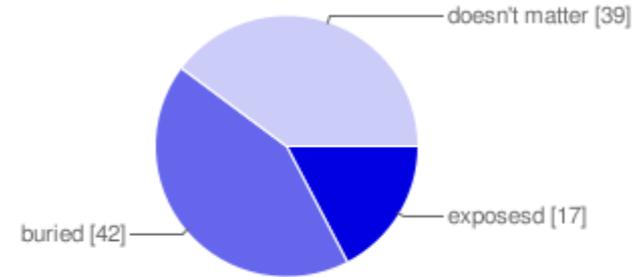
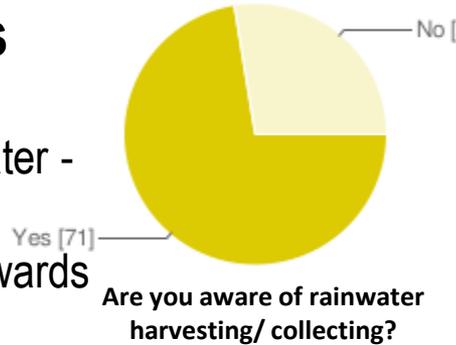
**LETS NOT WAIT UNTIL THE WELL RUNS DRY!  
START HARVESTING RAIN WATER TODAY!!!**



# Marketing: Surveys

## Conducted written surveys

- Received aprox. 100 responses
- Trying to gain an insight to why rainwater harvesting hasn't caught on.
- Questions asked were also geared towards developing a marketing plan



# Marketing: Package Design

# W.O.W.

## PRODUCT INFORMATION

### W.O.W. MODULE SPEC'S

DESIGNED BY: ILLINOIS INSTITUTE OF TECHNOLOGY  
 MODEL: 25  
 TRADE NAME: WALKING ON WATER RAINWATER COLLECTION SYSTEM

TO ORDER SEE US AT: GARDEN  
 SEE US AT: GARDEN  
 SEE US AT: GARDEN

OR MAIL TO: ILLINOIS INSTITUTE OF TECHNOLOGY  
 1400 E. CALHOUN ST. CHICAGO, IL 60607

### PUMP REQUIREMENTS:

MINIMUM FLOW RATE: 10 GPM  
 MINIMUM HEAD: 10 FT

MINIMUM FLOW RATE: 10 GPM  
 MINIMUM HEAD: 10 FT

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 MINIMUM HEAD: 10 FT

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 MINIMUM HEAD: 10 FT

Walking on Water is a modular rainwater collection system that can be placed under or above ground. The design allows the user to store rainwater without sacrificing the aesthetic value of their surroundings by having the product be used as a pavement also to hide the water storage. It also gives the user the freedom to set up the system in many different ways such as a pathway, patio, or even a driveway.

## WALKING ON WATER RAINWATER COLLECTION SYSTEM

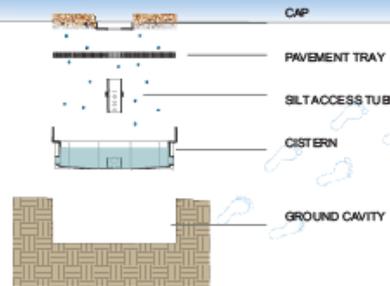


- BOX INCLUDES:**
- 6 Cisterns
  - 6 Caps
  - 6 Pavement Trays
  - 6 Silt Access Tubes
  - 10 Couplings
- BOX DOES NOT INCLUDE:**
- Pump Kit
  - Pavers



## HOW DOES W.O.W. WORK ?

# W.O.W.



## RAINWATER HARVESTING

### SINCE WHEN ?

There is evidence that people have been harvesting rainwater since 4000 B.C. The Roman Empire developed an intricate infrastructure to direct water to be used for irrigation and sanitary purposes. For the most part, modern society has abandoned the practice of harvesting rainwater because water sources have been plentiful and inexpensive.

### WHY ?

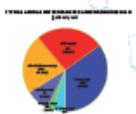
There is a shortage in our water supply fast approaching, and it is up to us to conserve our water supply. There are countless opportunities to use grey water (bath water) instead of potable fresh water (the flushing toilet, washing the lawn, washing the car, and many more).

### HOW ?

pleasing to harvest rain water. You can do it underground and have the top exposed, or you can have your cisterns above ground for all to see.

### WHO ?

ANYBODY can do it! If you have a place to put your cistern then you can harvest rain water.



# Achievements and Challenges



# What major obstacles did we encounter?

## **- design process / execution**

- material considerations
  - filter / filter fabric
  - filter box assemblies (parameters)
- rainwater run-off
- connectivity of modular units
- flexibility
- structural integrity of the assembly
  - material
  - molding (recycled plastic materials)
  - extruded plastic forms

## **-creating a public interest and desire for a product of this nature**

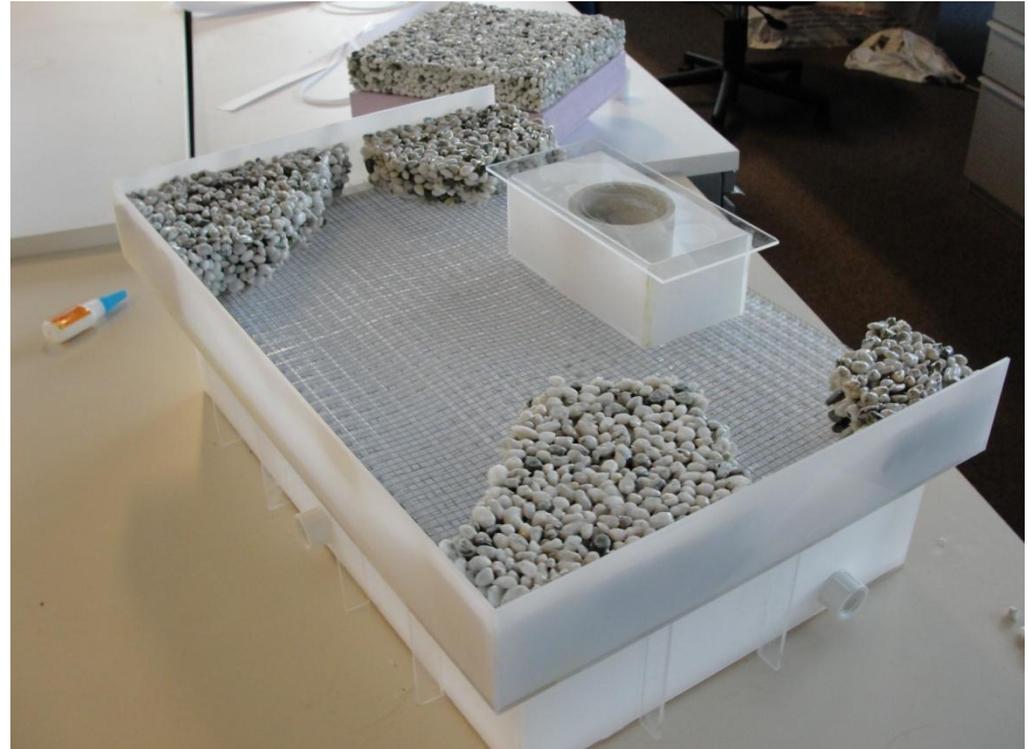
- marketing strategy

## **-cost / affordability**



# What did we accomplish this semester?

- Group met with Pentair/established a relationship
- Created an innovative rainwater system
- Field tested the prototype
- Created Marketing Plan
- Made a major step towards solving solving the water usage issue/
- Set the tone and paved a way for future IPRO's



# Next Steps For Future IPRO's



# What's next?

- Research costs
- Meet again with Pentair and look into and begin targeting middle market vendors like an Ace Hardware, or other stores that are not main stream suppliers to implement field tests for the product.
- Continue to research the topic of rainwater harvesting and systems that exist, because with rapid advances in technology a new innovation could surface that could help the product.



# Needs / Questions/ Requests

