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Lady Ridley Tree, Jan Campbell, Maria Caudillo,
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# WATER SAVINGS FOR ALICE KECK PARK MEMORIAL

Dear Madam and Sirs

## BACKGROUND

I am Monty Cole a general contractor in Montecito with a science and design background. I have 35 years experience in designing and building water drainage systems and am an EPA qualified Water Wise Landscape Professional. My company designs and installs rainwater catchment systems for estates, schools, businesses and homeowners in Santa Barbara County. We use Lash Construction as our main subs.

We recently designed a water catchment system for Lotusland, which gathers and stores in tanks over 700,000 gallons per year for them at roughly 2 cents a gallon. We are using Lotusland parking lots and driveways to collect water each rain and store it in underground tanks, set into corners of the property.

I made a point to create a survey of Santa Barbara Alice Keck Park Memorial and the surrounding streets for water saving capacities and would like to share my findings and recommendations.

I have a deep care for wildlife in this park, and any park where humans caretake animals, and I believe this work is an essential community project that is worthy of the Foundations attention. I too am "committed to preserving the natural beauty, ecological integrity and productivity of the wild and working lands in Santa Barbara County for generations to come."

The numerous aquatic animals, turtles, carp and ducks of Alice Keck Park Memorial are living in deplorable conditions, covered in slime, and foul smelling glop and I want to help alleviate this dreadful condition. I appeal to the Santa Barbara Foundation to find a way to help this project move forward.

My rainwater capturing design will solve this problem by providing 1,ooo gallons of clean rainwater every day from May 1st to Oct 1st. That's 150 days of stored water from rains during the winter. Also it will basically eliminate the need for city water at this world famous park. The numbers presented below can be verified by PE's, Architects and other design and water professionals. The numbers are researched and show the reality of gathering and storing 1.5 million gallons a year of rainwater at Alice Keck Park Memorial.

Note: Most of the work on this project is to be sub contracted to the well known and trusted LASH CONSTRUCTION and other local businesses.


## SITE RAINWATER AMOUNTS AND CALCULATIONS

The streets above Alice Keck Park create a large drainage area from which to draw rainwater. Also each street has 10 houses per block which have driveways and gutters that all drain to the street. (Note; Water survey excludes homes not draining to street.)

My survey of two blocks up from the Park show rain water capacity, flowing past the park of 1.8 million gallons a year. Each block in this area is 450 feet long and 40-50' wide,  so they have a great deal of collecting area. Some streets only drain on one side of the street into area "A"...  all this is acknowledged in the equations used to find water available at point "A", which is the pick up point used for the Keck Park project. This water as shown on the map, flows past Point A shown above, where we can pick this water up at the corner of Arrellaga and Santa Barbara Street. Here is the point A spot pictured...

If that sounds interesting, I hope you will read on.Since our 'rainy' season is normally about 200 days long, the calculation is this:

Yearly average from streets and homes above the park = 1.8 Million gallons / 200 days = 9485 gallons per day average, in an average rain year of 18".

This water can be stored in tanks for irrigation use each day or as needed to refresh the duck pond and creek, fill the weed basin and irrigate the entire park.

## METHOD AND COST

## PUMPS

My design here involves collecting water at N/W corner of the Park, from the gutter area by means of a 3'X4' grated sump as shown on the plans I have sketched out. The gutter basin will gather water from rain fall and carry it via a 12" PVC pipe under the sidewalk and into the Park grounds by gravity. In the park my patented stormwater diversion cube will shunt this water as needed into a sump, and the extra will flow through and back out to the street. The 600 gallon sump is located near the N/W corner as shown.

The sump has an 12" outflow which will return the first 20 minutes (time adjustable) of water to the street to flush out any possible road pollutants. After 20 minutes a timer activates the Cube valve and the pumps are feed water. Water from the 600 gallon sump is pumped 20' over to the new 160,000 gallon cistern for storage. Use (4) 9750 GPH pumps.

If the tanks are full and it's still raining, the additional water can be manually or automatically shunted to fill and flush the ponds, or to deluge-water the grounds, or simply turn the pumps off, open the Cube valve and water exits back to the street. This failsafe water return and first flush design will also operate with or without power.

## TANKS

Practically, the best spot for a tank farm or cistern storage is at this N/W corner, and along Arrellaga Street, just inside the Park grounds. Paint the tanks green, plant shrubs, vines and they will disappear in a few years. Recommend (3) 5o,000 gallon underground tanks if people can't stand to loose any parkland to a cistern. This will give the Park storage capacity of 150,000 gallons. With this storage, the Park can fill the tanks 12 times during a normal rain year, making for 1.8 million gallons saved each year.


## ALTERNATIVE CISTERN STORAGE- CHEAPER / BETTER

To save money, a 40' X 40' concrete block cistern is the way to go. Savings are substantial, in the 23% range. This would bring the complete estimated price down $66,000... to around $223,000 for a finished product. The cistern is 40' X 40' and will be imbedded 10' into the ground and 4' above ground for a low visual impact, with a low angled roof... and will store 167,552 gallons. This is more storage than the (3) underground plastic tank option. The sides of the cistern will be four feet above ground. A finishing option is to cover the exterior with sandstone cobbles to mimic the Mission cisterns the Mission Padres built 265 years ago... with Native American labor. Note that this old Padre cistern is still serviceable, sitting up by the Mission. The Spaniards knew about drought and built a dam in Mission canyon and

several cisterns with gravity feeds below, to keep the crops, cattle and people watered. It still works!

So by going to the cistern style the price drops 23% and the storage goes up from 150K to 167K gallons.  A 50 X50 cistern is nearly 205K Gals. I think it's a better idea, more efficient, more storage, more ecological as concrete lasts 80-150 years and plastic likely will crack and be hard to clean or repair.

## SUMMER SEASON USE

In the last rains of April, the tanks or Cistern are filled by 1.4 inches of rain, which will produce 150,000 gallons in storage. That will produce 3,000 gallons a day for 30 days... Or, over the long dry season from May to October, 150 days, the full tanks will produce 1,000 gallons a day for 150 days... or 7,000 gallons a week for 20 weeks.

**The entire dry season is now adequately watered without imported water.**

## ELECTRICAL

Electrical could be run from the garden shed to the pumps. The inflow will have a timer automatically begin working when water levels activate a float...and can also be switched on or off manually. The water can fill storage tanks within Park grounds which will automatically shut off pumps when full. When the pumps are off,  what street water comes through the 12" pipe from the street, leaves the sump and returns to the street. A clean failsafe design feature.

## COSTS

My general calculations of cost are around to deliver nearly 1.8 million gallons a year to the Alice Keck Park, depending on rainfall. After that, costs are only electricity to

deliver 1.8 million gallons each year. Price for this design as shown built out is $289,000. Includes tanks, electrical , pumps, sidewalk and curb work.

With the below ground cistern option the price is currently estimated at $223,000 with 167,000 gallons storage.

Note: Plans, Permits and Fees can add 10-20% to costs. Not included.

## COST PER GALLON

At the price here presented of $289,800 for 1.897 million gallons of rainwater, the cost per gallon is as follows;

$289,800/1,897,000 gals = .119 or about 1.19  cents per gallon over ten years

**or... about $14 per HCF...  A very good deal for nearly pure rainwater. The Park will look like a jungle paradise, the ducks, turtles and carp will be in a clean environment. It's a sad situation these animals are forced to live in now. Something should be done.**

***I offer a money saving solution. These water prices are cheaper than city water, and save the environment.***

## CONCLUSIONS

Various watering options exist. For instance, when the tanks are full, collected rainwater could easily be shunted to deluge the gardens, thereby saturating the grounds and storing water in the ground... or, excess water can be used to refill and refresh the lake.

Likely the Park *will never again need to use city water*. The system here outlined could easily provide 105,400 gallons per inch of rain, depending on the rainfall rate per hour. This water can be captured and used to fill the storage tanks 12-15 times a year. Also the great quantities of water could be pumped under the road and used to water the lower park.

**With the four 9650 GPH pumps I've recommended, the Park could actuality gather and store in tanks, 38,600 gallons per hour in a real downpour. These numbers are solid numbers that can be used by architects and other professionals to evaluate the design.**

I welcome any collaboration to further develop a rainwater saving product the City can use, to save the wildlife and plants of Alice Keck Park Memorial.

Thanks for the opportunity to present these findings.

Plans here presented are proprietary and for review use by SB Foundation and trusted associates only.

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Over View - Alice Keck RainWater Collection C

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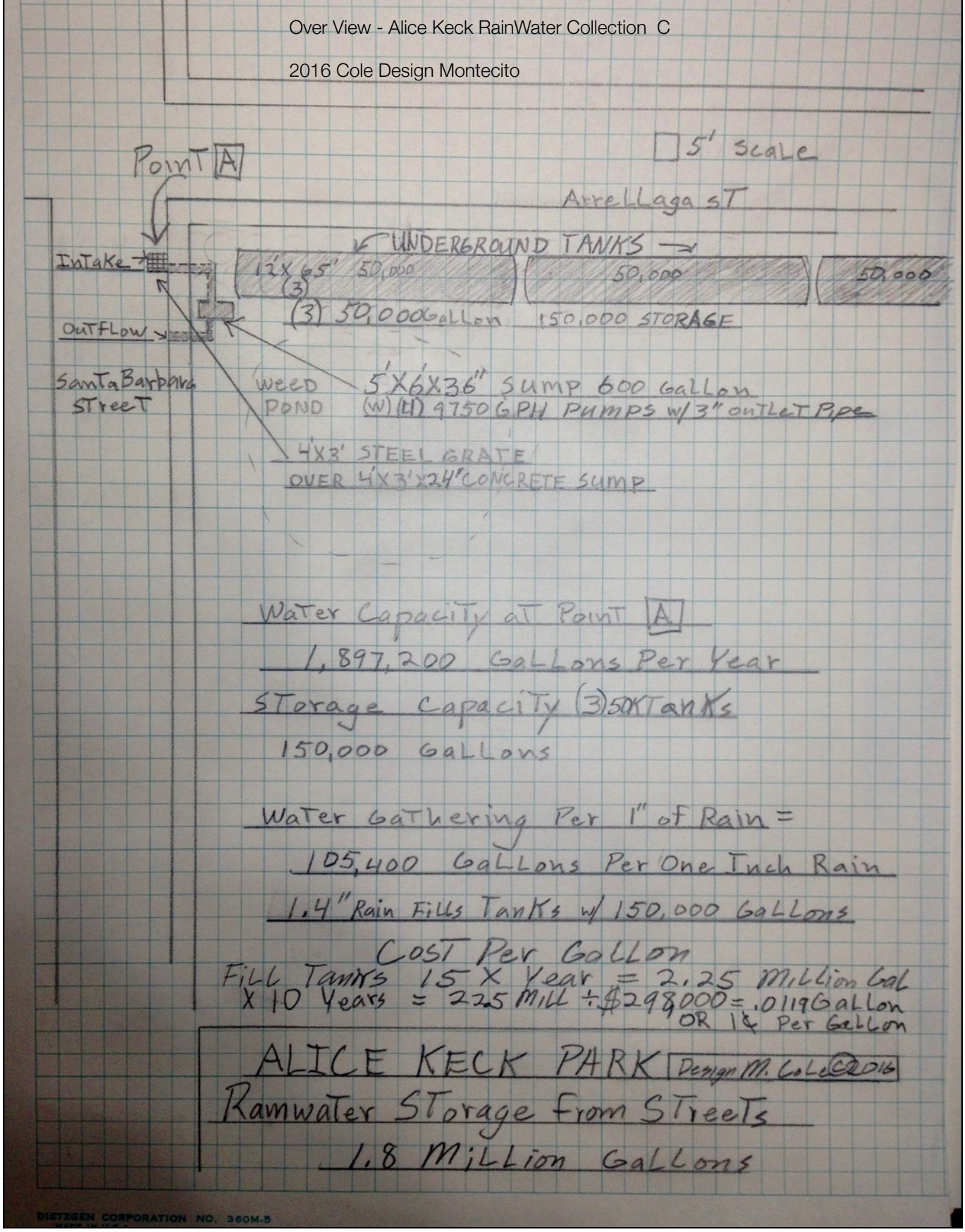
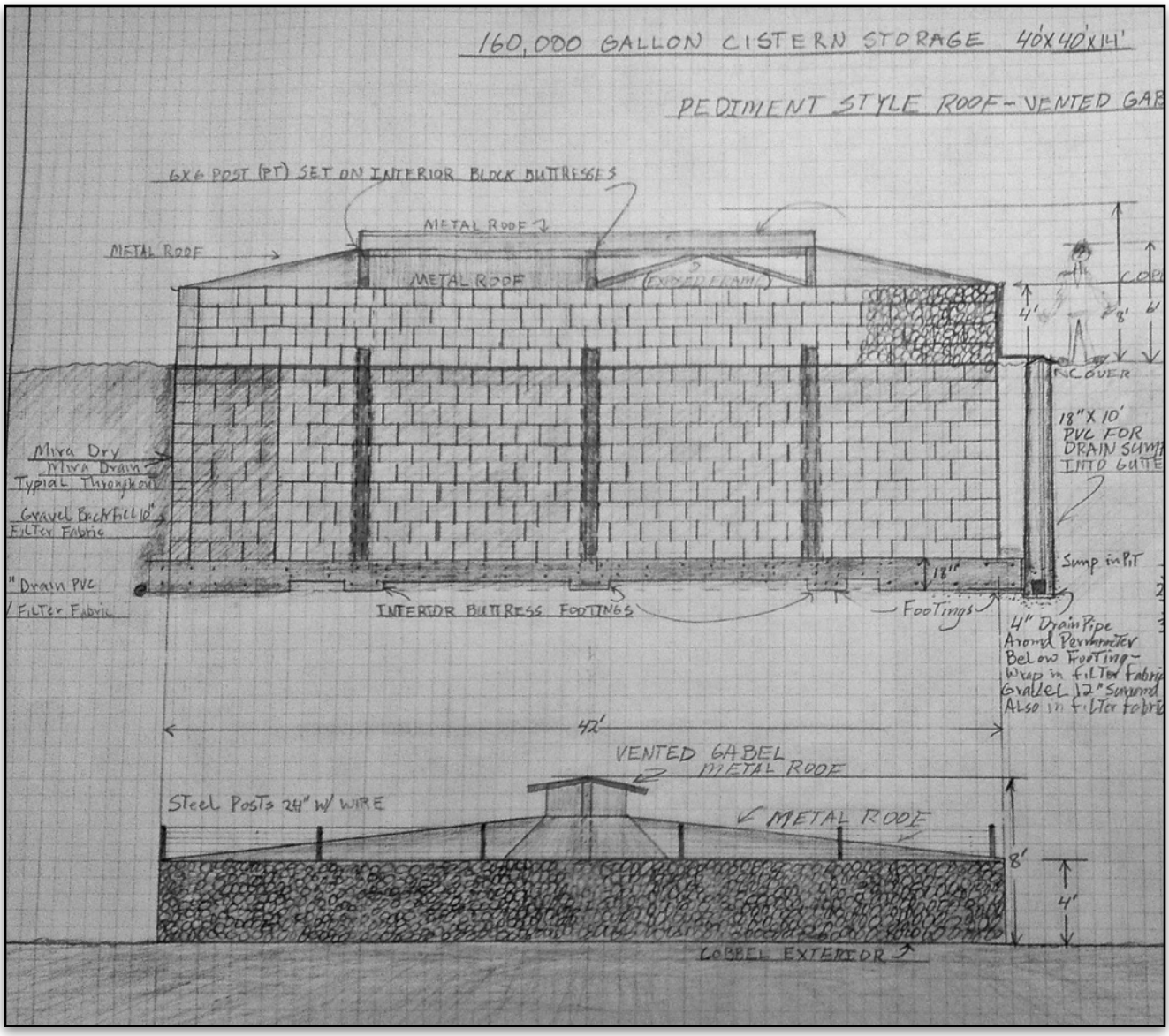
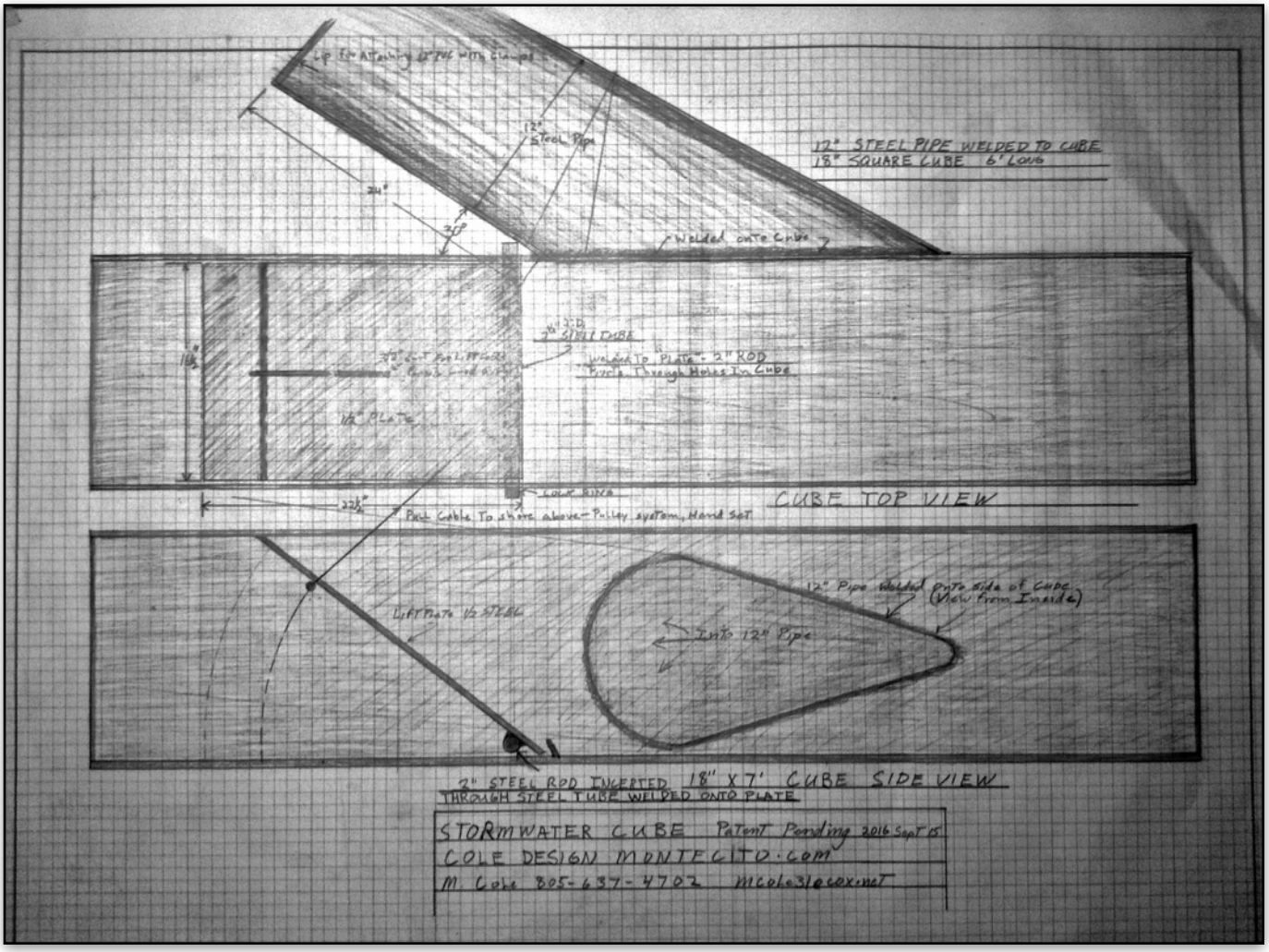



Don't let your rainwater go down the drain.... We can save you Thousand$


160,000 GALLON CISTERN STORAGE 40'X40'X14'
PEDIMENT STYLE ROOF - VENTED GAB
6X6 POST (PT) SET ON INTERIOR BLOCK BUTTRESSES
METAL ROOF
METAL ROOF
METAL ROOF
(EXPOSED FRAME)
4'
8'
4'
COVER
18"X 10' PVC FOR DRAIN SUMP INTO GUTTE
Miva Dry
Miva Drain
Typical Throughout
Gravel Backfill 12"
Filter Fabric
" Drain PVC
/ Filter Fabric
Sump in Pit
18"
INTERIOR BUTTRESS FOOTINGS
Footings
4" Drain Pipe Around Perimeter Below Footing - Wrap in Filter Fabric Gravel 12" Surround Also in filter fabric
42'
VENTED GABEL
METAL ROOF
Steel Posts 24" W/ WIRE
METAL ROOF
8'
4'
COBBEL EXTERIOR

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