

From: Jim Mazzocco
To: Flores-McCleese, Belinda
Date: 01/31/2012 10:50 AM
Subject: Fwd: Re: water harvesting?

Please add this email as background on the Sustainable Code from Dr. Joseph Tabor RE: Water Harvesting.

>>> Merrill Eisenberg <merrill@arizona.edu> 01/31/2012 10:37 AM >>>
Joe - thank you SO much! I owe you lunch at Bentleys! M

On Jan 31, 2012, at 10:22 AM, Joe Tabor wrote:

Hi Merrill,

There were no comments by the Planning Commission on Clarian's "Encourage Passive Water Harvesting Earthworks" and I do not know the water harvesting policies/codes for the City of Tucson. The following are my comments on the Clarian memo.

I would leave the requirements vague to allow adapting the structures to site conditions and purpose however I have concerns that were not mentioned in the Clarian memo and need to be communicated to the public.

Water harvesting/water conservation earthworks usually involve changing the surface drainage and can cause down stream harmful impacts (e.g., flooding, erosion) if the structures overflow or fail and divert water in a different direction. The resulting liability to harm/damages should be considered.

Collecting and using runoff for drinking, cooking, and food production can potentially cause harmful health effects if the water is collected from contaminated surfaces such as roadways, parking lots (e.g., heavy metals, toxins), and roofs especially during the first part of a rain (i.e. pathogens from bird excrement).

The Oro Valley regulations (as stated in the Clarian memo) "requires that standing water dissipates in a maximum of 12 hours." This will help assure that mosquito breeding does not occur where the water is impounded. A dry surface needs to occur in less than 3 days to prevent the emergence of flying adult Culex and Aedes mosquitoes, the mosquitoes that pose the greatest nuisance problems and health threats (i.e., various encephalitis diseases and dengue fever). [this is an issue with some of the city's culverts and drainage ways]

The above mosquito issue is a potential problem with "active" systems were the runoff water is stored in barrels and other structures for periods greater than 3 days. A breeding site can affect people within a 1 block radius, especially where vegetation provides shelter for the mosquitoes (e.g., grasses, forbs, and shrubs).

Hope this helps,

Joe

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Center for Rural Health | Read our Blog | Follow us on Twitter
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-----Original Message-----

From: Merrill Eisenberg [<mailto:eisenberg.merrill@gmail.com>] On Behalf Of Merrill Eisenberg
Sent: Tuesday, January 31, 2012 6:41 AM
To: Joe Tabor
Subject: water harvesting?

Joe -- I sent your comments to Jim Mazzocco at Tucson Planning and he noticed that you said you would comment on water harvesting as well. He asked me if I could ask you to do that--- so, if you are game, could you please also provide comments on that part of the memo? This is community service! Thanks so much. I'm out of town due to a family emergency, so if you have any questions, please email me.
THANKS! Merrill



MEMORANDUM

DATE: January 27, 2012

TO: Jim Mazzocco
Planning Administrator

FROM: Joseph D. Linville
Lead Planner

SUBJECT: Sustainable Land Use Code Integration Project Phase II

We have reviewed the Clarion Targeted Research Memo and the associated recommendations. The PDSD Landscape Review Section offers the following additional comments relative to the *Water Quality and Conservation, Green Buildings, and Urban Food* sections:

Water Quality and Conservation Pervious Pavement (PP)

PDSD Landscape recommends coordination with TDOT and other agencies regarding alternative street and sidewalk standards and details, as the development of these types of standards for public streets and sidewalks is beyond the scope of the LUC. Current details for concrete sidewalks, brick sidewalks, and decorative concrete and sidewalks/walkways, contained in the Standard Details For Public Improvements (1994), were developed jointly by the City of Tucson and Pima County and authorized by intergovernmental agreement. There also related standard specifications for concrete and asphalt adopted by the City and County. See <http://dot.pima.gov/transeng/stdspecsdet> for additional information. Approval of similar standards for PP products would “pave” the way for quick approvals in the public realm and on private property.

The proposal regarding reduction of lot coverage criteria where PP’s are used is regarded as having little impact, due to the generous lot coverage allowances currently in the code. It is logical to assume that a discounted lot coverage percentage for PP’s (presumably based on the merits runoff reduction) should also be available for unpaved vehicular use areas, which are now counted in the coverage calculations.

Passive Water Harvesting (PWH)

The Land Use Code includes a focus on passive water harvesting, contrary to a statement made in the research memo. The code currently requires rainwater harvesting for supplemental irrigation

TO:
SUBJECT:
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purposes on all sites, except for single family dwellings and duplexes on individual lots. See LUC 3.7.4.3.B: “Grading, hydrology, and landscape structural plans are to be integrated to make maximum use of site storm water runoff for supplemental on-site irrigation purposes. The landscape plan shall indicate use of all runoff, from individual catch basins around single trees to basins accepting flow from an entire vehicular use area or roof area.” Rainwater harvesting is also addressed extensively in DS 10-03.

The issue requiring of residential lot level passive water harvesting should be addressed, but it is likely that methods of implementation, other than regulation, may result in greater success. Public and private education efforts have been very successful in generating interest in the practice of water harvesting and additional work in this area, along with existing initiatives, may be sufficient to meet the City’s conservation needs.

Trees and Green Infrastructure in Street Rights of Way

Currently, most new development in Tucson is required to provide a street landscape border containing trees, shrubs, accent plants, and groundcover plantings. These regulations have been in effect for almost twenty years and have served to green up the City’s streetscapes.

We recommend modifying the standard street/sidewalk cross sections to provide options for additional planting space between the curb and sidewalks. The current minimum standards move most trees too far from the street, resulting in poor tree canopy coverage for travel lanes pedestrian areas. We also recommend development of standards which would allow private irrigation systems to extend to street-side trees. Currently, irrigation lines are restricted from crossing under public sidewalks.

Green Buildings

Solar Reflective Paving Materials

It is recommend that when highly reflective surfaces are used in and adjacent to parking and pedestrian areas, strategies to mitigate glare be included in the designs. Planting and shading can help reduce reflected glare from large areas of paving, improving user comfort.

Urban Food

Rules For Sale Of On-Site Produce

We support integration of urban food production into LUC Sections 3.7.2.2.C & D. These sections address “oasis area” allowances and exceptions with a focus on water conservation. The City should distinguish between crop production uses and the integration of non drought tolerant food bearing landscaping into other uses.

From: Jim Mazzocco
To: Flores-McCleese, Belinda
Date: 01/31/2012 9:47 AM
Subject: Fwd: Re: Clarion's sustainable code Targeted Research Memo

Send this out too.

>>> Irene Ogata 01/27/2012 10:44 AM >>>

Hi Jim,

Apologies for this untimely response to your request. Juggling too many projects, deadlines.

RE: Pervious Pavement

In general, I agree with the comments made by Jim V. below

(a) My understanding is also that both City and County's NPDES permitting states that LID practices, which includes pervious paving, is being considered as an acceptable compliance method, but final determination does not need to be made for 4 more years. The jurisdictions are in look/see mode of what's out there working and is this one of them.

(b) Here in the arid desert southwest, especially where our potable water source is groundwater, **it is mainly about providing water resources for vegetation, thus reducing need for potable resource use.** The additional benefit about stormwater harvesting is the flow characteristic, (because all solutions have multiple benefits) is that residential stormwater harvesting assists to address reducing peak run-off flows and extending durations (i.e., more gentle run-off into the major stream during extreme weather conditions by capturing more upstream waters) - NOT about recharge (this benefit is in the major washes which gets addressed differently via major wash reconstruction and restoration);

(c) Not known in the arid southwest region, what happens to the first flush, non-point source pollution that infiltrates into the soil; in biobasin areas, depending on type of plants, plants may contribute to absorption and breakdown of the chemicals; under pervious pavement w/o veg - not sure of maintenance factor - maybe like treatment of salt build-up, flush the chemical downward by flooding area and forcing downward flush, but the accumulation of sediment, nutrients (fertilizers, organic matter), heavy metals, toxic chemical (inorganic matter) and pathogens may or may not be filtered by sand/aggregate materials; Pima Co. DEQ is trying to find funding to do a bit of research on this

(d) I ditto Jim V's suggestion to take out the mention of specific type of paving (asphalt or concrete) out of LUC, then the engineer can determine on case-by-case basis what would be appropriate material. But this then requires some sort of criteria rating that can be used by the reviewer to make the determination (maybe some sort of decision-tree?)

Clarion Report Memo dated 10/2011:

I. Passive Rainwater Harvesting

a) Environmental: the primary environmental benefit is not improvement of water quality - it is more about avoiding use of potable water resource for outdoor landscape use (primary reason in this arid desert region is water conservation for long term water assurance) and need for excessive groundwater pumping; this alone allows what waters are recharging in the major waterways to remain in the aquifer, thus stabilizing, or increasing the water table (i.e., no pumping in the Tanque Verde aquifer except in extreme situations; the water table has risen and less land subsidence; riparian habitat in those areas doing slightly better); references to this type of passive water harvesting recharging the groundwater is misleading since in this community, the aquifer is recharged via the major stream areas

b) Economic: 1st bullet, last word: we don't know if this system will be 'inexpensive to maintain' - this is still wait and see what the systems that have been built reveal; it would be appropriate to state it is relatively

inexpensive to implement/construct

i) 2nd bullet: not entirely correct to say it "reduces the need for outdoor water" - the plants require a certain amount of water to thrive; more appropriate to state it diverts the need to use a potable water source, thereby reducing water bills

c) Social: there is no natural collection, filtration and absorption process of this scale water harvesting that recharges to stabilize the groundwater resource; but the avoidance of using the potable resource, decreases the demand and need for excessive groundwater pumping; the long term goal for Tucson Water is an assured potable water supply for the community

d) How Does Tucson Address This Today: the report alludes these methods are addressed via planning through a single department/regulation; it would be helpful if it were clarified there are multi-departmental approaches - the first 3 bullets are managed by Tucson Water; it does not reference the stormwater regulatory compliance with federal permitting requirements; tho it does reference "technical regulation"; but does not address/avoids the need to connect/recognize these 'technical' compliance issues with state and federal regulations. The 4th bulleted suggestions may better fit into landscape requirements with an emphasis on the benefit aspect of mitigating the urban heat island (human health), increasing/stabilizing community wealth (increase in property value). It seems a bit contrived and over-extended to reference water conservation in this instance as one of the solutions to "recharge" groundwater.

The organic mulch would be more for residential area and/or select areas of water infiltration areas on commercial sites. In commercial areas, organic mulch may require more maintenance. Decomposition and greater potential to be carried away in the water flow may cause more dust and air pollution on windy days (and measures to control dust is a regulation).

II. Trees and Green Infrastructure in Street ROW

Clarion seems to address this issue in a traditional manner as it divides the benefits in the three categories of (1) environmental; (2) economic and (3) social from a transportation/stormwater system perspective. If there were a paradigm shift, looking at ROW as part of a Park's urban trail system, the benefits and solutions would **connect** the broader community issues of urban heat island, human health (physical and mental), urban forestry, transportation, open space, water conservation, urban ecology, the built environment and maintenance. Designing the system to address a recreational/park component while addressing transportation safety issues, the design standards begin to take into solutions that address healthy tree/vegetation requirements (including above and below ground), pedestrian safety and recreational opportunity (walking and biking), community identity and economic development (linear park-like setting). Perhaps the development standards and regulations then take on requirements that look more like those required for dedication and development of public trail systems next to drainage corridors (and these standards exist in various other documents - P&R 10-Year Strategic Plan, Master Trails Plan).

III. Solar Reflective Paving

I agree with Clarion's findings that the technologies and research in this area is limited, but expanding. Studies are being done at research institutions such as Lawrence Berkeley National Laboratories (LBNL) and ASU's SMART Center. Both these institutions (LBNL long history, ASU more recent) have been tied to EPA's Heat Impact Reduction Initiatives (HIRI) and what comes down as federal recommendations. Under "Best Practices" they note cities that 'promote' but no mention of regulate. Pavement has been one of the last areas EPA has compiled/pushed research, so documented performance measures are few; and thus no regulatory standards for reflectance value (vs existing standards for construction and ASHTO requirements). EPA has recently come out with Energy Star rated roofing materials, but there is still no such rating for pavement. The pavement industry themselves have not come out with any uniform rating system.

The last example of Best Practices from Dane County, WI is an interesting approach as it also ties in with stormwater and UHI reduction. I advocate for the multiple solution approach, illustrating that everything is connected, single solution approaches are not effective in our complex urban fabric. In the case of Dane Co, where they may have perennial streams, this may be especially important environmentally to fish habitat (WA is especially cognizant of rising stream temperatures due to urban waters and the temperatures affecting salmon spawning, one of their economic drivers).

Supportive research findings are not available at this time to effectively push for solar reflective paving regulations. But this, with other approaches for UHI and green infrastructure, may be more effectively packaged as a menu of choices connected as incentives to meet compliance with a proposed new UHI ordinance.

IV. Urban Food

It appears Clarion's report alludes to differences between issues of land use from potential public health concerns. The LUC addresses land uses, the City municipal code and Pima County Health address public health issues. As stated above, all issues are ultimately connected and it is becoming increasingly difficult to compartmentalize regulations. The City would need to explore similar issues as addressed in home office or garage sale concerns (parking, noise, traffic) affecting the neighborhood patterns. These are issues that traditionally are covered in the LUC.

City of Tucson should not usurp public health issues involved with preparation and sale of foods, so should work with Pima County Health department to develop permitting criteria for these small urban agriculture-farm products (eggs; goat dairy products). This is especially important as the City has adopted that all new residential development be plumbed for gray water use; and Tucson Water has been promoting both new and retrofitting of residential properties for gray water. Gray water should not be used for root crop or ground grown vegetables, exception for fruit and nut trees. Under Best Practices, Cleveland requires a license from the Dept. of Health for "farm stands"; Oakland is considering home crop growing and selling similar to home occupation and sale of products - I reiterate, in this arid climate, water conservation has a long standing proactive program, gray water plumbing in City of Tucson is regulatory - there needs to be some sort of check, double-check, that the home crop production is utilizing the proper water source.

Give me a call if you have any questions on these comments,

io

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>>> Jim Mazzocco 1/4/2012 9:04 AM >>>
Irene,

I think I have already sent you the targeted research memo from Clarion.

Can you take a look at Jim Vogelsberg's comments. What are your thoughts on how to handle pervious pavements as a policy? I would like Clarion to consider what you and Jim say. Is there anyone else in the City whom you think would have useful comments on this topic?

Can you send any of your comments on to Darcie White from Clarion? Thanks for your help.

>>> Jim Vogelsberg 01/03/2012 4:06 PM >>>

Jim, happy New Year. Specific to your question regarding Clarion's evaluation as how we handle pervious pavements is essentially correct. Point by point, the current LUC is quite specific for hardscape materials; it can and has been interpreted that unless it is "asphalt or concrete" permission to use alternate materials must be obtained. There is no clear criteria for the application of the pervious materials. And pervious materials alone may not be used to as part of the stormwater calculations to comply with Flood Plain Ordinance. More on this below.

However, our Stormwater Retention / Detention Manual gives us the flexibility to consider and if practicable allows pervious pavements to accept some of the stormwater runoff demands. This should be noted in their research memo.

Much of Clarion's generic discussion of the advantages of P.P. doesn't apply to the Tucson area, i.e. benefit combination sewers (storm & sanitary sewer discharge in the same pipes - not allowed here), aquatic thermal shock; (you need standing or running water for this to be an issue; both in short supply in Tucson). Or reduce runoff by up to 90% (?) Per our F.P. Ordinance, all on-site runoff must be accounted for; an on-site retention/detention system meters the off-site discharge to the pre-development runoff conditions. Lastly, groundwater recharge from individual systems, in our area, is a fallacy. The most effective way for stormwater to recharge our aquifer is to transport runoff as quickly as possible to the major watercourse to allow percolation via their sandy bottoms .

I think a P.P. system could be attractive in jurisdictions that don't have floodplain management regulations; in situations where the individual is responsible not to cause any downstream problems, P.P. systems might be an option.

Now comes the lecture:

Permeable pavement is just one component of a stormwater disposal system, the top layer. Once the water travels down through the pavement, around the pavers, then what ? Intuitively we know the local soils are not very permeable; once the stormwater travels through six inches of pavement, the water will just sit and pond. A P.P. system has a reservoir of some type below grade. This usually consists of a poorly graded, i.e. same sized aggregate, that varies a few to many feet in depth. This subterranean, stone filled vault contains the water and (hopefully) the stormwater will eventually percolate into the earth. Compare this to our commonly used surface retention/detention systems: Same hole, but there's no rock or pavement on top of it... Occasionally the designers will propose a covered retention/detention basin so they may park on it. Rather than the stormwater flowing through countless little pores in the pavement (incidently, which is a maintenance nightmare; dust and grit plug the holes. The only effective way to rehabilitate the P.P. is to have an industrial 'vacuum cleaner' periodically suck up the entire parking lot), grates / inlets in the parking lot allow the water to flow into the vault. A P.P. system has the potential to create an environmental "hot spot". Heavy metals and pollutants are concentrated in the stone under the permeable pavement. Unlike an open air retention/detention basin where the contaminated top layer of soil can be mucked out and safely disposed of, the entire P.P. system surface be removed and all of the contaminated aggregate must be removed and transported to a suitable disposal site. Parenthetically, maintenance of these systems is it's Achilles Heel; once they cease to function properly and water damage occurs to downstream properties, we get drawn into the fray.

In summary, our floodplain regulations give the designer and staff the ability to review and weigh the merits of the use of pervious pavement systems. I can't think of any advantages for us, in Tucson, to encourage the use of pervious pavement systems. Conversely, if the P.P. system adequately disposes of the stormwater and there's an assurance the system will be maintained to function per the Floodplain Ordinance, we would not discourage the applicant's proposal. Why I think we don't see many parking lot subgrade systems is that it is prohibitively expensive to install and maintain. Unless parking area is at a premium, there's no incentive or benefit to install a subterranean system.

Additionally, if not already proposed, I think all references to specific paving materials, e.g. concrete, asphalt , should be removed from the Code; staff can weigh in on what the appropriate paving material is on a case-by-case basis.

Thanks,

-JPV

>>> Jim Mazzocco 12/28/2011 12:21 PM >>>
Jim, Joe,

Please take a look at this memo from Clarion. Especially their evaluation of how the City handles pervious pavements on Page 4. Is their evaluation correct? Or Do they need to modify it in some way to better reflect what we actually do?

The other area I have concerns with is on page 11 regarding trees in the right of way and their Tucson evaluation on page 13. What do you think?

Thanks for any input.

If there is someone else who should look at this and provide some input please forward the attachment to them and ask them to contact me with their comments.

From: "M. J. Yee" <moonjyee@gmail.com>
To: Belinda Flores-McCleese <Belinda.Flores-McCleese@tucsonaz.gov>
Date: 02/01/2012 12:50 PM
Subject: Fwd: Supporting net work.

Belinda,
Since urban agriculture involve water and fertilizer usages, I was curious how it might impact Tucson's water conservation and water quality, as well as cost and benefit to its practitioners. I asked Dr. Eisenberg what net working, education, and mentoring programs she might have established with the community organizations. Following is her reply. Please check with PDSB if it is appropriate to share it with other Commissioners at tonight's study session for item #3. Thank you.

Joe

----- Forwarded message -----
From: Merrill Eisenberg <merrill@arizona.edu>
Date: Wed, Feb 1, 2012 at 8:26 AM
Subject: Re: Supporting net work.
To: "M. J. Yee" <moonjyee@gmail.com>

Dear Commissioner Yee,

Thanks so much for your interest in urban agriculture. Yes, I am working very closely with community groups to make this happen. Actually, this is part of a larger effort to create policy, systems, and environmental change to prevent obesity. These efforts are funded under a grant the County received from the CDC. Our collaborators in that grant include the Community Food Bank, the YMCA, ProNeighborhoods, United Way, Carondelet, the UA Nutrition Department and Extension, the Drachman Institute, Tucson Community Gardens and the College of Public Health (where I am employed). One part of this effort was to develop community gardens, school gardens, and to increase participation in the Food Bank's gardening cooperative. The Food Bank (under the direction of Robert Ojeda) and College of Public Health (under my direction) have launched an organization to carry on the work after the grant is gone next month - it is called the Pima County Food Systems Alliance - and it includes community folks from all sectors of the food system, from farm to fork to waste management. Many small and also large growers participate in that group. We have created "workgroups" within PCFSA, one of which is Urban Agriculture. Other work groups include Small Growers, Marketing and Distribution, Access to Healthy Food -- I can't remember all of them off the top of my head at the moment. PCFSA regularly gets 40-50 people to their monthly meetings, but most of the actual work occurs in the workgroups. I am part of the Urban Ag workgroup and will continue to work on this after the grant expires and I retire (next month!). The PCFSA has members represent a broad range of constituencies - urban and rural producers, consumers, food educators, sustainability and conservation, restaurants, schools, farmers markets. Well known organizations that were not part of the County grant, such as Native Seed Search and Sustainable Tucson, are active participants.

I think we have made excellent inroads in the community. Using the grant money we started about 40 new community gardens, including one at Tucson House that is physically accessible for people with disabilities, and the gardening coop has almost 1000 members now. The Food Bank developed a 7 acre urban farm, Las Milpalitas that feeds 1000 people year round. They also worked with several schools to develop school gardens, and I worked with folks at the Arizona Department of Health Services on the development of sanitation recommendations for school gardens. We have also supported Iskashitaa, a refugee organization that does gleaning, funding them to purchase a commercial refrigerator and other equipment to support their good works. These are just some of the examples I can think of off the top of my head.

The grant will end on March 18, and on March 16 there will be an event at La Paloma to highlight all of the work that was done. I would be happy to forward an invitation to you if you are interested. Not all of the grant work was related to agriculture -- we also did lots of work in schools around school wellness policies, with neighborhoods to develop plans and projects that encourage physical activity, Carlondelet worked in faith based communities, the YMCA was in workplaces, we supported Cyclovia...lots and lots of work was done with this grant!

I hope this answers your questions. Please do not hesitate to contact me if you want more information.

Sincerely,

Merrill Eisenberg

Merrill Eisenberg, Ph.D.
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Attend the Annual Meetings in
Baltimore, MD, March 23-31
On Jan 31, 2012, at 3:54 PM, M. J. Yee wrote:

Dear Dr. Eisenberg,

Thank you for your very interesting urban agriculture presentation to the Planning Commission on Jan. 18th. Are you working with the local

community organizations to create programs to promote, educate, and implement this activity with the area participants. If you are, to what extent you have made such inroads?

Thank you very much in advance for your responses.

Joe Yee, Commissioner