10 31 2017

To: Planning and Sustainability Commission
BPS Staff

From: Mike Houck, PSC Member

I am writing from Cuenca, Ecuador following the failed attempt to join last Tuesday's PSC hearing on mapping and code reconciliation via Skype. I was unable, other than through my email memo to the PSC and BPS staff, to offer comments on Title 11 exemptions or other points of discussion. I was pleased to see that Title 11 exemption will be part of our work session on November 14th.

Given I was unable to participate in exchanges among Commissioners and staff, I would like to offer some responses regarding two comments that attracted my attention from the draft minutes that Julie sent for review regarding urban heat island and "sustainability vs people" in reparation to our November work session on Title 11 exemptions.

Regarding the "science" behind Urban Heat Island, a well-known phenomenon in the urban environment that simply describes increased temperatures in areas where hardscape dominates the landscape which is more or less devoid of vegetation. Urban Heat Island has been in the news the past decade as hundreds have died in France and other European cities and more recently in India from extreme heat events.

I want to draw your attention to the fact that Dr. Vivek Shandas, PSU researcher has actually mapped Urban Heat Island information for the City of Portland over the past decade and has shared that information with BPS, Portland Parks and Recreation and BES. Interestingly, apropos to the "sustainability vs people" question from the last PSC meeting, he has also documented the negative impact on humans, relevant to "sustainability vs people." It is well known that low income communities and people of color tend to be disproportionately impacted by negative environmental impacts on air, water and, relevant to Urban Heat Island concept extreme heat events. Fortunately federal air and water quality (Clean Air Act and Clean Water Act) regulations which contribute to a sustainable environment have significantly improved human health across socio-economic and demographic landscape. One of our great challenges in Portland and the metropolitan region is closing the gap between still negative environmental impacts on people of color and low income communities.

Increasing urban forest canopy where those populations live and in adjacent commercial and industrial which contribute to reduced air quality, increased Urban Heat Island impacts and in some cases flooding due to increased winter storms (which are projected to increase under climate change scenarios for our region). Therefore, I would argue there is a strong nexus between our efforts to

address “sustainability” and “environmentalist” issues and issues related to equity and helping people. The point being, there is no “us vs them” or “environmentalism vs people” with regard to creating a more sustainable and livable city and region.

As fodder for out November work session I recommend the PSC consider a significant body of research coming out of Portland State University, in particular Dr. Shandas’ research, so that our policy decisions are based on sound science. To summarize his findings:

1). Urban Forest canopy provides multiple benefits in the urban environment, particularly as forest canopy relates to Urban Heat Island. Neighborhoods with low tree canopy also have higher rates of: NO2 (nitrogen dioxide, a tracer for other pollutants). Other negative impacts associated with paucity of tree canopy include higher rate of social isolation and crime; energy use intensity; and increased body-mass index (e.g. obesity). Researchers have also observed better overall health among communities with more robust percentage of tree canopy.

2). Adjacency: Commercial and Industrial zones are frequently adjacent to residential areas. Vivek and others have found
that trees can cool areas locally (e.g. by taxlot) and that benefits of urban tree canopy can often extent into surrounding areas, in some cases as far as ¼ miles or more. Air pollution models for NO2 suggests canopy can impact nitrogen levels to ¼ mile and Urban Heat Island models suggest treed areas can influence cooling up to 400 feet.

3). Relevant to PSC discussions regarding “housing the middle” and addressing Portland’s housing crisis, Vivek and his colleagues have been working with a BPS design team from BPS to develop a better understanding of how rezoning to multi-family might impact the Urban Heat Island effect of increased temperatures in the fact of expected rise in temperature due to climate change. They have developed models that illustrate the importance of local design the ability to increase density while keeping temperatures constant or even reduce temperatures.

Some additional information that might influence our deliberations and policy direction:

a). In 2014 Portland was ranked among the top 10 major cities with the worst urban heat island effect in the United States. https://www.usatoday.com/story/weather/2014/08/21/urban-heat-islands-study/14389371/ The article also provides some basic grounding in the Urban Heat Island concept.

b). While canopy does appear to be increasing somewhat in commercial and industrial zones, the "June 2017 Tree Canopy Monitoring: Protocol and Monitoring from 2000-2015" report indicates that commercial and industrial zones are farthest from achieving the city's canopy cover targets.

"In commercial zones, between 571 acres (2000) and 827 acres (2015) of canopy were found, with total canopy cover ranging from 9.1% in 2000 to 13.3% in 2015. Commercially zoned lands contain approximately 3% of the city's total canopy acres.
In industrial zones, between 1,374 acres (2000) and 2,043 acres (2015) of canopy were found, with total canopy cover ranging from 6.4% in 2000 to 9.5% in 2015—the lowest of any zoning class. Industrial zoned lands contain approximately 7% of the city's total canopy acres."

https://www.portlandoregon.gov/parks/article/6455473.

It should come as no surprise that lack of urban tree canopy in commercial and industrial zones create the worst urban heat island hot spots within the City of Portland, as indicated by Dr. Vivek's research:
http://www.opb.org/news/article/mapping-portlands-hottest-places/

The following RAVES map (Rapid Assessment for Vulnerability and Environmental Stressors), a rapid assessment tool that aids policy makers with spatial information about the environmental stressors that can amplify social vulnerability. RAVES describes vulnerability as those communities who have historically experienced health impacts from heat waves, including older adults, communities of color, and those in poverty. The application uses a mapping platform and a series of colors, each of which define a cluster of communities based on their similarity of these demographic variables. Using U.S.Census information, users can hover their cursor over different parts of the city, and identify areas where urban heat and vulnerability overlap.
https://climatecope.research.pdx.edu/RAVES/#11/45.5501/-122.6545

Dr. Shandas has created tools to look at the relationship between trees canopy, urban heat island, and vulnerable populations (children, theelderly and people living below the poverty line). Check out the following Smithsonian piece on his tool that shows where trees should be planted, based on human health benefits:

"This New Mapping Tool Shows City Planners Where to Plant Trees
Researchers at Portland State University have created an app that looks at tree density in respect to neighborhood, population and pollution. In cities, tree cover is one of the most visible indicators of neighborhood income, and vegetation density is directly tied to health outcomes, especially for vulnerable group, such as kids, the elderly and people living below the poverty line. The U.S. Forest

Service estimates that trees save 850 lives and deflect 670,000 incidences of acute respiratory symptoms each year."

https://www.smithsonianmag.com/innovation/this-new-mapping-tool-shows-city-planners-where-to-plant-trees-180956272/

Dr. Shandas will appear before City Council between 9:30 and 11:30 the morning of November 14th to provide expert testimony regarding trees and the city's rights-of-way. I would urge PSC members to attend that hearing so that our discussion that afternoon might benefit from whatever information he provides City Council in the morning. I asked Dr. Shandas if he might be available for our meeting that afternoon. He indicated a willingness to be available for a short presentation and some Q&A if his schedule allows.

Finally, the urban forest canopy figures prominently in the city's commitment to increasing investments in Green Infrastructure and is critical to addressing issues of environmental sustainability, biodiversity, stormwater management in myriad Portland policy documents including: Portland Plan, Comprehensive Plan, Central City 2035, Climate Action Plan, Climate Preparation Strategies, and newly drafted BES Strategic Plan.

Respectfully,

Mike Houck,
Commissioner