

## Open Space, Environment, and Sustainability Committee Meeting Transcript – 05/26/2016

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>> Pool: I'm going to -- no, I can't. I need one more person.

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>> Pool: All right. We'll go ahead and get started then. And okay, thank you. All right. Looks like we are a full four here for our meeting, so I will -- I'm Leslie pool, councilmember for district 7 and chair of the open space, environment and sustainability committee. And I bring this meeting to order. It is Thursday, may 26th, 2016, about 3:05 in the

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afternoon, Austin city hall on west second street. And mayor pro tem, Dr. Rivera, who is chair of the parks board is with us, and my vice-chair, councilmember Garza, and councilmember Zimmerman. Thanks, everybody, for being here. So we are called to order. Approval of minutes for the meeting from last month, April 27. Do I have a motion? Vice-chair moves. Do I have a second? Any changes to them or anything? Are they approved as written? All those in favor say aye? Thank you. That passes unanimously. Citizens communication, the handy dandy sign up on the computer is

firing up, so I don't -- I don't know who all is signed up. Maybe Kelly, could you tell me?

> > [Inaudible - no mic].

> > Pool: Great. One citizen to speak during citizens communication. If you could tell me who that is? It's David king. Great. Come on up, David. And you have three minutes. Thanks for being here today. And congratulations are in order for you, I believe.

> > Well, thank you so much. I appreciate that. Yes. And she's congratulating me because I got married last Friday. Judge Eckhardt and senator Barrientos happened to be there so they got in the pictures too. Thank you. I appreciate -- this was not possible just because of myself, but because of the other folks like you who are helping to make changes that treat everybody with dignity and quite nicely. So thank you for all you did to make that possible. But I'm here to talk about parks and parking and I'll be very brief. As the urban -- as our urban core gets more dense and we have limited park space available, limited parking available for park users,

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yet we have more folks coming in needing to use the parks, then parking is becoming more of an issue. And particularly in issues where those park parking facilities are shared with non-profits. So I think that issue is starting to bubble up and I think that's something that we need take a look at is what are our policies on park parking and when do we decide to charge for parking and how do we make sure parking is available for park users? And there's been a policy kind of on the back burner or code amendment that's been on the back burner to allow park parking lots to be used to meet minimum business requirements. That really concerns me. In my neighborhood, Zilker, we have one park parking lot across from the Butler baseball fields, next to Butler baseball fields that's a park parking lot, but it was now being used by businesses that are right across the street. And so the previous council passed that policy. Of course you could imagine I don't agree with that policy. I think it's the wrong policy. But -- and I know two of the council members voted against that. Thank you for doing that, Mayor Pro Tem, that policy, but it passed nevertheless. But that parking lot is going to be needed for future park users as more folks move downtown and in our urban neighborhoods. So I think we need to look at that policy and at some point I hope that we can not allow businesses to use that parking lot so we can make sure that it's available for park users. And that particular area near there, there's a shared parking lot with non-profit and park users and there's some contention there. So I think that we need to look at the parking policies. I know I've been hearing comments about charging for parking in Zilker park, and I think the policy about when do we charge and which parks do we charge parking for and which we do not charge parking for, I think that's a policy. I would not advocate for charging park users to park in our park parking lots and that they should be available for park users

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not for businesses. So I hope at some point we can have an item on the agenda to talk about that. I'm glad to see the chair of the parks board here. I know you have dealt with these issues and did not support that policy either that I had mentioned earlier. Thank you for that too. I appreciate your support. And thank you very much.

>> Pool: Thank you, Mr. King. I think we may have you on our calendar to meet maybe next week, I think?

>> Right.

>> Pool: And do seek out the chair of the parks board if that's something that you want to advance through the parks.

>> I'll do that, thank you.

>> Pool: Great. Is there anybody else? All right. We'll move on to our staff briefing, discussion and possible action, item 3 is briefing and discussion regarding identifying flood risk in Austin. Mr. Pantalione and Mr. Shank, very glad to see both of you and welcome to the committee.

>> Good afternoon, members of the committee. I'm Joe Pantalione and I'm with me Joseph Shank. I'll turn it over to Kevin.

>> Thank you. So the first presentation, just a brief overview of how we identify flood risk. With what you learn in this first one, I think it will apply to some of the discussions that we had through the second one, which is the update on the Onion Creek floodplain study. So before we talk about how floodplains work, I think it's important to talk about flash flood alley. The city of Austin as well as other cities in Texas are within this area called flash flood alley, nationally known for creating historic and significant rainfall. It has to do with meteorological conditions, moisture coming off the gulf, fronts coming from the north, coming down from

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the north, and winds coming from the Pacific side kind of create a perfect storm and we have many world record rainfalls within this area because of those conditions. In addition to meteorological conditions there's geological reasons why flash flood alley exists and that is because of the thin soil layer that we have, so it's not a lot of ability to absorb moisture. And we have some steep terrain in portions of Austin and portions of flash flood alley where water runs off very quickly and gets to the streams. All those things create significant flood hazards which then creates floodplains. So in very

general terms a floodplain is the area where water will rise when it can't flow just in the channel. The channel could actually be a floodplain for that matter. And when we talk about floodplains, we can talk about just, well, there's where the creek was flowing and that's the floodplain, or we can be very specific about the floodplain we're talking about, and we're talking about regulatory floodplain and we've heard the word 100 year floodplain or one percent floodplain and many other types of floodplains. This is a picture from -- of onion creek at the 183 bridge. This is the Halloween 2013 flood with the creek dry and that's the creek flowing almost at maximum stage that morning. So first we'll talk a little bit about hydrology. Hydrology is the study of rainfall and runoff and we're going to talk about flood wave as well because the timing of flood waves and the timing of how water flows into a creek is important. So when we talk about rainfall we'll talk about historical

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rainfall as well as historically derived rainfall data. And we use historically derived rainfall data in order to come up with the statistical measurements. So that really speaks to the importance of rain gauges and having a very long history of rain gauges makes it possible for us to really rely on the data that they provided in order to give us some statistical measurements of rainfall. And we're talking about statistical rainfall, we hear words like the one percent annual chance rain, also called the 100 year rainfall yes. They mean the same thing but sometimes they can sound a lot differently to people. It doesn't mean that it's going to happen once every 100 years. It just means that the probability of it happening is once every 100 years. It can occur multiple times a year, it can occur several years. But as far as the statistical measurement, one percent chance annual rainfall. Some of the other regulatory rainfalls that we talk about and maybe you've heard is the two year flood or the 10 year flood or 25 year flood. For the city of Austin regulations our regulations are based on the 100 year rainfall and the 25 year. When you look at FEMA maps, FEMA maps will show you what the 100 year flood looks like and then the 500 year flood. So now let's talk a little bit about actual rainfall versus some hypothetical. So we can get a sense of how much rain are we talking about when we talk about these design storms. So actual rainfall is the -- this is from rain gauge data around town and these are two notable storms that happened last year. One was the Halloween 2015 flood that there was about 14 inches of rain that fell in a six hour period right near the airport. Significant amount of

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rainfall. Statistically if we measure that it is so well beyond a 500 year rainfall it's essentially off the charts. We can extend the charts and we did and so -- we could say that it was on the order of a 2000 year rainfall, but we don't have two thousand years record of rainfall to really justify that. The point being that it was just a significant amount of rain. The memorial day storm in Austin here last year was about three and a half inches of rainfall over a three year period. You can see the difference

between the two. When we talk about hypothetical or design storm rainfall when we're doing our floodplain models and floodplain studies, the 100 year rainfall is 10.2 inches of rain over a 24 hour period. Again compare that back to 14 inches over six. A two year rainfall would be about almost three and a half inches of rain over a 24 hour period. Now, our hypothetical rainfall in our design storms some R assume that they're 24 hour durations. Obviously storms can be in any duration. The Halloween one last year was six hours. Memorial day for Austin was about a three hour storm. And so the intensity of the rainfall is very significant. 14 inches of rain over a week's period is much different than 14 inches of rain in six hours. Sew a lot of times after flood events or rain events we hear a lot about depth of rainfall and that's significant, but really need to be asking ourselves what was the time frame for that depth of rainfall to note the intensity of the storm in order to determine what the impact may have been. Okay. So let's talk a little bit about runoff. Runoff is what happens, rain hits the ground, some of the rainfall can be absorbed into the ground and the rest of it shed off as runoff

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and flows to the creeks and it's that water that reaches the creek that then can create flood risk for the community. In some case could create flood risk before it ever reaches the creek. So some situations that control runoff are the land use of the watershed, the soils that are within that watershed as well as the basin slope. We talked about slope when I talked about flash flood alley. When we talked about land use obviously we're talking about impervious cover. And impervious cover can have an impact on flooding. And picture you see here is a watershed before it's developed and then the same picture with development that occurs. Now, when we're doing FEMA studies, FEMA floodplain studies compared to city of Austin floodplain studies there's a distinct difference between the two and the land use is the difference. And for a FEMA study the assumption of the land use is whatever the use is on that land at the time of the study. So FEMA can't -- because they're using that information to require someone to buy flood insurance and FEMA can't require flood insurance based upon a condition that doesn't even exist. So it's a snapshot in time at the time of the study, what is the impervious cover and the land use of the area, of the watershed at that time. The city of Austin regulations, we do what we call fully developed conditions. So take for example the development we're seeing here. Say it's a 300-acre parcel of land. And there is no development on that land. The FEMA study would take into account that it's just soil. It's just dirt. Now, if that land, 300 acres, is zoned a particular zoning which allows 60% impervious cover, then even though it's not developed yet,

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the assumptions is has that development on it at the time of the study. Soils do have a factor in how much runoff happens because different types of soils can absorb more water. They can tell us what soil types exist so that we can calculate how much runoff

or absorption or soils because this is worth saying because in some case it's shown that a saturated soil can contact or react to rainfall similar to impervious cover. So if you have saturated soils that can't absorb any more water so any additional rainfall that hits it is going to shed off. The difference between that all is dependent on the fact that you had a rainstorm previous to the flooding rainstorm. So saturated soils aren't necessarily going to be saturated when a flood comes, but impervious cover is going to shed that water off regardless of what the previous rainfall was. And then basin slope certainly matters as well as far as runoff is concerned. Once the rainfall hits a portion of the watershed and then flows down to the creek, steep terrain gets the water to the channel faster, whereas narrowly sloped terrain it will flow much slower. Okay. Talking about flood wave timing. So you've probably heard even for onion creek here in Austin, which is the outline that we're looking here, that's the entire onion creek watershed. You hear it nationally too when you hear people talk about the Mississippi river and they'll say, well, the flood wave will be in New Orleans in six days. Onion creek the flood wave is going to hit down at the lower portion of the watershed

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in three hours. So it's all a matter of timing, and timing of flood waves is very important. Because if we have rainfall that falls in the high upper portion of the onion creek watershed, it's going to be six to nine hours before the water gets all the way down to the lower end of the watershed. Whereas if you have rainfall similar to October 30th, 2015 that fell in the portion of the watershed that's indicated here, much less time for that major flood wave to get to areas where we have some flood risks. So again not just intensity of storms, but it's location of storms that matters. Now, the other thing that I wanted to comment on, detention, is detention can change flood wave timing depending on the detention pond. In some cases where we have large regional detention ponds in upper waller creek, for example, that significant sized --significantly sized regional detention pond would affect flood wave timing as it goes downstream so that's why we promote regional detention in the upper portion of our watershed because we would rather hold back that water into the middle and the downstream portion can flush out and the rest of the water can flush out when it has capacity. So once we know how much water is falling on the watershed then we have to determine with that amount of water how high is this water going to get in the channel?

>> Zimmerman: I'm sorry, before you go on, back on page 14 do I understand correctly if I look at the far right of that page 14 --

>> Pool: I tell you what, why don't we hold the questions a and he can finish and that will give you time to formulate the question.

>> Zimmerman: Sure. Go ahead.

>> So as far as floodplain hydraulics,

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one of the first things we do is we hire survey crews to go survey the topographic data of not just the channel, but the floodplain as well. Here's a picture of the typical creek and the black line indicating maybe where the survey may have been taken with the dots showing exactly what the surveyors would calculate, what the ground elevation is at that location. We then put the information into our hydraulic models and computer model and it tells us what's the shape of the creek, the floodplain, such that they can do the calculations on how high the amount of water is going to get within that particular creek. In addition to hydraulics of the shape of the channel and the floodplain, we look at friction and obstructions. Obviously both of those -- pardon me. Both of those come into play when we're trying to determine how high water is going to get in the channel. And for friction we're typically looking at what we call the roughness coefficient of the channel. And that can be -- it has a lot of vegetation or a lot of trees in the channel as compared to a rock lined channel or a concrete lined channel where the water will run a lot faster because there's less friction to slow the water down. As far as obstructions in the channel, as you can see in the picture there, bridges are a significant obstruction to flood flow and when we are designing new bridges across creeks that the goal of that is to try to minimize, in some cases eliminate any impacts that would curb with putting a new bridge over a creek. Whether it be a bridge or a culvert or some sort of a dam, that's the analysis there. And buildings as well. Obviously if the building extends out into the channel and in commercial areas where there are buildings, those buildings cause an

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obstruction as well. Okay. So once we know how much water there is and high water the water gets, then what we want to do is represent where that water is going to go, and that not only helps us as engineers to try to come up with flood mitigation solutions, but another key goal of floodplain studies is to maintain flood risk so the community can see if they have flood risk to their homes or on the road on the way to work. So floodplain mapping comes into play. Now, for hypothetical or regulatory floodplain maps, we have an online floodplain tool called flood pro and it's at [floodpro.com](http://floodpro.com). It indicates the city of Austin 25 and 100 year floodplains as well as the FEMA. Folks can get the floodplain for their property off of this and download floodplain engineering off this website and it's been a really successful tool for us and we've made some recent improvements to it and hopefully it will be coming out here very soon. Now, that's regulatory floodplains. Now, we also have a floodplain mapping program for actual floodplains and we use that in our flood warning group. We call it the predictive floodplain mapping. So a little hard to see some of the picture here. This is Shoal Creek right at Ninth Street. And so what this is indicating is that 45 minutes before this flooding occurred our software is telling us based upon the

rainfall that has happened and other rainfall that may be happening, and based upon a realtime hydraulic model our computer is telling us it may happen in this period of time. It was a 45 minute lead time to tell us we would have water ponding up on Lamar street. What does that do for us? It can give us time to community that to the

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public safety agencies, to the roadway barricade crews in order to barricade the road or provide some warning for the area where that may be happening. So obviously what the purpose of this is to understand risk. And that's the importance of the floodplain information. Within the city of Austin we've got about a little over 5,000 buildings that touch the 100 year floodplain and we have about 400 roadway crossings that are in the 100 year floodplain. So with the knowledge that we have from these floodplain studies we have our development regulations and the knowledge wherever the flood risks are and the floodplain information and the development regulations intention is to eliminate any additional risk that may be caused by development. And then these tools also help us to mitigate existing flood hazards that are across the city such that we can protect the life and safety of the public. I wanted to touch on a few of the flood mitigation policies and I can -- I'll run through these and then we can talk a little bit about them in general. I think these are key points that we've been talking with the task force about, the flood mitigation task force about, and some things that have come up when we talk about buyouts and buyout policies. So I wanted to touch through a few of the policies to make sure that we're communicating on how we're doing things effectively. As far as flood risk problem identification, again, we create these floodplain models and maps to identify flood risks and once we have identified the flood risks we prioritize where we're going to do flood mitigation projects based upon the risk and then based upon a cluster of risks.

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So in other words, if we have a neighborhood that has houses with 10 feet of water with the 100 year flood and there's, say, 20 of them, that's going to rank very high as a flood problem area, an area that we may be addressing sooner rather than later. Whereas if we have another area of town where we have homes maybe that are touched by the 100 year floodplain, but we don't predict that it would be in the buildings that might score a little lower on the priority scale, no the to say that it's not a problem, it's just as far as prioritizing the risks it's base upon the actual risk and then the grouping. The task force when we went over a lot of these policies with the task force, and they do -- they have recommended multiple approaches to identification, not just flood risk and clusters, but they've recommended to expand that a little bit and maybe look at event-based mitigation and maybe not necessarily cluster, but look at individual homes for mitigation as well. So that's something that we're looking into. So once we have identified where those flood risk problems are, then we're starting to look at solutions and evaluate some of the solutions for



those areas. So that's where we do an engineering study to determine what are the possible solutions for this flood risk problem and what are the costs associated with it? And those can range from regional detention ponds to buyouts to maybe some channel work, maybe upgrade some low watercrossings and some bridges. The task force again recommended -- evaluated this. One of their recommendations to us was to use buyouts as a last resort. I couldn't say we don't use it as a first case or last. It's just one of the tools in our toolbox of flood mitigation, but certainly taking into account some of their recommendations as we come up with solution evaluation.

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So buyout implementation. Again, once we've identified that the solution for a particular area are buyouts, lower onion creek is a great example because we're actively involved in buyouts there. The prioritization for those buyouts is based upon risk and that's essentially what we've done for lower onion creek is in the areas where the homes had the highest risk they have a higher priority than the homes with the lower risk. The task force again evaluated this and they have recommended some event-based and some individual programs, like I said, not just large clusters, but maybe look at some individual flood mitigation problems as well. So that's something that we're considering. Now, the acquisition and relocation policy, once we are -- have identified that buyouts are the solution for a particular area, the city is following the uniform relocation act with our buyouts and we've been consistent with that and the task force was -- their recommendation was for us to be consistent with the policies that we have used for recent buyouts. So what we plan to do is to bring to you the watershed's recommendation for these policies based upon how we have been doing things and continue to do things, and then maybe some of the -- look at some of their recommendations that the task force has made and then the department to make some recommendations and bring them to you for your consideration. That's all I have.

>> Pool: Thanks so much for putting this together. I especially appreciated the point that you made in -- on the buyout, the event-based and individual program. I know that we're keen to preserve communities where

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they've been established, and we talk about displacement and a way to be displaced is flooded out, but if there are homes and the people want to stay there and they're there and they're not in any immediate daybreak I guess that's a good thing where that's possible. It's hard to -- I haven't ever had to come back from my home being flooded, that kind of disaster. I can only imagine how hard that would be to manage. Any questions from anyone on this? Commitment? Councilmember Zimmerman?

>> Zimmerman: I had four pages that I made notes on, 11, 14, 21 and 27. But these are mostly quick I think technical questions. On page 11 there's a plasticity index, right, that's used in engineering for the capacity of the soil to hold water. So do I understand in the modeling we do pay attention to this, right?

>> Right.

>> Zimmerman: But when it comes to city building codes and policies, do we actually have a difference between the western side of Austin which has very low, you know, plasticity index? It's rocky and thin soil and in some places it's not much different than concrete. Just the stuff that's on the ground. In fact, there's bare rock in many places where I am. Is there a difference between how you calculate the retention pond area for west Austin versus east Austin?

>> I would say that the difference would be taken into account with the soils data that we have because it's different -- different for the entire area. So within a particular area if there is a lot of clay or there's a lot of rock in that area, then the soils information that we have takes it into account and then that information is fed into the model.

>> Zimmerman: So I'm impressed if you would do that and you had differences, depending on the soil in different parts of the city, is that part of the site

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presentation that the engineers do currently?

>> It is to some degree. There's general data for the soils data across the entire state, across the entire country that we use. And it gets updated every so often, so new information for us.

>> Zimmerman: On page 14 quickly, we talked about the detention pond requirements. So do I understand looking at this schematic here on the left side of the page, which would be upstream, that the detention calculations, engineering calculations are different as compared to downstream? If I go to the far right as we get towards east Austin and get out of the Austin area, are the detention ponds different there on upstream based on downstream, do I understand that?

>> As far as location of detention,, it will be detention 101, but essentially when we're looking at regional detention we break the watershed into thirds. The upper third of the watershed is a great place for regional detention. The lower third might be. And the bottom third is not the best place for regional detention. If we look at onion creek in this picture really the lower third is the portion that's within the city of Austin so we're talking about large regional detention ponds that may not be effective at mitigating floods downstream. On a much more site specific level detention ponds play a role of the watershed because of the receiving stream that may not be the main creek so it has to look at the receiving stream and how to get that water down to the

maincreek. So you may still have detention pond on the lower third for site specific areas, but there's as a regional solution we send to go in the upstream area.

>> Zimmerman: The reason I ask is there is state law regarding this on say a statewide level, not just region for the city of Austin, but statewide there are some considerations. Do we -- if we're looking over there again in east Austin as we get towards the edge of our

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jurisdiction, are there still some technical or engineering or state law requirements we think about so that we don't flood county areas that are downstream from us further? Is that part of our calculations or policy? You know where I'm going with that, right? It's more than just our region.

>> Yes. And our regulations do -- are applied for the whole watershed. Is not if you're in a certain area then site development doesn't have to have detention.

>> Zimmerman: Okay. Page 21. On 21 I almost hate to ask the question, but has anybody put a pencil to how many properties are in the 500 year floodplain? Because as you pointed out, we've recently had a 2,000 year flood event. Have we done some Numbers on that?

>> I don't have them off the top of my head.

>> Zimmerman: We might be afraid to do it. [Laughter]. Okay. And final question here is on page 27. 26 and 27. I was listening carefully to your conversation about risk, but if it were me, and it's not me doing this, but if it were me, I would probably break these into financial risk versus personal safety risk. And they are different things. And if I talk about personal safety risk, I care a lot about the depth of the water and its velocity because we had a conversation some time back about lake Travis. Their base flood elevation had changed because of modeling. We said look, this is a giant swimming pool. When you're on the bank and you have an historical flood event, at the edge where the homes are, you have no water velocity. You may have some in the middle of the river headed towards the dam, but at the edges you have nothing. But then other areas like onion creek famously you have these extremely dangerous high speed flows. So the other risk is the

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financial risk which is property value. So I would look at, you know, like at the tax rolls and say what is the property value on the tax rolls and say, you know, I probably would need -- if there's no safety risk issue I would look at financial and I would prioritize where the most property damage would occur as opposed to less property damage. Is that along the lines of what you've been doing?

>> We do take into account other factors than just depth. So certainly, I mean, timing comes into play. Velocity comes into play. That's whether it be road flood hazards or home flood hazards as well.

>> Zimmerman: Thanks.

>> Pool: All right. Any other questions on item 3? All right. Yes, vice-chair Garza?

>> Garza: I don't know how to form my question. On slide 10 about land use and the existing conditions, you said the FEMA maps are based on existing conditions and then it says there's fully developed conditions is what Austin use. So FEMA maps are used to determine if somebody needs to buy flood insurance or not. What do Austin maps require? Why do we do it differently? Does that change some kind of development standard?

>> It's a higher standard than FEMA minimum standards to do fully developed conditions. There may be a variety of reasons to do that. The reason we do here is because of the significant flood risk that we have because we're in flash flood alley. And we feel we want to be protecting our citizens higher than FEMA. FEMA sets their program to meet their goals and it's for flood insurance purposes. And industry-wide it's

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not just Austin, but a lot, there are a lot of communities in the country that do go above and beyond the minimum standards. And fully developed conditions is one way of doing that.

>> Garza: Is one example of saying if my home is not in the -- a piece of property I own is not in the FEMA 100 year, but it is in the Austin 100 year, then there would be additional requirements or I couldn't even build there because of that. I would be required to get a variance?

>> All of the city of Austin development regulations are tied in to the city of Austin floodplains. We don't use the FEMA floodplains for regulatory purposes at all.

>> Garza: Got it. Thanks.

>> Pool: Okay. Any other questions? We'll move on to four then -- four is the onion creek floodplain and flood mitigation study.

>> Tovo: So I think it might be interesting as a follow-up to this at some point, and you may have sent this in memos and things, but I'm really interested in the south Lamar mitigation area because there was some additional provisions as I recall or some restrictions that were placed on that area because of the cumulative effect of the increasing infill in that area and the way it was creating flooding for properties that hadn't been flooded in the past. I think that's an issue for some some arrests

in Bouldin creek and Hyde park where they are experiencing flooding where they hadn't in the past because of increased infill. I don't know what the best way is to have that conversation, but I think especially as we have an increase of conversations about additional infill tools and changes in the land development -- potential changes in the land development code, it is absolutely critical that I think we understand what was undertaken as a pilot program has yielded in terms of results, but also how the information we're getting here today

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coupled with the existing conditions on the ground in some of the central center neighborhoods could be missing? I hear that from a lot of the conversations.

>> The pilot program within the west Bouldin watershed is ongoing and we're seeing good results out of it and trying to -- that will help us to maybe not increase regulations because the regulations are already there. We're just trying to do it on a little more of a microscale. And I think some of our -- some of the codenext recommendations may come into play with some of those and a lot of that will tie into the policy discussions we have with identification of the flood risks.

>> I think you may have seen a preview of some of the codenext recommendations as part of I believe Jim Robertson's presentation on the natural and built environment description paper where there was at least one recommendation on modifying the detention requirements similar to that west Bouldin situation.

>> Tovo: I'll just say to my council colleagues, we started to have a conversation at planning and neighborhoods earlier this week about smaller lots and smaller houses on smaller lots, but again, I think especially if those are going to be tools that are considered for some areas that are already experiencing increased flooding from infill, I think we need to be -- we need to work some of these conversations in with those potential land use changes? Changes.

>> Mayor pro tem, was there any reference in that conversation to the change in impervious cover if the lot sizes were reduced?

>> Tovo: I would say we really talked about it just at a surface level. It was -- I believe I had made myself some notes, but I don't actually -- that refer to impervious cover. I don't believe that we -- that that came up in our discussion. I think I talked a little bit about it in

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passing, but we did not talk about it in any detail.

>> Pool: I think an area where our watershed protection staff can help us is in kind of getting a sense of what the impervious cover percentages are around the city and in

those areas if we are looking specifically in parts of town to weigh that change. And I know we're sort of getting off topic a little bit here, but it would be good to see how the impervious cover may shift, how those Numbers may shift.

>> Tovo: And you have those great maps that you've done district by district that shows the density.

>> We have GIS maps. I think we handed those out last week and certainly we have all the data available.

>> Pool: Yes, vice-chair Garza.

>> Garza: It would be interesting to know how the potential effect of those infill tools, but I guess I would also want to know I guess how much flooding have certain areas of town experienced? Because what seems to be used as an example many times is the 14 inches in six hours. And as you just explained, that was off the charts, so it would be having in that -- interesting in that conversation to also know how much flooding has happened. As soon as it starts raining kind of flooding or if it rains 14 inches? It starts flooding?

>> And that's a really important point. I think in my tenure at the city really the majority of our work has been focused on reducing risk based on some of our modeling results, but in the last -- between 2013 and 2015 we had three large storm events that put us in more a reaction mode than just working off our models. And really before 2013 we would always talk about the 1981 flood, Memorial Day 1981 and talk about that as kind of looking at how the city reacted soon thereafter and we put a lot of money into Shoal Creek and detention ponds and the upper part of the watershed. And as time went on we started working more on using our predictive

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models and predicted risk until 2013, 2015 where we had a lot of actual damage and we were more in a recovery mode. But that is a really good point.

>> Zimmerman: Quick point. I have a quick question for you here. So when we design the retention ponds, obviously if we tried to do that 2,000 year flood event the detention ponds would be absurdly huge. Do we design for 25 year or 100 year or does it depend?

>> The regulations hinge on the 100 year.

>> Zimmerman: On the 100 year.

>> Right.

>> Zimmerman: So an important point to make, when you get started on the next one, you're going to show us a photograph of these famous photographs of flooding, and

it's really important for me to emphasize this one here. Once you get past that 100 year statistical event of a tremendous amount of rain falling in a short amount of time, it doesn't matter if you have a retention pond or not. When you get a certain rainfall event in a certain speed it doesn't matter if you have retention ponds or not. That water is coming at you. There's nothing you can do.

>> Pool: Thank you very much. We only have a two-hour meeting today so we'll keep moving on. I think the next item is item number 4. And Mr. Shunk is going to give us an update on the onion creek study and the flood mitigation study.

>> So now you know how floodplains work we'll put it together with the onion creek floodplain and the flood mitigation study which is currently underway. I'll talk about the initiation of the study. This study has two parts. Typically we do these with the floodplain study first and then flood mitigation study, but this one has both included at the same time. I would talk a little bit about some previous

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studies that have been done that we're incorporating some of the information and give you a little status report. So the initiation of this study followed the 2013 Halloween flood. And we knew obviously that there were high risks within onion creek and the 2013 Halloween flood occurred. Council passed a resolution in May of 2014 calling for the city manager to identify some funding to do an onion creek floodplain study and flood mitigation study for the upper portion of onion creek, essentially from I-35 to slaughter lane. So the department identified that funding within the department and noticed to proceed for phase one of the study was in December of 2014 and the phase two notice to proceed was in April of 2015. So here's a little bit of the scope of work for the floodplain study itself. Now, this is the floodplain study piece of it. Again, there's the flood mitigation aspect of it as well. But the floodplain study piece is looking at updated hydrology for onion creek and one of the smaller tributaries, Rinard creek. So a lot of the hydrology for some of the other tributaries, slaughter creek, Williamson creek, cotton mouth creek, has been updated more recently than onion and Rinard, so the hydrology changes were just for onion creek and Rinard creek. We're updating hydraulics and mapping, how high the water gets and then representing that on a map, for about 64 miles of stream, which is significant. It's all of onion creek from the Travis-Hays line down to the Colorado river. So that's a significant amount of stream in addition to some of the major tributaries of onion creek itself. So the product of that will be new regulatory maps and information that we'll use within the city of Austin, but it will also include 11

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FEMA flood insurance rate map panels, that again being a large creek and so long it impacts a large number of panels. And like I said the updated regulatory floodplains

here for Austin. So here's a map. I know this is hard to see, but I'm going to outline, there's the main stem of onion creek. So the blue line is all of onion creek within the city of Austin that is included within the study. The other red lines that are highlighted there are some of the tributaries where we're doing updated studies as well. So on the top left portion of the screen, Williamson creek and below that slaughter creek and south boggy creek, those have been studied fairly recently so we're not updating those studies. Obviously we're considering the water that flows from them into onion creek with the study. So now here's the scope for the floods hazard mitigation aspect of it. First we had the floodplain study and now we have the mitigation aspect of it. So the mitigation aspect is looking at floods hazard solutions. Flood hazard mitigation solutions between I-35 and slaughter creek. It goes by lots of different names and they are confusing and some of them are longer than the other. Some people call that onion creek, onion creek subdivision. Some people call it pineHurst golf club community. It's that area that the street names are pine Hurst drive, champions lane, wild dunes drive are some of the sections there that we're looking for mitigation solutions. So the range of options that we are looking at are regional detention, some channel modifications and some flood walls and levees and buyouts. Again, all those are part of our toolbox of mitigation solutions and are being investigated with the study. It was clear before we started, and it certainly is clear now

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that probably the most feasible alternative is going to be multiple tools. While you could just do one -- and that may come out to be the case, it's more likely that it's going to be a combination of tools that are going to solve the flood problem in this area because it's so enormous the flood problems and the amount of water coming down is so enormous that it more than likely would be a combination of items. So this is not the first time onion creek has been studied. And there have been several studies in the past and we're not ignoring those. We're taking the information from them and using that information to help us so that we don't have to recreate things that have already been done in the past. 1997, the onion creek flood control study was accomplished by the city of Austin to look at some flood solutions in the lower onion creek portion around the William cannon area. And then the corps of engineers partnered with the city of Austin, Icra and Travis county to look at some -- a feasibility study, and that is the study where it came out the buyouts in the core area that you're familiar with. Fairly recently, 2013, hays county actually did a study of onion creek that runs through hays county, and while none of that's in our jurisdiction, we are able to use some of the data and information that came from that study within ours as well. So the project schedule is here. In early March we presented to council a feasibility level evaluation memo that just talked about in very general terms what sort of solutions would we be looking at for the flood mitigation aspect, I-35 to slaughter, and what are some of the general costs. We provided that in March. We're looking at the



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current -- the original schedule was for the floodplain models and maps somewhere around June with new FEMA maps and new regulatory models happening -- at least the regulatory models at the end of September 2016. FEMA maps tend to lag behind that about a year or so. Now, we are definitely expecting adjustments to the schedule. And there are several reasons for that. One of them was we had just completed a review of the hydrology for the watershed, and hydrology is important in any floodplain study, and it's very important when you're talking 350 square miles of watershed. And so we had some internal discussions and really wanted to pay close attention to it so that we are comfortable with the data that we're proposing so there's some hydrologic changes. The task force recommendations, out of the task force their recommendation was to expand some of the flood mitigation study to include some more regional detention ponds, so we're going to add that into the scope of work and increase some of the review of some regional detention options. And so that is -- we do plan -- we do expect that to delay the schedule out a little bit more. We don't have any final dates at the moment. We're actually talking to the consultant about it right now. So when we do have some of that information we can pass it along. So the current status, the phase one aspect of the study was a survey basically and it was getting some finished floor elevations, which was the elevations of the houses so we could determine how high -- if the water gets to a certain height which houses it would go into. Then we had some highwater mark surveys. This was right after the 2013 flood, so we wanted to -- we identified how high the water had gotten and it's always good to go out and get survey information. It helps us do some

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calibration of our models with realtime data. We had done the hydrologic surveying, we completed all that. The hydrology is very close to being done after the internal discussion that we had. We're happy that that's wrapping up. And then the consultant is working on some of the draft hydraulic models to determine how high the -- how high the water gets. And the feasibility analysis again was completed back in March. I wanted to run through the options that were in the feasibility level analysis and briefly discuss them and if you have any questions about those we can go through that. This is an example of a regional detention pond. So in the small inset map there in the red portion, which is well in Hays County as you can see, is what we call the Centex West pond. And it's an existing quarry that's operated by Centex. Now, the scale here of this pond, the long dimension is almost a mile, just to get a sense of how big this hole in the ground is. Well, when a hydrologist sees a giant hole in the ground in an upper part of the watershed the first thing we think about is filling it. That's when we're looking at regional detention options. It's -- are there existing quarries, are there existing ponds that could be modified? And then certainly we look at creating new ponds or new dams, but those have a lot of regulatory challenges, but nonetheless we'll take a look at some of those as well. So so we looked at this Centex pond and we'll

take a look at others to try to determine what would be best for helping solve some of the flooding problems downstream. Another option is doing flood walls, and you can see the location of the flood walls. There's a picture to zoom in on it a little bit here.

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So the pine Hurst area is just downstream from I-35 and the wild dunes area is just upstream from slaughter lane. The red lines are indicating in general where flood walls may be. They've been investigated with previous studies of onion creek. The core study look at at some flood walls in this area. They could not find a core project that met their cost-benefit ratio, which is why it isn't included. But we've taken some of that information to use in this study. The location that we have shown for these flood walls is not set in stone. Again, this is a feasibility level. We're just looking at, really, quick level analysis of, in general, do we think a flood wall would work. It would work. It would be extremely expensive and the flood wall could be in the order, in some cases, 15 to 20 feet high. Another option that we can -- we're considering and still looking at is channel clearing. Now, we talk a lot about the citizens about clearing out the channel, because the debris in the channel. There's that kind of clearing, but just in a hypothetical case, which is what we did here, when we're talking about clearing, we're talking about wholesale clearing of the channel, and it will not look like - anything like the creek looks like now it will be all the underbrush and all the smaller trees taken out. There are significant environmental and other engineering problems that could come from clearing out a channel. It's not -- not necessarily something that we're bringing forth and looked at that we're recommending it, but we certainly wanted to show what that might do to the problem and present that to the neighborhood, and have it in the report as a discussion topic. Another option was channel benching. We looked at -- actually, with the core study, looking at flood

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solutions on Williamson creek, we looked at some channel benching, it's similar to this here, and that's really going in and digging out significant portions of the channel. And I'm, again, not talking about just digging out 10 to 20 feet of the channel, I'm talking about hundreds of feet of channel, in some cases 20-foot high cliff sections that would need to be excavated, significant amount of dirt work that would have to occur for this to happen. Again, lots of other environmental issues could occur with this. Again, not something that we're necessarily recommending. We are wanted to investigate it to see what level of improvements this solution may have. And if you look at the solutions that we did, that we looked at so far with the feasibility memo, the channel clearing, the channel benching, don't -- in and of themselves, don't come anywhere close to mitigating the flood problem. If you look at a buyout, complete buyout solution or a complete flood wall flags, that could meet the goal, which is mitigating the floodplain, in and of themselves, albeit it's very expensive to do, but those two solutions could work in and of themselves. It might make sense, with a little

bit of regional detention, maybe the flood wall could be shorter, not in a certain location, that's why I'm saying it'll probably be a impinges -- be a combination of multiple items in the end. I don't have a picture of it, but it would just be a buyout of all the properties that are impacted by the hundred-year floodplain to mitigate the flood problem. So what are the next steps? The flood study piece is the first to proceed along, finishing the hydrology aspect, then the hydraulics and mapping. We're currently coordinating and will continue to coordinate with other municipalities, counties,

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regional state interests, regarding regional approaches. In fact, after this meeting, staff and myself are going to the Barton springs conservation district. We're going to be presenting essentially the same presentation to their board. We've been talking to them already, but they just wanted to get an update on how it's going. So we're going to talk to them a little bit about aquifer recharge. That's just one entity we're talking to. We have conversations about the city of Buda, and continue talking with hays county. It's a regional approach. We like that and we know that is certainly one way we could go to meet the goals, and we'll continue that. Coordination with the onion creek neighborhood, we do -- we meet with a representative of the neighborhood every two weeks to bring them up to speed, and we do plan on doing public meetings there, certainly to get -- to receive their input on some of the solutions that we're proposing. So then once the flood study is done, we'll determine recommendations for flood mitigation, and that will be the result of the study, not just the new floodplain maps themselves, but it would be a recommendation for flood mitigation solutions for that area. I'd be happy to answer any questions.

>> Pool: Thanks. I have a question about the flood walls. Does it ever happen that the water is trapped on the upper level side, you know, next to the homes in the neighborhoods? Does it ever happen --

>> Yeah. That's one of the main considerations with flood walls is you still have to deal with the water that's in the neighborhood. So typically, that could mean reconstructing storm drain systems, that they can't out at one location, you have to take them to the end of the flood wall, so that's a significant part of a flood wall design.

>> Pool: Then would these walls tend to interrupt the natural migration patterns of any animals, wild animals that might be in the area?

>> I don't know that off the top of my head. It's something certainly when

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we're doing the final analysis of the options to consider. Yeah.

>> Pool: Okay. That's probably one of the lower level impacts, but -- and probably if the walls weren't real long, for example, but if they were miles long, for sure, it's definitely -- becomes significant.

>> Uh-huh.

>> Pool: Vice chair Garza, this is your area of the city. Anything you wanted to talk about?

>> Garza: This is actually councilmember kitchen's. I do have a question. That I know she's proposed some possible buyouts maybe for this area. I guess you're working with her office, and that -- would a flood wall possibly be the alternative to buyouts, or flood walls are too expensive and buyouts are cheap, or --

>> I don't think we have the answer to that yet, as far as what the recommended flood mitigation solution is.

>> Garza: Okay.

>> So it could come out maybe the flood wall would be a better option, maybe the buyouts in this particular area, could be a combination of both of them. I think some of the discussions with councilmember kitchen are on kind of the emergencyrecovery type of buyouts, and some of those folks still are not in their homes because of the level of flooding that they not only got in 2015, but 2013 also.

>> Garza: Okay. Thanks.

>> Pool: All right.

>> Zimmerman: And I have couple of questions.

>> Pool: Councilmember Zimmerman, then we're going to move on to the last item.

>> Zimmerman: On page 11, 12, and 15, page 11 is really, really interesting here. But I guess -- I can't really see what's upstream of this potential retention pond. It's kind of an interesting idea, but obviously, you'd have to get lucky and have the rainfall hit, you know, upwards from the pool. So I can't really see, you know, how much we could mitigate with this scheme. And also, it's in hays county. So would you contemplate that the city watershed department

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would need to buy the property from centex and then repurpose it? Or how would that work? Or do we work with hays county in this? Is hays county interested in this?

>> In general, I would say all the above. The land is actually privately owned. It's leased by centex so they don't even own the land, so the conversations on whether we could use this would have to be with the lessee, centex, and how it may impact

their praise, and it would also be with the owner to determine, in perpetuity, if they were willing to allow it to be some sort of regional detention.

>> Zimmerman: It's all cost/benefit analysis, which is not simple to do. Right? So on page -- on page 12, the question on the walls, I mean, what is the data -- 15 to 20 feet high, from what? Is that from the base of the creek? I mean, that's not 15 feet higher than the site level of homes. Right?

>> From the base of the wall, the wall itself. So say in somebody's backyard or at the street area, it would be 15 to 20 feet high as you're standing next to it.

>> Zimmerman: Really? Okay. I have to chew on that a little more. But going to page 14 here, or 14 and 15, I was wondering if there was a way to do cost/benefit ratio on the idea channel clearing, because that could be economical to do.

>> There is, and we have -- in the document, we put together some initial costs, and then some long-term maintenance costs in order to maintain that level.

>> Zimmerman: And do we know, is that something maybe that could be done relatively soon? Because it shouldn't be terribly expensive compared to some of the other options.

>> Well, whether it's a solution or not, a viable solution, is really -- we haven't gotten to that point yet in order to implement one of the solutions. And then some of the

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implications that would occur if we went down that road, we'd have to go down that path.

>> Zimmerman: I thought part of what we're paying for drainage fees now is maintenance, you know, conveyance channels. Right? Isn't that part of what is expected currently, without considering any new studies or anything else, I mean we do that, right?

>> Right. We currently have the equivalent of one crew for north Austin, one crew for south Austin, and their focus and their priority is really maintaining the flow line of our waterways to be opened. What this type of clearing is doing is really getting up outside of the creek area into the floodplain bench and doing a significant amount of clearing, which is somewhat different than what we do right now. Actually, very different than what we do right now.

>> Zimmerman: We haven't done that in the past. Okay. Thank you.

>> Pool: And I'd be interested to know what environmental impacts would be by removing that much of the property there. So conversation we can have in the future. Any other questions? Mayor pro tem?

>> Tovo: Just a quick one. In doing the feasibility for the flood walls and the channel clearing and the channel benching, did you come up with cost estimates on all of those options as well? And is that in the memo?

>> Yes. It is.

>> Tovo: Okay. Thanks. I'll look back at that.

>> Pool: Well, my thanks to you both for coming and making this great presentation. Keep us posted on how your conversations go with the Barton springs Edwards aquifer group. I'm very interested in seeing our partnership. All right. We're moving on to item 5, and that is a briefing and discussion regarding the Austin community climate plan. And I see we have Lucia Athens and Zach Baumer. Welcome to you both and thanks for coming today.

>> We're here today to provide

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an update for you on the community climate plan. And, basically -- have we got a clicker? Oh, there it is. Basically, we have a pretty simple agenda. And I'm -- once again, I'm Lucia Athens, chief sustainability officer, and Zach is also in the office of sustainability. So the agenda today is just to give you a quick refresh and update on where we are, and then to give you the new information that's been gathered on the community inventory, the community climate inventory, and then to give you an update on the phase I implementation plan of the community climate plan, and then just a little bit on next steps. So the -- there's been several different council resolutions over time related to climate and community greenhouse gas emissions and the city's operational emissions. 2007 -- was the original climate resolution, which was under mayor Wynn at the time, so there was a lot of activity that was prompted by that. But what was missing from that piece of legislation was a target for community climate reductions, community greenhouse gas and emissions reductions. So the piece of work the community climate plan that we're talking about today, was triggered by an additional council resolution that did set the target. The resolution was adopted in 2014 and it set the net zero goal for the community greenhouse gas emissions by 2050.

>> Zimmerman: So what do we mean when we say net zero emissions by 2050? Is it on now?

>> So this is just a -- sort of a glide path each and every time showing, if nothing was done to reduce emissions, obviously business as usual, using

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fossil fuels, we'd just continue to increase emissions over time with more people and

more activities. But if we're going to meet this target of net zero emissions, from transportation sector, use of electricity, the way sector, industrial sector, are all going to have to be reduced dramatically over the next 35 years. So you'll see in this chart, we have interim targets that were set during the development of the plan. The next interim target that we have here is 2020, trying to reduce community wide emissions to 11.3 million metric tons in that year. It's also really important, when we're thinking about net zero emissions and thinking about something this long-term, you know, 35 years into the future, the world is going to be a completely different place 35 years from now, in terms of energy generation, the way we get around, the way we communicate with each other. So trying to envision a future with technology we currently have to reach this goal is hard. It would be unbelievably expensive if we were trying to get to net zero emissions next year. But over the course of 35 years, not only ourselves but also nationally -- internationally, it seems like a feasible thing the to thing to be accomplished.

>> So one of the points we wanted to make sherries asstaff and community members were crafting the community climate plan, we were able to build on a lot of great work that had already been done, because -- as Zach is going to explain to you a little bit more, about the community carbon footprint in a minute. Being able to pull together existing plans, understanding what already existed in existing cities, strategic plans related to things like -- for transportation and land use, things like imagine Austin, the bicycle master plan, other transportation related plans, for the energy sector, Austin energy's resource generation and climate protection plan, and the zero waste plan of resource recovery. Those plans all help us reach these goals. So we were -- I didn't have to have to start from scratch. We were able to leverage a lot of that good work that

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had already been done. And one of the other points I wanted to make is just that there a lot of other benefits and reasons why the city is engaged in many of these activities. Greenhouse gas emissions reductions, per Se, is not necessarily the driver for many of these activities, but it's definitely an additional benefit and a co-benefit that we can -- that we can garner from achieving a lot of the goals that are set forth in these plans. And to some degree, we can think about it as a collective impact model, through all of these different activities that we're doing, we can reach the collective impact of greenhouse gas emissions reductions that we need to achieve. So in the plan -- and you'll be familiar with this if you've looked at the plan -- there are various sectors that are -- that are lined out in the plan, and they are primarily in these areas, electricity and natural gas there's a whole working group that was put together with staff and community leaders and knowledge experts on electricity and natural gas issues. Transportation and land use issues. Materials and waste management issues, and also industrial process issues which has to do with some of the high-tech -- primarily the high-tech sector here in Austin. So the bullets

that you see here are just sort of the major categories of actions that were identified by the advisory groups, the technical assistance groups in each one of these categories. There was also a steering committee that oversaw the entire plan. And I forgot to say at the beginning that we also have several members of the relatively new joint sustainability committee here in the room today, and council has tasked them with overseeing the implementation of the plan.

>> So like she said, we have those major emission sector areas. What actually ended up in the plan was about 135 proposed actions that would be completed. And those actions are phased out into the future. So 58 of those are phase I actions. So you'll hear a lot about those 58, when I say phase I, we really mean the actions across all the emission sector areas that are likely to be completed in the next five years.

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So those are really the things that departments are working on, now that people are engaged with currently. Then we have phase II, which is about 60 actions, which is further out, 2020 to 2030, then we have phase III actions which are even further out from that. So you can think about the things that are phase I are realistic, are cost effective right now. Things that are phase III are sort of bigger picture, long-term visionary type actions.

>> So the recommendations that were adopted by council, and with the adoption of the plan, kind of fall into several different categories. One particular area was to develop an implementation plan for the phase I actions and a public outreach plan. Another recommendation was to determine the feasibility of something that was referred to as a carbon impact statement that could be applied to major city council decisions. The third was to determine the feasibility of a local carbon fee or trading and investment program. And then finally to continue climate research and resilience planning efforts. So next I'm going to turn it over to Zach to explain the update on the community greenhouse gas and carbon inventory that was completed.

>> So since the plan was passed last June, we've been working on this progress update, the implementation plan, and trying to focus on metrics and the inventory and really figure out where we are, numberswise. So 2013 community inventory, that feels like a long time ago. The challenge with doing a greenhouse gas inventory like this over a community as large as ours, including all the buildings, powerplants, all the vehicles, the data doesn't come right away. So we do this inventory basically every three years. In 2013, we actually completed inventory inventory in 2015 so we're kind of looking back in the past with the best data that we have. So basically what we see

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here is we've done a community be inventory three different times for Travis county



and the Austin area in 2010, it was about 13.5 million metric tons in 2010 it was about 14 million metric tons. In 2013, it was about 17.7 million metric tons. And that's a lot of emissions, but that's the emissions from every single vehicle, every single business, every single power plant, all rolled up together. Between 2010 and 2013, our population in this area increased by about 16%. But emissions went down by 2%. So that's a good indicator that the actions that we're taking, not only in our level but the state level, the federal level, are working to reduce emissions even with more people doing more things in our area. So just quickly, these next couple charts break down the different emissions sectors. From electricity, as you all know, Austin energy is implementing many programs around solar, around renewable energy, around energy efficiency. So basically between 2010 to 2013, total energy usage over the community is actually lower. Over the course of those three years. And the emissions per kilowatt hour, so basically the carbon intensity of the electricity we're using is also lower. So, again, with many more customers and many more people and activity in our area, emissions from the electricity and natural gas use in our buildings is down, which is good. From transportation, it's a little bit more of a challenge, so as we know, all the vehicles on the road that make all the congestion, that make all the traffic that we have to deal with every day, there are more and more vehicle miles traveled in our community. So that has greatly increased between 2010 and 2013. The only thing that's helping us right now, keep this stable, is basically CAFE standards, so the federal emission standards on vehicles. So as all vehicles in the community change over and people buy new vehicles and those vehicles are more efficient, that helps bring

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the emissions down even if you have more people driving on the road. Okay. So that's the summary of where we are, basically with the inventory. The thing that we worked on basically over the past year is trying to figure out where we are in terms of implementing these 130 and these 58 specific phase I actions in the community climate plan. So why did we develop -- why do we develop this implementation plan? A plan is just a plan. I mean, the actions in this plan are things that we hope would get done, things that we would like to get done. But making sure that they're going to actually get driven forward and move forward so we achieve emission reductions is key. The first thing was transparency and accountability to the stakeholders, all the people, the hundreds of people that helped us develop this plan, they don't want to see the plan sit on the shelf. They want to see it get implemented. The next one is clarify roles and responsibilities of city departments. All of these projects getting implemented aren't the responsibility of the office of sustainability. This is a large, coordinated effort between transportation department, Austin resource recovery, planning and zoning, Austin energy, this is a lot of groups working together.

>> And also outside entities such as Capital Metro and Texas Gas Service. It's also not just the city.

>> Yeah. And then the last one there is to really create a well-defined set of requirements for those actions, to make sure that they're being tracked, that they're being implemented, that we understand what the cost is, and the impact of those actions to be completed. So what did we -- what did we focus on? We basically focused on these top 58 phase I actions. These are the ones that are going to be implemented in the next five years. We went back to the department, so this was heavily worked on and completed by those departments that are partnership -- in partnership with us. So they really focused on, for each action that was identified, what's currently happening with that action. What's underway, what's being worked on, is something occurring that's going to fulfill that action. The next one was funding. Then the incredibly one was

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potential carbon reduction. Then we tried to bring all that together to try to categorize the implementation status. We needed to understand -- 58 actions is a lot, so we needed to understand, what's higher priority, what's lower priority, what's getting the attention it needs, what's not getting the attention it needs, so we can bring information to you that is distilled down. So in terms of implementation, we submitted this implementation plan and the progress update to council by memo, I think March 25th, so you still have hard copies of those. But basically for every single one of those 58 actions, there is a narrative from the departments on the cost benefits and the current status of programs.

>> I have some extra copies of the implementation plan with me if anybody needs a copy of it.

>> Just on the highest levels, you'll see the -- I'm okay for right now. The great thing about building off of existing initiatives with all the departments is that at the highest level, the vast majority of the actions are already ongoing, or are currently in development. So just these three high charts, over 90% of the actions in all three of these, the phase I actions, are currently in development or ongoing. So there's a lot of action and initiative already occurring. It's not like we're starting at zero, which is good. This is the primary chart that was the result of all the work of the implementation plan. So we basically mapped out all the 58 actions and tried to put them in these three buckets. So we tried to understand, with each action, what's the implementation status. So has the action begun? Is it in development? Or is it currently ongoing within the departments -- departments' work? The next thing you'll see on the Y axis there is how important is the action being completed for us to reach our communitywide 2020 interim target. So those are low, medium,

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and high. Low would be actions not going to create reductions anytime soon, high are

the ones that would create large amounts in the near term. There were these three categories. The lowest level, the blue actions, those are actions that we think we should just monitor the status that the departments are implementing those or they're trying to implement those, but they likely don't have a huge impact, so we should probably just leave those alone. The green category is, needs continued support. So as you see, the largest amount of actions are in that needs continued support. So these are actions that Austin resource recovery, transportation department, and Austin energy are currently implementing within their departmental strategic plans and action plans, and are the kinds of things you hear about all the time, from those departments. The last area there, just highlighted red, I actions for focus. So those are the actions we thought through the collective work of the group were going to create the highest amount of you can reductions, but weren't being fully implemented at this point. So when we say in development, we mean it's not a fully fledged, fully implemented program that's fully funded and operational.

>> They're newer ideas, more emerging inside in many cases.

>> Yeah. So those are the most important actions for -- that we're putting forth to be focused on in the next year or two. So just highlighting the green and red sections here, as you'll see, actions here that are green, these are actions that need continued support. These are things that you hear about from these departments. So with Austin energy, you know, the purchase of 580 megawatts of combined utility solar, that's a huge deal. It's huge they're doing it on their own and that's being implemented with council's support. That's going to make a big impact. Transportation department, things like the 2020 mobility challenge, capmetro updating service, you know, those are things that are currently happening, they're funded, they're moving forward, it's very important. Then with Austin resource recovery, continuing to implement the universal

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recycling ordinance and continuing to capture and destroy methane at the city's landfill, those are two things that are really important.

>> One thing I wanted to mention related to the resource recovery zero waste plan and the budget briefing that was given recently to council about that topic, overall, is, I know that there's a lot of discussion right now about trying to decide where to go with service delivery and whether to prioritize recycling to be weekly, as opposed to every other week, and where to go with prioritizing curb-side organics, waste collection. I just wanted to mention there's another way of looking at that, in addition to all the other factors that we have to consider, which is that if we can increase the food waste recovery, that does help us with greenhouse gas emissions, because if you send the food waste to the landfill, that basically is anaerobic methane. It still produces gas emissions in the form of carbon dioxide, but

if you're properly managing it on site or through a facility, those are opponent gases, so it's another thing to think about in terms of prioritization of those services.

>> Yeah. That's the take-away from this whole effort, when we looked at all of these actions, this is really through the lens of greenhouse gas reductions first. If we're going to meet climate targets, if we're going to be supporting the global effort to combat climate change, if you're really looking through the greenhouse gas lens, these are the kinds of things you focus on. As we know with the city, budget, prioritization, there's a lot of things that come into play when we make decisions. So the actions that we need for focus -- that need additional focus are basically 13 identified here. That top one that's lumped together, those are actions in energy efficiency and demand response actions related to Austin energy that are all tied back to advanced metering

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infrastructure. So Austin energy is undergoing lots of initiatives to increase metering, to be able to do more things with more data for more customers, and there are numerous actions for us to be more successful with energy efficiency that awful our customers need better data. So Austin energy is evaluating the cost benefit of all of this stuff, but they need support in that area if we're going to achieve those reductions. The next one was two actions related to transportation demand management. The transportation department is implementing this program called smart trips, where they're trying to connect with individuals about how can individuals reduce their single occupancy vehicle trips. So programs like that need to continue, need to come to fruition. We need to reach individuals to help them figure out the best options to get out of their single occupancy vehicles. The next one was purchasing. These two are related to sustainable purchasing, and purchasing initiatives of the city, and how the city of Austin spends its -- spends its billions of dollars on all the different vendors, all the different products and services that we buy. This is an initiative that's moving forward with the central purchasing office, but needs to have continued support. The next one is methane management. We have numerous landfills in Travis county. The city of Austin owns one. There are numerous others that are owned by private landfill owners. We just need to ensure that the landfill gas at those landfills is completely captured and destroyed. Then the final one there is recycling action 4 in organics diversion, these are both related to full implementation of the universal recycling ordinance where we collect as much recyclables as possible, as much organics as possible and keep those out of the landfill.

>> So we're wrapping up here. We just have a couple more slides before we're done. One of the other pieces to the plan is developing a

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full public engagement plan with the community, and we're in the process of developing that plan, but we have been doing a lot of communication and outreach through our website and our blog. You may have seen some of these posts in our new campaign called met zero heroes, where we're celebrating achievements of people in the community from all walks of life and backgrounds and their personal actions to reduce their own personal carbon footprint. This has been a really successful campaign so far. We've reached over 25,000 people on Facebook through this campaign, so we're continuing to expand that. We have an app that's called rethink Austin, that encourages behavior change, so we just completed some commissions with schools, and also our Austin green business leader members, using the app. We have about 1600 users so far. We're hoping to expand the use of that. We're also beginning to have some conversations with resource recovery about their recycling games and their block leaders, and some of the things that can be achieved through that campaign, tying back to, as well, to this -- these carbon reduction activities and how we can work together. So a lot to come there. The next steps that we wanted to talk to you about, a lot of it really does have to do with reporting. We previously reported to you in the fall of 2015 and spring of this year. We mentioned the joint sustainability committee. We had our third meeting with that group last night. They're meeting every other month, sometimes a little more often. I know they have subgroups that are working now on some specific things they want to communicate with council about that may tie back to the upcoming budget process, and we're also reporting to the resource management commission, and we'll continue reporting twice a year by memo to the full council. We're working on and completing a study on the carbon impact statement and carbon fee concept, so we're still doing that analysis on that, looking at options, talking to the law department about the implications of what some of those things might be, so you will be hearing more

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about that. We are developing better tools to do some of these quantitative calculations. It's a huge piece of work to do the calculation of the community, carbon footprint, there's a lot of work that goes into it. It's very time consuming. We're automating some of those tools. We're in the process of hiring a new person in the office to replace somebody who left who actually does a lot of that work so that's underway. And by our September update to council, we plan on having the full community climate engagement plan for you to consider. So that's some of the things that's coming up. And then also budget gap for the phase I action implementation, we mentioned some of those items that are further out. We are working with all of the partner departments so that they're developing some cost analysis for -- or, you know, other actions needed, such as policy development. It isn't all necessarily just budget, cost-driven. So we will be feeding all of that in the budget process moving forward. So that's the end of our slides now.

>> Pool: Great. That that's I had a real quick question on slide 17. Do you have -- this is the one that has all phase one actions. Do you have proportional impacts of these various actions?

>> The amount of --

>> So proportional in terms of gas reduction?

>> Pool: Exactly. Yeah. Like a -- I don't know if it would be -- not a heat map, but some kind of -- you know, the size of the dot would be different based on how much -- or how little.

>> Yeah. We didn't complete that for this. When we're looking at action by action, and trying to calculate the specific metric tons for each one, in some cases, we're able to get really specific, because if you have, you know, X megawatts of solar being implemented, you can directly calculate what are the megawatts. But if you're implementing a program, you know, related

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to food waste that ends up in a landfill that he understands up turning into methane, you know, ten years down the road, it was harder to do. And that's how we ended up with low, medium, high. When we say low, thinking back to when we were classifying these things, I mean, low is probably in the single thousands of metrics of tons. Medium is probably in the 10 to 50 to hundred thousand metrics of tons.

>> Pool: Okay.

>> And high, we're getting into really large amounts.

>> Pool: Really big impacts?

>> Yeah. If we got all of the high reductions, that's where we're going to be actually meeting those targets.

>> Pool: That's actually really helpful. Thank you. Any other questions? Okay. Good. And I think -- I think you have one more item to talk to us about.

>> Yes.

>> Pool: And it's kind of Greek, so I want to make sure I say it right.

>> Okay. Great. Thank you.

>> Pool: That is the briefing and possible action regarding the city's possible membership in the bio philic cities network.

>> Let's get that mention loaded up quickly.

>> Pool: And while we're doing that, could you introduce the members of the joint sustainability committee that came down today?

>> Sure.

>> Pool: The ones that are still here? I see Jim walker and who else do we have?

>> [Off mic]

>> Pool: Thanks for your work, Stacey.

>> [Off mic]

>> Pool: Thanks for being here, Jim.

>> Jim is my counterpart in sustainability at the university of Texas.

>> Pool: And you've beendoing sustainability work up at UT for quite a while now. Yeah. Thank you. All right. Talk to us about the city --

>> Okay. Great. Moving onto the next one --

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>> I was told to tell you guys from Kelly that your packet -- your new packet is clipped --

>> [Off mic]

>> Pool: It's right here next to us.

>> Okay. Great.

>> Pool: Thank you. Thank you so much.

>> Those are really minor adjustments to the presentation. Great. We're happy to be here today to share this presentation to you on the biophilic cities network. I've already introduced myself. Once again, I'm chiefsustainability officer and I'm joined by Leah Laney, the environmental coordinator in the urban forest division in the city's development service department. I also want to acknowledge peter Davis, who's backhere. Peter, I want to really thank him because he really brought this opportunity forward to us. He's in the public works department, but one of our sustainability experts at the city in many regards, so I just want to thank him for bringing this opportunity to us. So we're here today to tell you about the biophilic cities network, to explain the benefits and go over the requirements for the

city of Austin to join the network. You might think of it a little bit as a follow-on to a presentation you had, or related at least, in your last session, to the connecting children with nature initiative. We were originally going to try to have those at the same time, but nevertheless, we're doing it this month with you. So, first of all, just starting out with biophilic. In 1984, the renowned biologist E. O. Wilson dubbed the term biophilia. He dubbed it the urge to identify with other forms of life. This is really a good read if you ever want to take it to the beach with you or if you ever have free time for reading, if it's not required reading. I don't know if you do. But the modern biophilic community talks about how humans are co-evolved with the natural world and we have a need for contact with nature and other forms of life. Another person that we've actually been in communication with, Timothy Beatley, in his 2010 publication *Biophilic Cities*

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made his first attempt to determine how biophilic principles could be integrated into urban design and what does that look like in a city. Dr. Beatley is a professor of sustainable communities at the University of Virginia and he and his team have been identifying the benefits of living in nature areas, they look at cognitive performance, stress, mood. Their research goes beyond the benefits that cities receive from ecosystem services, things like cleaner air and water that we know are important for many different reasons, lower urban temperatures, and kind of acknowledge that collectively, all of these different benefits create a more livable urban environment and a healthier city population. In addition, other researchers that have been around for a long time, such as Dr. Roger Ulrich, who was the co-founder for systems of health systems and design at Texas A&M, have identified how trees can increase value and increase sales in well landscaped business districts. So a biophilic city recognizes that the benefits the community receives from nature and sees nature as a core principle of urban design and planning. As a biophilic city, we work to create opportunities to learn about and connect people with nature. We support increasing understanding of things like our local flora and fauna and support initiatives to nurture the environment and provide residents with nature immersive environments. The office of sustainability published a white paper related to integrating it into the city and I think you have that in your packet.

>> With that connects in mind, I'd like to jump into information about the biophilic cities network, led by the professor and his team, the original founding cities were the 11 you see here. San Francisco, of California, Portland, Oregon, good morning, Singapore, to name a few, plus less obvious, Milwaukee, Wisconsin, Phoenix, Arizona, and

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Birmingham, United Kingdom. They were joined in 2013 because they recognize nature as an integral component of their city of the future. And they wanted a seat at the table



where advanced theory and practice for biophilic cities was being dreamed and executed include collaborative research, dialogue, information exchange, and teaching.

>> Singapore is considered a leader in the biophilic cities movement and is a fascinating city of how an internationally renowned city can integrate nature into incredibly dense urban fabric. 50 years ago they set the intention to perform 270 square miles of land into a city and a garden. While their population has grown by some two million over the last 20 years, their percentage of green has increased from 36% to 47%. They have an extensive park network and green areas that are tied together by 124 miles of park connectors. Many of those to a form of canopy tours, or tan my canopy walks. They have greener spaces, planting trees, green roofs, green walls, and providing support for community gardens. With over 500 million people currently living in Singapore, most of those living in high rise buildings, they're a testament to what setting attention can achieve. So for Austin to get a seat at this table, there are a few steps we need to take, such as officially stating our intention to join the network, paying a one-time fee of \$250, preparing a statement covering how we currently prioritize nature in our city, our goals and aspirations to further incorporate nature into our planning and design efforts, and selecting at least five nature-based performance indicators. The network is not heavily focused on metrics and creed accreditation, but they want us to set a baseline and track progress. It's a way for Austin to show our commitment,

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integrating nature into the city, and priorities to our local needs and constraints. We currently plan to track the following indicators in relationship to imagine Austin and as part of our sustainability keyperformance, including number of trees planted annually, percent of trees -- of tree canopy coverage, number of residential units within a half mile of park or open space, the environmental integrity index, the amount of permanently preserved land by category. Once the city has joined the network, we'll continue to feature nature-based information related to work we're doing to integrate nature into our urban fabric. The hub for communications and community engagement will be the nature and the communication platform which consists of a Facebook page, monthly newsletter, and a nature in the city blog. Austin representatives will benefit from access to training and communication with network reps in other network cities. We in turn will share our information with partner cities and have the opportunity to host delegations from around the country and the world.

>> So just a couple of slides here before we wrap up the presentation, I think we all know that one of the core principles of imagine Austin is to integrate nature into the city and by strengthening our codes, green infrastructure parks, urban forest trails, green ways, creeks, urban spaces, wildlife habitat, the relationships between all these things, and the community and the way we do development, we can protect this natural environment and our quality of life in the city. And the green infrastructure priority

program that's led by Mike perconet who's here, has has been doing a fantastic job of really seeing how all of these different aspects tie together and high the city invests and protects those resources.

>> There's a clear alignment between the initiatives already taking place in Austin and joining the biophilic cities network. In fact, we have decades of community and city based initiatives that support this next step of joining the network, which will, in turn, support our

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community's longstanding desire to protect and nurture our local ecosystem. As we work to implement imagine austines green infrastructure priority program and develop new initiatives like connecting children with nature, which you heard about at your last meeting, membership in the biophilic cities network will give these plans and initiatives access to intellectual resources and potential partnerships that weren't previously available. Austin has a rich and unique natural heritage. Our environmental bounty and local beauties what drew settlers here 177 years ago and continues to draw people here to this day. By joining the biophilic cities network, the city will continue to position itself to meet imagine Austin and city leadership goals, demonstrate an international level of leadership on the environment, and a local commitment to the well-being and health of its residents.

>> So that concludes the presentation. And one of the requirements, as we mentioned, to become a member of the network is for there to be some kind of official adoption or official action. So, basically, our staff recommendation is, we think this is a good thing for the city to join the biophilic cities network. Our recommendation is to support efforts to integrate nature into the city and officially support the city of Austin joining the biophilic cities network. That official action can take a number of different forms. It could be a council resolution -- council had of sponsored resolution. It could be an item from -- brought forward by staff, so it's really -- it's really pretty open right now, how we want to proceed with that. We do have a draft resolution that we've prepared if you want to see what that looks like, for your consideration. I can give you a copy of that.

>> Pool: Sure. I think that would be great since you've got it prepared. Be happy to look at that. Sure. I think the mayor pro tem has some questions.

>> Tovo: I have just a couple quick questions. So on those five indicators --

>> Uh-huh.

>> Tovo: One, I think we're currently doing.

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Number one, the number of trees and the tree canopy, seems like something we're already doing. 5, I'm less clear on what 4 is, and number 3 seems like a really useful metric, but typically, I think we talk about it a little differently. Usually, we talk about the areas of our city that are not within a quarter mile. The goal now, the city goal now is a quarter mile of park space. I guess I just wondered how you selected the number to measure the residential units within a half mile park and open space, versus the areas of our city, you know, are we -- I mean, there are all kinds of ways you can measure that, but I just -- in terms of being consistent with the way -- the ways of the parks department is measuring proximity to parkland, I wondered if that was -- it seems to me this is a different way of thinking about it.

>> Okay. We can double-check that. We were attempting to be consistent with imagine Austin, so that comes directly out of the indicators that have been selected in conjunction with imagine Austin. So I can go back and double-check. Maybe it's actually changed.

>> I think it's a quarter mile.

>> I thought it was a quarter mile.

>> A quarter mile in certain areas, then a half mile in other areas. I think it's well beyond downtown.

>> Pool: That rather expansive area that goes 183.

>> Tovo: I was going to say, central business district, it's the central auction which is Ben white. But I may be wrong. I can never keep that straight.

>> We'll double-check on that. Our intention here, councilmember, is to have these metrics be in alignment with things that we are currently measuring.

>> Tovo: Right.

>> So at the moment, through things that we already measure, we feel like we meet the five minimum metrics, and of course there are other things we can measure. But we'll double-check that.

>> Tovo: Okay. That sounds good. I wasn't sure they were capturing that information in terms of residential units. But that was really the

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substance of my question, was about whether or not this is going to require additional work, or whether you tried to select metrics that we're already using so there's not a real increase in terms of staff time to pull this together.

>> Definitely the latter. We're trying to pull metric we're already using and we'll double-check to make sure that one is in. That one, in particular, since you asked, are in alignment with what we're doing.

>> Pool: It's very interesting. Had you thank you for bringing this to us and certainly I'd support a recommendation from this council. I guess that would be the only -- so there would be the really nominal cost, plus the staff time of doing this, but the metrics are -- I mean, this is information we're already collecting, and then the additional things you've highlighted there were conference calls and participation. Do you anticipate any other costs?

>> No. I don't really anticipate additional costs.

>> Tovo: Thank you.

>> Pool: Vice chair Garza.

>> Garza: Those were most of my questions, and I guess just concern of, in a future budget cycle, a request for an fte because we need someone to do -- you know, whatever.

>> No, we are not planning on any additional staffing for this. We have staff that are already working really on all these things that are very much in alignment with this, so, really, the intention, I think, is to join the network partly so we have access to this knowledge network for information sharing with other cities, so that we can share some of the things that we're already doing and we can learn from some of the things the other cities are doing. So, no, there's no intention of additional staffing. We have great staff, such as Leah and many others already working on these things as part of programs they're already involved in.

>> And just for clarification, you believe that all of these things are things that we're already doing. The five indicators are stuff that already -- okay.

>> I mean, we're not already participating in conference calls with other members, obviously. Those would be additional things. And educational

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opportunities would be things that we, you know, are not necessarily already doing because they're opportunities, they're not available to us. So those would be dealt with on a case-by-case basis. They're things available to you but you don't have to do them to be a member of the network. I think we're covered on things that are mandatory, with the exception of paying the \$250 membership fee which we can cover with existing budget pretty easily.

>> Pool: I know on number 2, the tree canopy coverage, Michael embesi was here last week, talking about things that were done, is he here? High, Michael. You talked

about the treecanopy inventory that was done. Maybe just real quick, we've got like five minutes left in our meeting here. I don't know if everybody was here when you made your presentation a month ago, because I think it was toward the end of the meeting, and there was a fairly extensive inventory done, not by the city, but rather -- was it by the federal government that came in and did that?

>> Yes. Thank you. Michael embesi, urban forest manager. Yes, there was a first of its kind inventory and assessment by the U.S. Forest service working with our Texas forest service to assess the values that an urban forest has on a community, and Austin was chosen to be the very first study. We're working with your staff in hopes to bring a much more defined presentation to you about that -- about that study in the near future.

>> Pool: Great!

>> But indeed, that study identified that canopy covers are nearly 31%.

>> Pool: And wasn't there kind of an estimate number, like a dollar figure, that was the dollar figure benefit to the city to having the canopy?

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>> Yes. The estimates that were found from this study, they estimated that we had 34 million trees, and that a combined value has -- all of those trees have a compensatory value of \$16 billion to the citizens of Austin.

>> Pool: Was that if you had to replace them, or just the value of the trees themselves?

>> The services they were providing, if we had to replace those services, then it would be -- it's a 16 billion-dollar value.

>> Pool: Wow. Thank you. And then I just have one more question. The environmental integrity index, I'm not sure I know what that is. Are you able to explain that? That's number 4.

>> I don't know if I can explain it in detail, but it is published annually in the state of the environment report. The new one just came out, so you should all have copies of that.

>> Pool: Okay.

>> It's one of the sections in the report. But I'm afraid I don't have enough technical knowledge about exactly what's contained in the index. I'm sure we can have a presentation on it if your interested because that is fascinating.

>> Pool: Okay. That would be great. We can talk about that for the future. I'm looking at the be it resolved it says here on this draft resolution that you brought. I think you were working with the law department on --

>> Yes.

>> Pool: -- Having it written poem. It basically says: Pursuant to the goals and aspirations of imagine Austin and the priority principle to integrate nature in the city, the council declares its support for the principles of the biophilic cities network and commits to promoting, learning about and collaborating with other participating municipalities, institutions, and organizations to support urban biodiversity and to create opportunities for all city residents to connect with nature. And then it directs the city manager -- it authorizes the city manager to secure the member in the biophilic cities network. This tracks also I think nicely with the presentation we had last month on the children in nature network, and I think there was mention of that in your

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presentation.

>> Yes.

>> Pool: And the good work that Hayden Brooks and his folks are doing. And we have the national league cities grant on that as well. So this is really very nice -- very nice work, and it kind of brings together and touches on a lot of topics that matter to folks in Austin, kids in nature, and being able to play outside in natural landscapes and really connecting is really important to all of us. So, mayor pro tem, did I hear you say that you were interested in --

>> [Off mic]

>> Pool: Okay. Is there a motion?

>> I'd rather not make a motion and second but I'll support it.

>> Pool: Okay. All right. I'll be happy to second that as well. And is there any other conversation then? Okay. All those in favor? And that is unanimous. So we will send this with a unanimous recommendation to council for adoption, for formal action by the full council. Thank you for being here.

>> Thank you very much for your support.

>> Pool: You bet. This is pretty exciting and I'd like to stay current on, if we decide to do this I think it would be a nice element to follow and expand our portfolio of the work that we do in the community.

>> If I could just add -- I just want to add for the record, my hesitation, I know it's a nominal cost, but there's so many pressing, pressing, issues in my district, and so that's -- that's my hesitation for adding additional cost of city spending. But I also understand the effects of having this kind of -- you know, having nature in neighborhoods and that kind of thing, so I just wanted to explain my hesitation.

>> Pool: And it may actually be some help. I see one of the whereases talks about greening neighborhoods through planning has been shown to reduce crime, strengthen

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community connections, and reduce walkability. That really is what we're talking about with our codenext efforts and just trying to have the most livable, walkable, and high quality of life in our community. So, again, thank you so much. It also talks about reducing stress, so that would also be helpful to all of us. And I think we are -- we're done for the afternoon. Thanks, everybody, for hanging out with us today. And I think our next meeting is going to be at the very end of June. I think it's on June 30th - the 29th, okay, which is the fifth Wednesday of the month. We've pushed it back so that we could accommodate, I think, a budget -- a budget meeting is on the 22nd. All right. Thanks, everybody.