BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE — LS-359

IN THE MATTER OF THE APPLICATION OF TUCSON ELECTRIC POWER COMPANY, IN CONFORMANCE WITH THE REQUIREMENTS OF A.R.S. § 40-360, ET SEQ., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE MIDTOWN RELIABILITY PROJECT, WHICH INCLUDES THE CONSTRUCTION OF A NEW 138 KV TRANSMISSION LINE ORIGINATING AT THE EXISTING DEMOSS-PETRIE SUBSTATION (SECTION 35, TOWNSHIP 13 SOUTH, RANGE 13 EAST), WITH AN INTERCONNECTION AT THE PLANNED VINE SUBSTATION (SECTION 06, TOWNSHIP 14 SOUTH, RANGE 14 EAST), AND TERMINATING AT THE EXISTING KINO SUBSTATION (SECTION 30, TOWNSHIP 14 SOUTH, RANGE 14 EAST), EACH LOCATED WITHIN THE CITY OF TUCSON, PIMA COUNTY, ARIZONA.	DOCKET NO. L-00000C-24-0118-00232 LS CASE NO. 232 EVIDENTIARY HEARING

At: Tucson, Arizona

Date: July 15, 2024

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REPORTER'S TRANSCRIPT OF PROCEEDINGS

VOLUME VI
(Pages 1047 through 1324)

GLENNIE REPORTING SERVICES, LLC
Court Reporting, Video & Videoconferencing
1555 East Orangewood Avenue, Phoenix, AZ 85020
602.266.6535 admin@glennie-reporting.com

By: Jennifer Honn, RPR
Arizona CR No. 50558

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BE IT REMEMBERED that the above-entitled and numbered matter came on regularly to be heard before the Arizona Power Plant and Transmission Line Siting Committee at Tucson Reid Park Doubletree, 445 South Alvernon Way, Tucson, Arizona, commencing at 9:05 a.m. on July 15, 2024.

BEFORE: ADAM STAFFORD, Chairman

GABRIELA S. MERCER, Arizona Corporation Commission
LEONARD DRAGO, Department of Environmental Quality
NICOLE HILL, Governor's Office of Energy Policy
R. DAVID KRYDER, Agricultural Interests
SCOTT SOMERS, Incorporated Cities and Towns (via videoconference)
MARGARET "TOBY" LITTLE, PE, General Public (via videoconference)
DAVE RICHINS, General Public
JOHN GOLD, General Public

APPEARANCES:

For the Applicant:

Meghan H. Grabel, Esq.
Elias Ancharski, Esq.
OSBORN MALEDON
2929 North Central Avenue
21st Floor
Phoenix, Arizona 85012

and

Megan Hill
Tucson Electric Power Company
88 East Broadway, MS HQE910
P.O. Box 711
Tucson, Arizona 85702

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APPEARANCES: (continued)

For Banner University Medical Center and Banner Health:

Michelle De Blasi, Esq.
LAW OFFICE OF MICHELLE DE BLASI, PLLC
7702 East Doubletree Ranch Road
Suite 300
Scottsdale, Arizona 85258

For City of Tucson:

Roi L. Lusk, Esq.
Principal Assistant City Attorney
Jennifer J. Stash, Esq.
Senior Assistant City Attorney
P.O. Box 27210
Tucson, Arizona 85726

For Underground Arizona:

Daniel Dempsey, Director
737 East 9th Street
Tucson, Arizona 85719

CHMN STAFFORD: All right. Let's go back on the record.

Now's the time for the continuation of the hearing for Line Siting Case 232.

I believe we left off on Friday, Ms. Grabel, you had Mr. Jocham. Am I pronouncing that correctly.

MR. JOCHAM: Yes.

CHMN STAFFORD: All right. He was in the middle of his direct still?

MS. GRABEL: That is true, Mr. Chairman. However, I think what we'd like to do is start with the cost comparison that the Committee asked for. I think that will be most efficient. And then we'll turn back to Mr. Jocham to complete out his testimony.

CHMN STAFFORD: Okay. Thank you.

MS. GRABEL: Sure.

So do you have in front of you -- have you handed it out yet? Okay.

We are actually going to bring Mr. Bryner back on the stand, so he's going to join this undergrounding panel.

You can't get out of the panel there, Mr. Bryner.

CHMN STAFFORD: And you're still under

oath.

And this is from -- you're looking at TEP-16?

MS. GRABEL: No. We are now looking at TEP-31. This is a new exhibit that was prepared over the weekend in response to this Committee's request on Friday.

CHMN STAFFORD: Thank you.

MS. GRABEL: And I'm going to ask Mr. Bryner to run through it.

But just to give you a little bit of overview, these are the two routes that the Committee inquired about on Friday. So this is our preferred route B-4 and the route that runs down Campbell, D-1. And it shows a total project to total project comparison.

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JASON JOCHAM and LARRY ROBINSON (Cont.),
called as witnesses as a panel on behalf of Applicant, having been previously affirmed or sworn by the Chairman to speak the truth and nothing but the truth, were examined and testified as follows:

CLARK BRYNER (recalled),
called as a witness, joined the panel on behalf of Applicant, having been previously affirmed or sworn by the Chairman to speak the truth and nothing but the truth, was examined and testified as follows:

DIRECT EXAMINATION (cont.)

BY MS. GRABEL:

Q. So, Mr. Bryner, if you'd please kind of walk the Committee through the various columns and give an overview of what is included in each number in each column.

A. (Mr. Bryner) Sure. I'd be happy to.

So on this table, there are three main total project costs, all developed with different assumptions. But there's two columns before that. One is just your route alternative. And the route alternative is -- well, this is just a subset we have in this same exhibit. We have every route alternative. These are the ones that we

heard from the Committee that you are most interested in hearing from. But, in addition, we felt like you may have questions on the other routes, so we developed these costs for all of the route alternative segments.

So you've got that. You've got the total length of that alternative segment. And then you've got the three project costs.

Let me just talk about those real quick.

So the first column, "Total Cost As Proposed." So that's the project that we have in our application that we've proposed. "100 Percent Overhead For the Transmission." And those costs in there are inclusive of right-of-way, of engineering, purchase of materials and construction, as well as the addition -- and this is something that you may not always see -- as well as the addition of the underground cost to place that lower voltage distribution underground. And so it's -- it may be little more inflated for what you'd typically see for just transmission line of this voltage.

The fourth column, "Total Cost Undergrounding Gateway Corridor." That makes the assumption that there would be a requirement to place the transmission line underground anywhere -- anywhere where we parallel a Gateway Corridor Zone.

So you can see for Route B it's the same cost as

the total as our proposal. That's because Route B does not parallel a Gateway Corridor Zone, whereas Route D you do parallel a Gateway Corridor Zone for about half a mile from Grant Road down to Ring Road. And so you can see the added project cost.

Route 1, a lot of that route is located within a Gateway Corridor Zone, so you can see the reflected increase in the project cost.

And then Route 4, it's also not located within a Gateway Corridor Zone, so it's the same as your proposal.

Now, the last column over there, "Total Cost Undergrounding Gateway Corridor and University Area Plan," now that makes the assumption that there would be a requirement to place the transmission line underground both within a Gateway Corridor and anywhere it's within the University Area Plan area. And so for that one you do see increased costs for Routes B and Routes 4 but also for Routes D and 1 because now they'd go through the University Area Plan in areas outside of the Gateway Corridor.

Again, for all three of these costs, those reflect right-of-way, engineering, procurement or purchase of materials, and construction costs. And as applicable, those costs to place the lower voltage distribution underground.

So it should be an apples-to-apples comparison from one route to another to another.

Q. So, Mr. Bryner, just to clarify, in the areas where you assume here, so that's the total cost undergrounding Gateway Corridor and total cost undergrounding Gateway Corridor and University Area Plan, to underground the transmission line, do you also include the cost of undergrounding a distribution line?

A. (Mr. Bryner) Yeah. Yes. So we do as applicable in those areas where we would still do the underground distribution.

Q. So that is only where you're building the aboveground transmission; correct?

A. (Mr. Bryner) That is correct.

Q. So in the areas where you're actually going to be undergrounding transmission, would you also be undergrounding the distribution in those areas?

A. (Mr. Bryner) No, we would not be.

Q. Okay. Why not?

A. (Mr. Bryner) So as you heard Mr. Jocham testify last week, when you place -- well, placing the transmission line underground that creates heat that needs to dissipate. And when you place the distribution line underground, that also creates heat. And so you have this mutual heat creation that now needs to be

dissipated, and it lowers the rating of the line.

Q. Okay. Thank you.

And if I call your attention, please, to the asterisk on the route alternative where you say that, "The analysis contained in the slide assumes that the City of Tucson will grant a special exception for building overhead," can you elaborate a little bit more on that?

A. (Mr. Bryner) Yeah. So for Route 4 -- if you'll recall from the nightmare we went through last week explaining these routes in detail, where Route 4 crosses -- it's on Euclid crossing Broadway, so that's kind of Broadway is a Gateway Corridor, and Broadway is also the boundary between the University Area Plan.

And so we would need to -- so since Route 4 would have a perpendicular crossing of Broadway -- Broadway, we would need to get a special exception of the Gateway Corridor for that.

Within those special exception provisions, it has some language with respect to being in compliance with any specific area plans. And so we made the assumption that we would be able to get that special exception even though it also overlaps the University Area Plan.

Q. And so, Mr. Bryner, if the City of Tucson

refused to allow you a special exception because it could not make a finding that we were consistent with the University Area Plan, is it possible that the City of Tucson would require undergrounding in the preferred route?

A. (Mr. Bryner) It's possible.

Q. Would that increase the cost in that fourth column, "Total Cost Undergrounding Gateway Corridor" as to Route 4?

A. (Mr. Bryner) Yes. It would.

Q. Okay. Thank you.

And real quickly, how does the cost displayed on TEP-31 -- so what the Committee's looking at today -- compare to the cost calculation in the S & L report, which is TEP-17?

A. (Mr. Bryner) So these are going to be a little bit different numbers because the S & L report was a subset of these. So it took -- if you look at the "Total Cost As Proposed" column right there, so I kind of mentioned three different categories of numbers, right-of-way costs, engineering procurement and construction costs, and then the underground of the lower voltage distribution costs, and these are all reflected in our application TEP-1.

But it took those engineering, procurement, and

construction costs only, which come out to be a little over a million dollars per mile -- I think around 1.1, 1.2 million dollars per mile, generally there's a little variability between route -- and compared those with the same engineering, procurement, and construction, but in an underground scenario. So it was apples-to-apples but only a subset of the costs you see as the total project costs.

Q. And so the 14 to 22 percent multiplier that we identified in S & L report was comparing an entirely undergrounded segment with the same distance of an entirely aboveground segment; is that correct?

A. (Mr. Bryner) Yes. That's correct.

Q. And the costs identified on this screen have less of a multiplier because it's kind of a hybrid of the two. We got some of the cheaper aboveground and some of the more expensive belowground; correct?

A. (Mr. Bryner) Yes.

Q. Okay. Thank you.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Just so I have this clear in my mind, Ms. Grabel and Mr. Jocham, as I'm adding the numbers together, I'm getting roughly $86 million for B-4 and $80 million for D-1; is that correct?

I mean, you didn't do the math so I did it.

CHMN STAFFORD: In looking at the total cost of underground in the corridor and the University Area Plan?

MEMBER GOLD: Yeah.

CHMN STAFFORD: Far right column? Okay.

MEMBER GOLD: So roughly those are the numbers. It's $6 million less to go D-1 as opposed to $6 million more to go B-4.

If you go D-1, you're putting transmission lines but not distribution lines on Campbell Avenue; is that correct?

MR. BRYNER: Yes.

MEMBER GOLD: The distribution lines on Campbell Avenue will remain aboveground just like the transmission lines; is that correct?

MR. BRYNER: Yes.

MEMBER GOLD: But the distribution lines in B-4 will now be underground because you're not running transmission lines there?

MR. BRYNER: I'm not sure that I'm following.

MEMBER GOLD: Okay.

MR. BRYNER: Okay. For the $85 million scenario?

MEMBER GOLD: Well, the -- yes. Let's take a look at the Campbell route and call that the expensive route in a commercial area just for layman's terms. We're putting for all intents and purposes giant telephone poles on Campbell Avenue where there are already telephone poles.

Then you're hooking on Grant Road to DeMoss Petrie, and you're putting giant telephone poles there again where there were already telephone poles.

But if you use this route as opposed to B and 4, you're bypassing almost all the residential areas.

MR. BRYNER: That's correct.

MEMBER GOLD: So the residential areas would see visual improvement in their areas if we go with the Campbell route as opposed to if we go with the preferred route through the residential areas --

MR. BRYNER: So if we --

MEMBER GOLD: -- is that correct?

MR. BRYNER: Sorry. Excuse me.

So if we were on -- if we were on D-1 and we were undergrounding the transmission line or overheading --

MEMBER GOLD: Overheading. I'm talking about overhead.

MR. BRYNER: -- the transmission, okay,

then B-4 within those residential areas, they would see no change from the current state.

The distribution lines going through B-4 today, those are dependent on -- the undergrounding of those distribution lines is dependent on us going down B-4.

MEMBER GOLD: So they would lose 45-foot lines, but they would gain 75-foot lines roughly spaced farther apart?

MR. BRYNER: In places where there are -- where there's distribution or the 46.

Now, the one caveat to that would be the 46kV lines, those go away regardless of the scenario.

CHMN STAFFORD: Within 10 years, though; right?

MR. BRYNER: Within -- yeah, within 10 years.

MEMBER GOLD: But they would go away along Euclid Avenue and Park Avenue, in that area?

The residential areas, they would go away?

MR. BRYNER: There is some 46 on Euclid that -- or that it crosses Euclid that would go away. The lines on Park and on Euclid are primarily those distribution lines that would be placed underground if we went down those routes.

MEMBER GOLD: Okay. But assuming we don't go down those routes nothing changes in those areas?

MR. BRYNER: That's correct.

MEMBER GOLD: Gotcha. Thank you.

MEMBER LITTLE: Mr. Chairman.

CHMN STAFFORD: Yes, Member Little.

MEMBER LITTLE: I apologize, but would it be possible for the applicant to send copies of the new exhibits to Tod so that I can pull them up on a different computer or print them out so that -- because when remotely as soon as it goes off the screen, I don't have reference to it. It would be very helpful to me.

MS. GRABEL: Absolutely, Member Little. We're doing that right now.

CHMN STAFFORD: And Member Somers too as well. He's also remote. So I'm sure he'd like to see these.

MS. GRABEL: We'll just send them to Tod.

CHMN STAFFORD: Okay. Perfect.

MEMBER LITTLE: Thank you.

MS. GRABEL: Certainly.

MEMBER SOMERS: Yes. Thank you.

MS. GRABEL: All right. Thank you.

BY MS. GRABEL:

Q. Mr. Bryner, I think you mentioned that there are

certain special exceptions we might need to apply for if we were required to underground in a Gateway Corridor; is that correct?

A. (Mr. Bryner) Yes.

Q. And with respect to the University Area Plan is it the company's position that the language in the University Area Plan does not require us to go belowground?

A. (Mr. Bryner) That would be the company's position, yes.

Q. Is the company's position that it would only -- that the University Area Plan would only require undergrounding if it was incorporated into some perhaps zoning decision by the City of Tucson?

A. (Mr. Bryner) Yes.

Q. Zoning change decision?

A. (Mr. Bryner) Yes.

Q. Does the company believe it needs to undergo any zoning change in order to build the preferred route in this case?

A. (Mr. Bryner) No.

Q. Or any of the routes in this case?

A. (Mr. Bryner) No.

Q. Okay. Thank you. That's all I have on that.

MS. GRABEL: If the Committee doesn't have

any further questions on the cost comparisons, I think --

MEMBER GOLD: Mr. Chairman, I have one more question.

MS. GRABEL: Certainly.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Just to make sure I'm reading this correctly, the total cost to underground in Gateway Corridor is putting the transmission lines underground; is that correct?

MR. BRYNER: When in the Gateway Corridor?

MEMBER GOLD: Yes.

MR. BRYNER: So it's kind of a hybrid of overhead and underground.

MEMBER GOLD: But the cost as proposed is all overhead?

MR. BRYNER: Yes.

MEMBER GOLD: Thank you.

CHMN STAFFORD: Ms. Grabel.

MS. GRABEL: Okay. Thank you.

I guess we'll turn back to Mr. Jocham.

If we could put TEP-16 back on the screen. That was the underground analysis presentation. Thank you.

BY MS. GRABEL:

Q. Now, Mr. Jocham, I think we left off talking

about reliability.

And if there's anything you'd like to pick up talking about on that slide, that would be helpful.

A. (Mr. Jocham) Yeah.

Q. Are you not able to advance?

A. (Mr. Jocham) Hey, Grace, this won't advance. There it goes. Thank you.

Okay. I think we touched on everything in regards to maintenance and reliability, but there was one thing that I do think we kind of breezed over in an effort to get to that maintenance and reliability.

So just to retouch on the report that was written as Mr. Bryner mentioned, this is a cost estimate that is apples-to-apples for engineering, procuring, and constructing a pure overhead line to a pure underground line.

It was looked at in three different areas, mainly three different scenarios, a major arterial such as Campbell, and then we were looking at two more residential streets as an apples-to-apples comparison to determine a dollar-per-mile impact.

Generally from that cost estimate and going out to the vendors we -- just a few things to point out. So we did go out and receive major quotes on this project, mainly the cable.

So the cable for this underground project was quoted at 54 times greater than what an overhead cable would cost, and that's at $243 a foot mainly driven by the price of copper. So we did identify what that price of copper was as a part of this quote, and the cable cost is contingent on that price of copper changing, which is extremely volatile right now, in all honesty. So it could go down, it could go up, but that's what the quote was based off of the time that we did receive it.

And just as another point of reference, that actual quote is -- for the cable itself is 6.5 times great than the whole construction of the overhead transmission. And, again, that is just engineering, procuring, and constructing the line. That does not include anything such as real estate, right-of-way, et cetera.

In addition to that, we did use quotes from similar-type projects in this region, including traffic control, equipment cable testing, and mobilization costs as a part of this cost estimate. So just a few things that we didn't get to touch on on Friday that I wanted to make clear.

And I think that finishes out the presentation, Meghan.

Q. All right. Thank you very much, Mr. Jocham.

Before we move on to -- I want to have you put on the record a little bit of a discussion about the Underground Arizona website and the allegations made on that website.

But before turning to that, I think it might be helpful to summarize the difference in constructing a transmission line belowground and constructing a distribution line belowground.

And so if you and Mr. Robinson could please give that for the Committee, that would be helpful.

A. (Mr. Jocham) Sure.

Generally, transmission line installation underground we utilize special bonding methods to help reduce the circulating current on the conductor, which helps the ampacity rating.

That's mainly because transmission lines are point A to point B. And so we use the concentric neutral on the transmission line cable to allow the voltage to build up a little bit, and which helps the ampacity, helps the circulating current, and allows the conductor, the cable itself, to operate a little more efficiently.

And because of that, we install a separate what is called a ground continuity conductor, which acts as your grounding conductor. So if a fault was to occur, that would be your operating mechanism to help that fault

to ground.

So that differs from distribution just from an operational perspective, whereas a distribution system is multipoint bonded, so basically every time you splice a conductor or every time you run into a vault you ground with that concentric neutral, so that concentric neutral is not -- or the GCC on a distribution system is not present.

Transmission is installed in a concrete duct bank with multiple conduits, a single cable to conduit. We also install communications in that duct bank. As I mentioned prior in my testimony, you also install a distributed temperature sensing system or DTS system to help monitor and operate the transmission line. Distribution does not have that.

And then -- and then obviously the GCC.

So there's multiple other conduits which are typically not installed on distribution.

So a much bigger system as a whole.

And I can let Larry touch on other aspects of distribution that may be different from -- from an underground transmission perspective.

A. (Mr. Robinson) Sure. For a few things that I just want to confirm, though.

Installing transmission underground is not

impossible. It is possible for us. We want to acknowledge that as a power company. It's just not as simple and as easy as it's kind of been portrayed already here in this hearing and I'm sure will continue to be portrayed going in the future.

It's very difficult. The impacts to the community are high. You know, there's a lot of road closures and things like that. The maintenance and the requirements for maintenance are significantly different than overhead transmission lines.

And I just want to also confirm that from our perspective, this underground is not required from a safety or reliability of the transmission system. It doesn't do anything for us from that perspective.

I also want to talk about from a distribution perspective, we do have a significant amount of our system underground distribution, and we regularly install underground distribution. The tools, they're off the shelf. They are -- the supply chain is much better for distribution. The equipment that's necessary to install it, to maintain it, to troubleshoot it is -- is available.

And I just want to also acknowledge and confirm that TEP does not have the skill sets or the manpower or the tools to troubleshoot, install, or maintain 138

transmission voltage.

So those were a few things that I wanted to add to that.

Q. Thank you, Mr. Robinson.

And does an underground distribution facility require a trench?

A. (Mr. Robinson) It does.

Q. Does it require the same type of infrastructure that a transmission trench requires?

A. (Mr. Robinson) No. It's much smaller.

Fewer conduits, lower operating temperatures, and easier to pull maintenance on.

Q. Thank you.

Going back to you, Mr. Jocham, unless the Committee has any follow-up on that.

MEMBER GOLD: I have one more follow-up question.

MS. GRABEL: Certainly.

MEMBER GOLD: When I do the math, I see the costs for undergrounding is about between 80 and $86 million depending on which route you choose.

If you do overhead with just undergrounding the distribution lines, it's between 20 and $22 million.

That's a difference of four times, not 10 times.

Why do you have 10 times up there?

MS. GRABEL: Mr. Jocham, do you want to address that question?

MR. JOCHAM: Yeah. So in this particular scenario or the TEP-31 that was shared, the $86 million is a hybrid scenario. That is not entirely underground. There's still underground -- overhead transmission that is part of that number.

MEMBER GOLD: Yeah. But I'm looking at your number just while you're saying that, and for the D area the difference between total cost to underground is 22 million and total cost underground and everything else is 26 million. That's a small difference. So the majority of the cost in your Gateway Corridor is undergrounding.

MR. JOCHAM: So the total cost is undergrounding in the Gateway Corridor and the University Area Plan. So where the alignment is not within those, it is still overhead. And so that number is a hybrid number. It's not explicitly underground.

And then in addition, the number that is in the total cost as proposed includes the undergrounding of distribution, which inflates that number. Whereas the total cost to underground in Gateway Corridor and University Area Plan where the transmission line is

underground, that distribution line is no longer undergrounded. That cost is removed.

MEMBER GOLD: So it's actually three times as much for just the D portion route to go underground?

MR. JOCHAM: For the project, yes.

MEMBER GOLD: For the project and --

MR. JOCHAM: Just transmission to just transmission, so just overhead transmission to just underground transmission. And just engineering, procuring, construct is where that 10, 14 to 22 number comes from.

MEMBER GOLD: Understood.

So in the D portion it's three times higher, in the 1 portion, it's five times higher.

But what we're not showing here is the massive disruption to the community, to the area by doing this underground.

MR. JOCHAM: Correct.

MS. GRABEL: Member Gold, I think it might be helpful if we looked at a map, because I think your question will be answered to see exactly how much it's aboveground versus underground. It's a very small amount that's underground that's resulting in that three times because most of Route D is an aboveground transmission construction.

So if you see the DeMoss Petrie to Vine on Route D is green, the vast majority of that running from DeMoss Petrie to Vine does not go through a Gateway Corridor, does got go through University Area Plan, so it is allowed to stay aboveground. So that's the lower cost of an overhead transmission line.

It's that smaller portion going from down Vine into the Vine Substation that -- no?

CHMN STAFFORD: It's down Campbell.

MS. GRABEL: Oh, that's on D. Thank you.

Going down Campbell and then into the Vine Substation, that smaller amount would be required to be undergrounded under the University Area Plan and the Gateway Corridor, and that smaller undergrounded portion is what results in the three times cost multiplier.

MEMBER GOLD: But then going down Campbell Avenue to Kino, how much of that is underground?

MS. GRABEL: That is Route 1. And so that's --

MEMBER GOLD: Yeah. That's the one I'm talking about.

MS. GRABEL: All of that would be undergrounded.

MEMBER GOLD: Exactly the point I'm making.

MR. ROBINSON: That's not correct.

MS. GRABEL: Oh, sorry. Go ahead and correct me.

MR. ROBINSON: So on Route 1 underground the underground portion is -- there's two options, right? There's the overall area plan option that has this section underground and then underground to right here where Route 1 breaks away from Kino Parkway and Campbell.

From Campbell south to Kino is overhead -- is an overhead route. So that is not all -- that is not all underground. This is all aboveground. So about 50 percent of that route is aboveground.

MEMBER GOLD: Mr. Robinson, thank you.

My next follow-up question is on Campbell Avenue from roughly the Arroyo Chico Wash north to the Vine Substation --

MR. ROBINSON: That's correct.

MEMBER GOLD: -- to do that underground would require a tremendous disruption in all commercial activity, traveling, and everything else blocking streets.

How long would that take to construct it, that area underground in your estimation?

MR. ROBINSON: So Mr. Jocham talked a little bit about the difference in time perspective.

We think that that construction of that

route would take us about a year, year and a half to get done.

And conversely overhead it would take us about four months.

MEMBER GOLD: And if you were to start that project -- let's assume somebody says, yes, go ahead, do it underground -- when would it start, your opinion?

This is July 2024; we have a suspense date of 2027 to complete the project.

How long until you start and then a year from that?

When do you estimate you could begin?

MR. ROBINSON: For the detailed design and all of that -- and this is just an off the top of my head, Member Gold.

MEMBER GOLD: I won't hold you to it.

MR. ROBINSON: I'm going to say that it's going to take us probably 18 months to go through a detailed design from the time that we're given a route corridor before we can place the material order. So then another six months to nine months of supply chain, and then we start.

So really two years from now we would start construction and finish three and a half years from now.

MEMBER GOLD: So three and a half years

from now.

And now this is a question to Mr. Chairman.

How long politically would it take for them to get approval to do an underground route?

What is your estimation?

CHMN STAFFORD: Oh, I couldn't begin to speculate. I can just tell you the process how it comes from the Committee to the Commission. Once the Committee issues its decision, the Commission has to act on it not any earlier than 30 days but no later than 60 days.

And then, of course, I guess, the parties would -- they have 20-day window to request a rehearing.

And then if that's denied, they have 30 days to file an appeal in Superior Court.

But, I mean, I don't think the utility can wait for those to shake out. They need to get something from the Commission and start construction one way or another to get this project online by 2027 so they can maintain their reliability.

They've shown us clearly that this whole system is at maximum capacity. They need this upgrade to be able to reliably provide service. I guess in the meantime if they don't get the transmission line, they have to keep putting band-aids on their distribution system, the 40 -- is it 46 or 48?

MR. JOCHAM: 46.

CHMN STAFFORD: -- 46kV system to just keep the lights on and more importantly the ACs on.

So, you know, I think a decision has to be made and they have to execute on it because they have to get -- they need to know what they're doing because based on the time line he's say that they're not going to have it in service until probably 2028 based on the number -- the time frame I'm hearing.

MR. ROBINSON: That's an accurate estimate.

CHMN STAFFORD: Okay. So then you'd have -- they'd have to be -- at the same they're doing this -- they have to put more band-aids on the 46kV system.

MEMBER GOLD: And if I understand this correctly, '28 is a good estimate. I would bet '29 or '30.

And the reason I'm concerned is last night with this storm we had, again, this is the first time I've ever lost power for more than 45 minutes. So we had no power in an entire area of Tucson that I was in and I don't know how many others from six o'clock at night until four o'clock in the morning. And this is only going to get worse because everybody's anticipating the weather's going to get worse.

But it looks to me -- and I'm just giving you an opinion -- you know, I know we're going to vote on this later, but my opinion is this undergrounding is untenable. It doesn't reach a suspense date which could cost people's lives, not to mention the ridiculous expense and disruption to the community.

That's just my opinion, Mr. Chairman.

MEMBER RICHINS: Mr. Chairman.

CHMN STAFFORD: Member Richins.

MEMBER RICHINS: A few minutes ago, I just want to confirm, did you guys testify that undergrounding in this instance is not necessary for grid reliability or resilience; is that correct?

MR. ROBINSON: Safety and grid reliability. So what I was testifying to is we don't have to put it underground to make it safe and reliable. The overhead project, this project overhead, will meet all of our safety and reliability aspects or requests.

MEMBER RICHINS: Is it true that underground power lines are more resilient to weather extreme events?

This is -- the literature I've been reading has been indicating that.

Do you guys find that to be true as well that underground infrastructure could be more resilient?

MS. GRABEL: Mr. Jocham, why don't you address that question.

MR. JOCHAM: In hurricane-prone situations, you know, the southeast, you're seeing utilities underground distribution. Because those are much smaller poles, they are not designed to the resiliency that transmission-level voltages are designed to. So a lot of literature that you will read is undergrounding medium to low voltage circuits.

MEMBER RICHINS: So 2021 there was a report released by the feds talking about that issue, and it wasn't limited to the southeast. It was the northeast where you have the ice storms, the Midwest where you have bomb cyclones that you're seeing this trend for grid resilience.

The reason I'm asking about this is because Mr. Gold just complained about losing power for 10 hours, and that's an overhead distribution system that he lost power through.

So and then in the next sentence we talked about now we've lost -- you know, if you want resilience, I mean, you can't have both. I just --

MEMBER GOLD: I wouldn't say that.

CHMN STAFFORD: One at a time. One at a time.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Wait. Wait.

Member Richins has the floor.

MEMBER RICHINS: So what I'm getting at is it in your opinion that undergrounding in this instance is only for aesthetic reasons?

MR. ROBINSON: For this project?

MEMBER RICHINS: Yes.

MR. ROBINSON: Yes. We actually believe that the overhead with a -- the redundant loop feed is more reliable than what potentially the underground with a loop feed would be.

MEMBER RICHINS: Okay. Thank you.

Mr. Bryner, are you still -- are you a part of this panel again?

I'm trying to remember if we --

MR. BRYNER: Yes, I am.

MEMBER RICHINS: Should you do a major undergrounding of the transmission system through one of these routes, and commending the incredible outreach you guys did to get you to this point, would it be safe to say that TEP would have a pretty robust outreach system for businesses and affected residents along that route that would enable them to stay in business and access their properties?

MR. BRYNER: Okay. So let me just make sure I'm understanding right. So you asked me a bit about our outreach, but then you were also asking about the underground?

MEMBER RICHINS: No, not asking about outreach.

MR. BRYNER: Oh, just --

MEMBER RICHINS: In the past outreach at least.

No, in the event that you need to construct a route underground --

MR. BRYNER: Okay.

MEMBER RICHINS: -- the question is do you have in place outreach that will help minimize those impacts to businesses and residents?

I can't manage that you're going to leave them to navigate around a project at -- you know, with no stance.

I mean, I think of the light-rail project that got built in the Phoenix area and that they had specific line sections and citizens committees to help make sure that residents and businesses were able to withstand the impacts.

The question is do you have something similar to that?

MR. BRYNER: Okay. I understand what you're saying now.

So, yes, so we -- regardless overhead, underground we do have mechanisms that we reach out to and notify anyone who'll be affected by any of our construction projects to let them know and to, you know, minimize any of those disturbances. And so, yeah, we would put that in place.

MEMBER RICHINS: And, yeah, and then just kind of closing out the previous, so if we were to avoid -- well, I guess never mind. I'll withdraw that question. Thanks.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Regarding the recent outage that I just made reference to, what caused it?

MR. ROBINSON: You're referencing the storm that occurred last night?

MEMBER GOLD: Yes.

MR. ROBINSON: That was a microburst with very high winds. If you watched -- if you tracked the weather, it crossed the entire valley.

MEMBER GOLD: And what did it break?

MR. ROBINSON: We're still doing damage assessment on that. But right now I believe the pole

counts at 42 poles in multiple -- multiple locations. I want to say around 32,000 customers out of power at its max. Today I think there's 5,000 customers still out of power.

MEMBER GOLD: Of the 42 poles how many were steel?

MR. ROBINSON: I don't know the answer to that question.

MEMBER GOLD: Do you think any of them were steel poles or were they all the old wood poles?

MR. ROBINSON: I don't believe any of them were steel poles, but --

MEMBER GOLD: Okay. That's why I believe your project updating the wood distribution poles with the 4k or the 14k up to the 41k --

MR. ROBINSON: 46kV.

MEMBER GOLD: 46kV would be a massive improvement, improve redundancy, safety and security. Just my opinion.

And I want to thank you for your prompt action.

MR. ROBINSON: Okay. You're welcome.

CHMN STAFFORD: So do you know -- one second.

Do you know if the -- all the 42 poles you

mentioned, those were all part of the distribution system, not the transmission system?

Do you know that?

MR. ROBINSON: They are all part of the subtransmission and distribution system. We did have a couple 46 poles that fell in last night's storm.

CHMN STAFFORD: So none of it was 138kV or higher then?

MR. ROBINSON: That's correct.

It's one of the reasons why we think from a safety and reliability perspective and a loop feed that overhead is -- meets the needs of the community.

MEMBER GOLD: Hear, hear.

CHMN STAFFORD: Okay. Thank you.

I saw a hand down there.

MEMBER LITTLE: Mr. Chairman.

CHMN STAFFORD: Yes, Member Little.

MEMBER LITTLE: Now that Mr. Bryner is on the panel, perhaps I could ask the question that I asked last week, which is I'm wondering to what extent the neighborhood organizations and the public have been made aware of the information that we were given last week about exactly -- not exactly, but generally what is required to put a line underground?

Because, you know, people just blithely

say, well, underground it, underground it. And, you know, the difference between what is required to overhead a transmission line and what is required to underground a transmission line is pretty significant.

In addition, the difference between undergrounding a distribution line and undergrounding a transmission line is pretty significant.

And I'm wondering if some of the neighborhoods might not be a little less anxious to have everything undergrounded if they realized the extent of what is involved.

MR. BRYNER: Yeah, Member Little. I'd be happy to address your question.

So in all of our public outreach that we did -- or, sorry, in all of our public open houses that we did, so the four that we held, we had various stations that folks could go to learn about different aspects of the projects. One of those stations was a comparison of overhead to underground. So we had some basics of the differences between the two, and we had an engineer there to speak to it.

Again, from a TEP company perspective, we don't have the experience on undergrounding transmission, so we didn't have somebody like Mr. Jocham was not there to answer their questions. So we answered them from our

perspective and shared that information. But it was not a focus of our outreach on what we were trying to educate the public on.

MEMBER LITTLE: Okay. Because I thought that might be the case because the things I'm hearing are cost related. Comments are about the differences in cost, not the differences in the actual physical inconvenience.

Thank you.

CHMN STAFFORD: Thank you.

Ms. Grabel.

MS. GRABEL: All right. Thank you. I think if the Committee has no further questions on this subject, we'll turn to Mr. Jocham.

BY MS. GRABEL:

Q. And, Mr. Jocham, have you had the opportunity to review the Underground Arizona website?

A. (Mr. Jocham) I have.

Q. And specifically have you had the opportunity to review the portion of that website devoted to discussing the cost and maintenance of underground transmission facilities?

A. (Mr. Jocham) I have.

Q. Do you have any comments you would like to make on that section?

A. (Mr. Jocham) Yeah. So in regards to costs, a lot of references were made to APS 69kV lines. In this scenario, not really an apples-to-apples comparison. 69kV cables are more standard. They use standard off-the-shelf materials much like distribution, cold term splices, and can be installed by SRP crews, which is just it is a different process overall.

And so from a cost comparison, it's just not quite apples-to-apples to what this is at, you know, two 6,000-kcmil cables per phase. APS was installing a single I think it was 2,500-kcmil conductor, which is a much smaller conductor and can use standard off-the-shelf equipment and materials to install it.

Q. So, Mr. Jocham, let me interrupt you. So you're referring to the portion of the website in which Underground Arizona compares an APS overhead transmission facility cost to an APS underground transmission facility cost; correct?

A. (Mr. Jocham) Correct. At the 69kV level.

Q. And 69kV -- I misspoke -- isn't transmission, it's actually sub transmission; correct?

A. (Mr. Jocham) Correct.

Q. And you said that those were off-the-shelf components?

A. (Mr. Jocham) The majority at 2,500-kcmil

materials and equipment are off the shelf.

Q. Okay. And so that is probably closer to the TEP's undergrounding distribution components; correct?

A. (Mr. Jocham) It's right in the middle. Yeah. I mean, equipment types, yes.

Cold term splices -- or cold terminations are very similar to distribution. But it would still be put into a duct bank with multiple conduits, so it's kind of -- it's a middle ground.

Q. Thank you. And that project Underground Arizona website referred to, that's an old project, isn't it?

A. (Mr. Jocham) So the 69 he -- the website did reference multiple projects. Some of them being newer, some of them being older.

Q. And how old in some cases?

A. (Mr. Jocham) Going back to the early 2000s. That's -- there were a few, I believe.

Q. And have costs increased over the past twenty-something years?

A. (Mr. Jocham) Yeah, definitely within the last five copper prices have substantially increased.

Q. Do you recall the discussion in the Underground Arizona website of reconductoring a 40-year-old project?

A. (Mr. Jocham) Yeah. There was reference made to an active APS project undergrounding -- or a conductor

replacement on an oil-filled pipe underground transmission line, which is, I believe, APS's central Phoenix project, which runs generally in the Midtown downtown region.

But that project in particular is just a conductor replacement. The pipes are already in the ground. They've been in the ground for 40 years. They're replacing the conductor to ensure reliability of that conductor. It's a standard maintenance for that type of project.

Oil-filled pipe, high fluid-pressure filled pipes are not what's being proposed on this project. This is an XLPE cable, so no -- no fluids at all. That particular project and system has pump stations located, and it pumps oil through to keep the conductor cool and insulate the conductor. So that definitely is not an apples-to-apples comparison with this project.

Q. Thank you, Mr. Jocham.

And that example you just gave with the 40-year lifespan, is that consistent with the literature you've read about the lifespan of underground transmission facilities?

A. (Mr. Jocham) That's similar to the lifespan of an XLPE cable. As I mentioned in my previous testimony, EPRI, which is a nonprofit for the advancement of the

electrical industry, recommend -- or identifies a life expectancy of XLPE cable to be approximately 40 years.

Q. All right. Thank you.

And I believe the Underground Arizona website also has an analysis of the recent Salt River Project HIP line; is that correct?

A. (Mr. Jocham) Yeah, the HIP project, which is the Intel project.

Yeah, that -- the 1.5 cost difference between overhead and underground there can maybe be a little confusing.

The math on the website identifies the $17 million difference identified by the City of Chandler, but that $17 million is the difference between overhead and underground, not the total cost of underground.

And then it was divided by the total cost of overhead, which is inclusive of right-of-way, so definitely just wasn't apples-to-apples.

In addition to that, the APS line at 4 point, I think, $3 million a mile, which was part of your -- part of the CEC filing, that was a double circuit 230kV line with double circuit 69kV underbuild. It was a substantial structure and a substantial alignment. Quad circuit configuration, not single circuit configuration.

Q. So, Mr. Jocham, just to clarify for the record, the APS line you're talking about now is an aboveground transmission line; correct?

A. (Mr. Jocham) Correct. That was --

Q. So the analysis was comparing the SRP HIP project underground to an APS overhead line; correct?

A. (Mr. Jocham) Correct.

Q. And the APS line was a pretty big line?

A. (Mr. Jocham) Yeah. It was double -- double circuit 230, double circuit 69kV.

Q. Would you say that's substantially different from the 138kV line we're talking about today?

A. (Mr. Jocham) Much different.

You're looking at 140-foot-tall custom poles. Whereas this project is I think we -- it's identified -- Larry has --

A. (Mr. Robinson) Yeah. From 75 to 90. 85 I think is what our standard pole will be. But crossing the Aviation Highway is where we talked about we might need to be as high as 130 feet for those couple spans.

Q. Okay. And we might have already beat this dead horse, but I think that the Underground Arizona website talks about the increased reliability benefits of an underground transmission line compared to an aboveground.

Do you have any additional comments you'd like

to make other than what we've already talked about through Mr. Robinson's testimony earlier?

A. (Mr. Jocham) Yeah. I think we had submitted a filing, it was TEP-27 if I'm not mistaken. It's the national grid document, which identities that there was a study performed in Europe that identifies overhead and underground reliability to be approximately the same while underground always costing more.

Q. Okay. Thank you. No further questions.

MEMBER KRYDER: Mr. Chairman.

CHMN STAFFORD: Yes, Member Kryder.

MEMBER KRYDER: For Mr. Jocham again.

You just mentioned that UK study. In that, as I recall reading it, it showed quite vivid photographs of the size of the trench and pumping stations and so on and so on.

I was wondering is that something that could be expected in this project if it were undergrounded and say as we spoke from the mile and a half from Arroyo Chico up to Vine Station?

MR. JOCHAM: I'll say the national grid document was speaking maybe more in generalities, but they did identify that up to four conductors per phase could be required to meet the same ampacity requirements.

That isn't the case for this project. It

was determined that two cables per phase is sufficient to meet the demands as required by the project.

Installation in Europe is slightly different, but we would be at a more compact trench just purely due to the urban environment. Whereas maybe in a more rural environment you could experience a wider trench to help with some of the mutual heating impacts that underground lines can experience.

MEMBER KRYDER: But the limitations that you spoke about Friday and briefly touched this morning as regard to the amount of time whether it's a trench five feet wide or eight feet wide, five feet deep or 20 feet deep, I'm trying to get -- I'm trying to understand how much time -- if this went up Campbell Avenue, for example, and was undergrounded, the transmission portion of it was undergrounded, we're really talking about a lot of time to have this closed?

MR. JOCHAM: Yeah. Correct.

The project will work linearly, to make sure that we're being as clear as possible. But, yeah, you could expect durations from I think Mr. Robinson said -- identified approximately a year, maybe even further dependent on what you run into.

I think that's the one thing that we don't understand at this point. This is all -- you know, these

are estimates based off of known data, but we don't know what's underground along Campbell Road or any of the other roads for that matter.

I think one of the public did even mention that he worked for the City water group, and he very clearly stated that you guys have no idea what is under these roads, and it's going to be very difficult.

MEMBER KRYDER: Thank you very much for the clarification.

CHMN STAFFORD: Ms. Grabel, does that conclude the direct for this panel?

MS. GRABEL: It does. Yes.

Thank you, Mr. Chairman.

MEMBER MERCER: Mr. Chairman.

CHMN STAFFORD: Yes, Member Mercer.

MEMBER MERCER: I have a question.

So we heard the time frame for undergrounding could take up to three years?

MR. JOCHAM: So that includes engineering in that number. But during the engineering phase, there will be processes where we would need to get out as engineers and do certain aspects to help the engineering process along.

A few of those things would be utility locates. And in the case of underground, we would do a

Grade A utility locate, which means potholing or taking an excavate -- or a VAC truck out and actually excavating utilities, getting depths so that we understand not only where the utilities are located but how deep they are so that the trench can be designed accordingly.

But then we would also have some geotech efforts to understand the capabilities of the soil as well to dissipate the heat.

So just there would be -- the heavy construction period would be between a year and a year and a half as Mr. Robinson testified. But there would be other disturbances and interferences during the design phase as well as we gathered information to support the design.

MEMBER MERCER: So compared to overhead, what's the time frame?

MR. JOCHAM: So overhead, I think we had mentioned about one to two months per mile. And so as a -- Campbell Avenue is kind of what we keep referring back to to discuss, and that's the one to 18-month period that Mr. Robinson identified. That same window would be approximately three to four months to construct overhead.

MS. GRABEL: Maybe put a finer point on it. Mr. Robinson, how long do you think it would take TEP from now until in-service date if we were given the

authority to construct this project aboveground?

MR. ROBINSON: If we built this project aboveground, we could have it in service by early 2027 or mid-2026. It's going to take us about a year to engineer and get the procurement and about six to eight months to build the lines.

MS. GRABEL: All right. Thank you.

MEMBER MERCER: Thank you.

CHMN STAFFORD: As compared with to underground it --

MEMBER MERCER: Three years.

CHMN STAFFORD: -- about twice the time frame?

MR. ROBINSON: Yeah. I think twice the time frame. And, again, it's an estimate sitting on -- considering me sitting here in the room.

CHMN STAFFORD: All right. So they're now available for cross-examination? Yes, Ms. Grabel?

MS. GRABEL: Yes, Mr. Stafford.

CHMN STAFFORD: Ms. De Blasi, you're up.

MS. DE BLASI: Mr. Chairman, Banner does not have questions for this panel.

CHMN STAFFORD: All right. Mr. Lusk.

MR. LUSK: Thank you, Chairman.

Excuse me. I apologize. I was up a little

bit late cutting down some trees. I'm sure people can relate.

CROSS-EXAMINATION

BY MR. LUSK:

Q. I want to nail down the time line that was just discussed just so we can all be clear because it's slightly confusing.

As it relates to just Route 1, Campbell Avenue, as that is in the Gateway Corridor, I've heard the estimate that it's about a hundred feet per day for excavation; is that right?

A. (Mr. Jocham) Correct. That is a typical construction installation.

Q. In the case of undergrounding on Campbell Avenue, would it require more than one crew, I guess, excavating at the same time?

A. (Mr. Jocham) I wouldn't say necessarily required, but it is a possibility that you could have multiple crews working at the same time.

Q. I guess, well, maybe my question should be for Mr. Robinson.

Is that -- would that be contemplated by TEP?

A. (Mr. Robinson) Potentially, yes.

Not -- because of the underground, again, tieing

into the two segments and not working continuously, there's some risks associated with having to reconstruct some areas if they don't align.

But potentially we could have multiple crews.

Q. So and please don't let me pigeonhole. I'm not suggesting you should have two crews.

A. (Mr. Robinson) Yeah.

Q. I'm just trying to figure out are you -- would that be the plan, I guess, to have two crews?

But it sounds like it wouldn't be.

A. (Mr. Robinson) Yeah. So our approach to distribution on the civil side to get the conduit in the ground --

Q. Sure.

A. (Mr. Robinson) -- is not to deploy multiple crews while we're -- while we build that civil underground linearly.

Q. Okay.

A. (Mr. Robinson) So, again, we don't have experience with putting this type of facility underground, and I would assume we would try to apply that same construction practice.

Q. That makes sense.

So then what we're really talking about in terms of closures is a hundred feet per day?

A. (Mr. Jocham) No. That's the excavation. That excavator would then move down the road. While that trench stays open, additional work is being performed in that trench. And so you're looking at a thousand-plus feet of lane closures or road closures during the duration. Because it's a hundred feet a day for the excavator to actually excavate out the trench, but then you're coming behind that excavator putting in trench box, conduits, pouring the concrete, letting the concrete cure, covering the concrete up after it's cured and then re-asphalting the road.

Q. And that would stay open, that thousand feet would stay open or --

A. (Mr. Jocham) It would be --

Q. 24/7?

A. (Mr. Jocham) It would be open. You could cover it with steel plate to allow public assess to businesses and things like that if the contractor was required to do so.

Q. And, Mr. Robinson, I think you're familiar with construction in the City of Tucson.

Would you be required to do so?

A. (Mr. Robinson) We would be required to maintain traffic control over those areas. So even if the trench is covered with steel plates, I don't think we would be

allowed to open up unrestricted traffic flow with no traffic control for long periods of time.

Q. And define "long periods of time."

A. (Mr. Robinson) Multiple months.

Q. Well, we're not talking about multiple months, though, right, because a thousand feet would be excavated and be worked on, and then the next thousand feet would be excavated and worked on, right?

A. (Mr. Jocham) They would work linearly --

Q. Right.

A. (Mr. Jocham) -- down the project path.

And so after that area was re-asphalted and re-striped, then you could reopen that section of road back to the public before the cable was pulled in.

There will be periods of time that you're going to have to reclose down areas again around vaults to do conduit proofing, testing, et cetera.

So it's not that it's -- the traffic control for underground will vary over the life of the project, and it will ebb and flow as the type of work that's being performed.

Q. But what we're not talking about is a year where the entire stretch of the undergrounding on Campbell will be unavailable; correct?

A. (Mr. Jocham) Correct.

Q. And I think you mentioned again the hundred feet per day.

And we're talking about 1.8 mile stretch on Campbell; is that right?

A. (Mr. Jocham) I believe that's the length. Yes, that was estimated.

Q. So in my math -- and I'm a lawyer so my math is not great, but in my math that's about 95 days of excavation, correct, at a hundred feet a day?

You guys are engineers. You should know this.

A. (Mr. Robinson) Yeah, I just didn't run that number, but --

Q. You can see how I got the number, right, by just dividing it?

A. (Mr. Robinson) Yeah. I mean, that -- that also doesn't include anything for relocation of existing conflicts and --

Q. Sure.

A. (Mr. Robinson) -- things like that that would have to occur over the course of the project.

A. (Mr. Jocham) Well, sure. Yeah. And that's open trench, too.

So that doesn't include the cable installation. That doesn't include the proofing. That doesn't include testing and commissioning. I think we estimated

approximately -- if everything went as smooth as possible, the stretch along Campbell in our report I think identifies a nine-month period.

Q. Right. And can you talk about -- so you said proofing, testing, cable. Well, you said the cable pulling happens after, so you -- excavation and all that, right?

A. (Mr. Jocham) You proof -- yeah.

So once the civil work is complete, you will proof the conduits. And what proofing is is you basically pull they call it a pig, but it's basically a metal -- or, excuse me, it's a wood round dowel that they pull through the conduit that's approximately the same inner diameter -- the same diameter as the inner diameter of the conduit to make sure that there are no sharp edges and obstructions within the conduit that can damage the jacket and subsequently damaging the conductor.

Pull that through, that takes a period of time depending on how many conduits you have present in your duct bank. And then at that point you would pull your cables through. You would splice those cables with cables this size. And be it that they're segmented, it would take approximately a day to maybe even a day and a half to splice each cable together.

And then at that point you would test and

energize.

Q. So the proofing, testing, and pulling the cable through, that all occurs after the excavation and --

A. (Mr. Jocham) Correct.

Q. -- laying in the conduit and that sort of thing?

A. (Mr. Jocham) Yeah.

Q. So that happens between the vaults; is that correct?

A. (Mr. Jocham) Yeah.

Q. So that doesn't require any traffic control or anything?

A. (Mr. Jocham) Correct. You would have traffic control limited around the vaults --

Q. The vaults themselves?

A. (Mr. Jocham) -- at that time.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: I don't know if this should be -- who to direct this to, possibly Mr. Lusk.

When you're excavating -- let's take a worst-case scenario. You're excavating Campbell Avenue. And we're looking, I think, Mr. Jocham, at a best-case scenario.

What if you run into water lines?

What if you run into archaeological sites?

What's a worst-case scenario in time?

MR. JOCHAM: Yeah, I don't know how to estimate a worst-case scenario because I'm not entirely sure what you'd run into, but let's see --

MEMBER GOLD: Well, let's say I'm referring to you come across an archaeological site.

MR. JOCHAM: Yeah. If you --

MEMBER GOLD: Second option you come across some water lines --

MR. JOCHAM: Yeah. If you run into --

MEMBER GOLD: -- or gas lines.

MR. JOCHAM: If you run into a cultural site, and that has to be mitigated, that could shut the project down for like -- that continuation of the actual construction of the project could be shut down for months while that cultural resource is mitigated and removed.

That's all dependent on the State and how quickly they can get out there and perform the work.

For things like water lines and gas lines, you would perform utility location prior to mobilizing for construction, which would hopefully mitigate that risk.

But when you do run into areas with dense existing underground infrastructure, it slows the process of construction because you can no longer use a large

bucket excavator to excavate the trench. You're using hand methods to dig around these pipes. Then you're putting in supports holding those pipes in place if you're choosing to route around those pipes.

So things like gravity-fed sewer lines, things like that, you -- as an underground line you would typically -- "you" as the utility would avoid those because changing gravity paths of a sewer line is difficult. Nonetheless, that's a whole different topic.

But it would slow generally. You would have to hand dig, and your -- at that point, the process would slow.

MEMBER GOLD: Thank you.

Mr. Lusk, are you familiar with what's underneath Campbell Avenue?

Have your experts looked and seen what sewer lines we have, what water lines we have, what gas lines we have?

MR. LUSK: Sure.

MEMBER GOLD: Have your experts determined that there were no -- I used to call them archaeological sites, but for the proper terminology you'll know what I'm talking about.

Have you already looked through and made sure we don't run into those crazy issues that could take

this project well beyond the suspense date?

CHMN STAFFORD: Member Gold, that's more of a fact question for Mr. Lusk's witness. He's the lawyer, not the witness for the City.

These are questions that would be better address to his witness because he'll have -- he should have knowledge of that type of thing and not a lawyer.

MEMBER GOLD: So this is the witness my previous questions from the other day are directed at also.

When is Lusk's witness going to appear?

CHMN STAFFORD: Well, let's see. Up next after we finish the cross of this witness, we will have Banner will put on their case, their direct case. After that will be the City of Tucson followed by Underground Arizona.

MS. GRABEL: The only caveat to that, Mr. Chairman, is Mr. Lusk informed me his witness is not available today. So if we wrap up Banner, maybe go to Mr. Dempsey first and then the City.

CHMN STAFFORD: Yes. We're not going to wait. Yes. We'll proceed with whatever witness is available. Yes.

But, yes, that's the order how it's going. And those are kind of like the fact questions that we

need to get from his witness under oath because he's just a lawyer. He's not testifying. He can give you an answer, but it's not under oath.

MEMBER GOLD: You mean he's not an expert?

MR. LUSK: On what's under Campbell, no.

CHMN STAFFORD: Yes.

MR. LUSK: No. Thank you.

CHMN STAFFORD: He may be experts in other areas, but not the subject matter that you're requesting.

All right. Please proceed, Mr Lusk.

Thank you.

MR. LUSK: Thank you, Chairman.

BY MR. LUSK:

Q. And just to be clear, Mr. Jocham, and this can go for Mr. Robinson as well, that would also be a concern for an overhead line, correct, because I believe you're going down five to ten feet?

A. (Mr. Jocham) Not nearly as much with an overhead line. Again, you would do utility locates, but the benefit of an overhead line is you can relocate that very small diameter excavation away from existing underground utilities and existing -- if a cultural site was present, you can avoid it, or it's easier to avoid. I can't say that you could absolutely avoid it, but it would be easier to avoid as an overhead line.

Q. And, Mr. Bryner, I believe you're still on the panel; is that correct?

A. (Mr. Bryner) Yes.

Q. I hate to keep dragging you back in here.

You're familiar with the Gateway Corridor Zone and its requirements; that's correct?

A. (Mr. Bryner) Yes.

Q. And are there exceptions to the Gateway Corridor Zone related to cultural artifacts and archaeological issues?

And if you don't know, that's fine.

A. (Mr. Bryner) I'm not sure. Sorry.

Q. Sure. And I can have my witness testify to that.

But you'd say -- you're saying, Mr. Jocham, that you would have to make some alteration on an overhead line if you ran into those same issues; correct?

A. (Mr. Jocham) Correct.

Q. It could mean going from one side of the street to the other or in a different location on that street?

A. (Mr. Jocham) That's situational. It would vary and depend.

Q. As it would underground as well?

A. (Mr. Jocham) Underground you could relocate or reroute the underground transmission.

It would add a level of complication and -- but, yeah, there's feasibility to routing to the other side of the road theoretically to avoid a cultural impact.

But, again, that -- it would have to go through detailed engineering and not fully -- I can't fully state what the impact would be --

Q. And you --

A. (Mr. Jocham) -- at this stage.

Q. I'm sorry. I didn't mean to cut you off there.

You would also have to do detailed engineering to determine the archaeological nature of poles; correct?

So I would assume you would pothole to make sure that wherever you planned on doing the excavation was appropriate; correct?

A. (Mr. Jocham) I'm not sure of TEP's process on --

Q. Oh, sure. Let me -- let's give Mr. Robinson a shot.

A. (Mr. Robinson) Sure. So during overhead construction, we go through the detailed design, and we put a stake in the ground then and call for Blue Stake, which would hopefully identify any potential underground conflicts.

Q. And for the record, can you just describe what the sort of Blue Stake process is?

A. (Mr. Robinson) The Blue Stake process is nine -- or 8-1-1 call before you dig ticketing -- to have all utilities come and locate their underground facilities.

Once that's done, we go back and reevaluate whether there are any underground facilities that are in conflict with our chosen locations and whether we can resolve that conflict by simply moving the pole a little bit.

Our preferred response to underground conflicts is just to relocate the pole. Oftentimes we can resolve those by sliding a pole three or four feet in any one given direction, sometimes up to 50 feet. But most of the time it's only a few feet that needs to be resolved.

Q. And I assume that's the same process for your underground distribution lines?

A. (Mr. Robinson) Underground distribution lines are a little bit more challenging in that you have a linear underground disturbance. And the vertical nature of the pole is just in a site location where the underground disturbance is along the pathway of the other existing underground utilities that we're trying to collocate with.

So it's a little bit more difficult to involve them. Often we have to do that through a redesign and

either go significantly below or potentially relocate the conflict to a new location.

Q. And your --

A. (Mr. Jocham) So --

Q. I'm sorry. Go ahead.

A. (Mr. Jocham) Yeah.

Q. Did you have something to add?

A. (Mr. Jocham) Yeah. So with underground transmission, as I mentioned a few minutes ago, we would pothole for underground transmission to determine the depth of those underground utilities. And that would help us design around said utilities whether we were going underneath, or if it was a third party, let's say Southwest Gas and we were asking them to relocate, that would be the point at an underground transmission line design where we would determine if we were avoiding it with the underground duct bank or we were asking a third party to relocate.

So whereas the typical Blue Stake process, it is using a superficial locater to just identify where the utility is at. It is critical for underground transmission that we identify not only where the utility is at but how deep it is, because that will impact that duct bank as it runs through the ground if there's an obstruction in the way.

Whereas a pole, you can move it a few feet left, right, ahead, back, whatever to avoid that said utility. As long as there's a clear hole in the ground that you can dig into you're fine.

Where in underground transmission line you're linearly running through the ground, and you're having to duck under or around certain underground obstructions.

Q. And I think, Mr. Robinson, you just described that for distribution as well; correct?

That's the same or similar issues?

A. (Mr. Robinson) That's correct.

It's common to distribution underground and transmission underground also.

We have to do the same with our distribution poles too.

Q. For the potholing you're meaning?

A. (Mr. Robinson) The Blue Staking.

And if there's a conflict, potentially pothole or move the distribution location.

It's just a lot simpler because the pole size and hole depth are a lot smaller on the distribution.

Q. And laudably you, TEP, is committed to undergrounding distribution in the areas where it's an overhead transmission line, if I remember correctly. Is that right, Mr. Bryner?

A. (Mr. Bryner) Yes, that's correct.
Q. So it's possible you could run into these same issues that you -- that Mr. -- or Chairman -- or Member Gold just described in doing so?
A. (Mr. Bryner) Yes, that's possible.
MEMBER GOLD: Mr. Chairman.
CHMN STAFFORD: Yes, Member Gold.
MEMBER GOLD: Okay. Mr. Lusk.
MR. LUSK: Yes.
MEMBER GOLD: If I understand their process correctly -- and I may not. Please correct me, Mr. Robinson, Mr. Jocham, Mr. Bryner if I'm wrong -- when you're putting in a telephone pole, you're digging a post hole that's about six feet in diameter and going down about 10 feet; is that correct?
MR. ROBINSON: So for a distribution pole, that's often two feet in diameter, eight feet deep.
MEMBER GOLD: So two feet in diameter hole that's eight feet deep compared to a minimum 15-foot trench that's a mile and a half long.
I think the chances of hitting something are a magnitude greater when you're entrenching than when you're just digging a two-and-a-half foot hole.
MR. LUSK: Maybe I can clarify with Mr. Robinson because I think the comparison you just

described is not the case.
BY MR. LUSK:
Q. Mr. Robinson, I think I just asked you about undergrounding distribution lines, not poles; correct?
A. (Mr. Robinson) That's correct. Our discussion was --
MEMBER GOLD: I stand corrected.
Distribution lines are easy to underground, and I approve of them. So thank you, Mr. Lusk.
MR. LUSK: Sure. Member Gold, thank you.
BY MR. LUSK:
Q. And, Mr. Robinson, and I'll just to clarify for the record just to make sure we get the question all answered and buttoned up here, those kinds of issues that were identified earlier, archaeological issues and those sort of things, could be possible with an underground distribution line in the area of the overhead transmission lines you're describing -- we're talking about today; correct?
A. (Mr. Robinson) Yes. That's correct.
Q. Thank you, Mr. Robinson.
I want to talk a little bit now about the costing, Mr. Jocham.
And am I saying your name correctly?
I apologize if I'm not.

A. (Mr. Jocham) Yeah. That's fine. It's Jocham.
Q. Mr. Jocham. Thank you.
Mr. Jocham, I want to talk now in the S & L -- Sargent & Lundy study that was presented, there were some comparisons made and including the -- I'm sorry. Can we go back to the TEP, is it, 31? Is that right?
MS. GRABEL: The most recent exhibit?
MR. LUSK: Is that this one?
MS. GRABEL: TEP-31.
MR. LUSK: Thank you.
BY MR. LUSK:
Q. And this is I guess the first -- it's hard to describe -- I guess the first page of TEP-31 comparing the preferred route in Route D-1.
Is that what's -- am I correct in that description, Mr. Jocham?
A. (Mr. Jocham) Clark created it. I'll let him answer.
Q. Okay.
A. (Mr. Bryner) You're correct. You're reading it correctly.
Q. Thank you, Mr. Bryner.
The "Total Cost As Proposed" is listed in the third column, the "Total Cost to Underground in the Gateway Corridor" is listed in the fourth column; is that

correct, Mr. Jocham?

A. (Mr. Jocham) Sorry. Can you repeat that question?

Q. I'm talking too fast. I apologize.

The "Total Cost As Proposed For an Overhead Construction" is listed in column three in this page.

And the "Total Cost to Underground Within the Gateway Corridor" is in column 4.

Does that sound right?

A. (Mr. Jocham) Agreed.

Q. And, I'm sorry, Mr. Bryner, did TEP prepare these cost estimates, or was this in conjunction with Mr. Jocham?

A. (Mr. Bryner) It was in conjunction with Mr. Jocham.

Q. Okay.

A. (Mr. Bryner) We prepared parts. He prepared parts.

Q. Okay. I just want to make sure I'm asking -- but if you feel like you need to jump in, please do so.

Mr. Jocham, the total cost as proposed, is that including the contingency fee as well -- or the -- not the contingency fee, the contingency amount of 20 percent?

A. (Mr. Jocham) It does not. It is base cost with

adders.

Q. Okay. And, again, in column 4, "Total Cost to Underground in the Gateway Corridor," that does not include the 20 percent either?

A. (Mr. Jocham) That is correct.

The cost that S & L provided was the cost -- base cost plus adder.

Q. Okay. And just to clarify in the study prepared for the application, there was a 20 percent contingency applied to the amounts in that; correct?

A. (Mr. Jocham) So the original reports that S & L provided for Kino to DMP included a 20 percent adder. The most current report for this particular -- for the project that is -- that is now that we're discussing today is -- follows the -- the advancement of cost engineering or AA -- AACE, cost estimating classification system, and it is a Class 4 cost estimate, which means a plus 50 minus 30 range is provided based off of the base cost, and that is a study-level cost estimate.

Q. Can you clarify what that means, plus 50 minus 30?

A. (Mr. Jocham) So based off of the base cost that is produced in S & L's report, we provided a range after that that is a plus 50 cost due to unknowns and a minus 30 cost due to unknowns.

Q. And, again, is that plus 50 percent or --
A. (Mr. Jocham) Yes. Percent. Sorry.
Q. Okay. Thank you.
Just, again, the math thing.
So and this is -- I think this is the exhibit that was just handed -- oh, I'm sorry.
So the plus 50 minus 30 is not included in TEP-31, though; correct?
A. (Mr. Jocham) Correct.
It is the base cost --
Q. Just base cost?
A. (Mr. Jocham) -- plus adder. So assuming jack and bore and the spare phase.
Q. Okay. Thank you.
The total length for D-1 of undergrounding within the Gateway Corridor is a total -- I want to make sure my math is correct.
It's 1.8 miles, correct, of the 4.1 miles?
A. (Mr. Jocham) For the total in just the Gateway Corridor?
Q. Yes.
A. (Mr. Bryner) I have that if you want.
A. (Mr. Jocham) Yeah. Go ahead. Sorry.
Q. Please.
A. (Mr. Bryner) So for Route 1 it's 1.8 miles

within the Gateway Corridor.

For Route D it's .5 miles.

So 2.3 total within the Gateway Corridor.

Q. Thank you, Mr. Bryner, for that clarification.

Can we go through, Mr. Jocham, Mr. Bryner, the numbers as they relate to D-1. Let's start with 1.

So the difference between total cost as proposed and total cost to underground approximately $36 million.

Does that sound about right?

Again, sorry about the math.

A. (Mr. Bryner) I was doing the math over here in anticipation of that. That's what I have.

Q. You see where I'm going, Mr. Bryner. Thank you.

The $36 million is for the cost to underground 1.8 miles?

A. (Mr. Bryner) That's the cost differential to underground the 1.8 miles.

Q. Okay. Is it -- is that -- am I not saying that correctly? I want to make sure I'm -- because I -- it sounds like maybe there are different -- it's a difference between -- it's not a per mile thing, is it?

A. (Mr. Bryner) Let me step back.

Q. Sure.

A. (Mr. Bryner) I actually think you did say it correctly.

Q. Okay.
A. (Mr. Bryner) I think I responded incorrectly.
So for that 36 million that we're looking at, that would be for the all-in costs to underground that 1.8 miles.
Q. And that's just the differential between cost as proposed for overhead and the differential for underground?
A. (Mr. Bryner) Yes.
Q. Okay.
A. (Mr. Jocham) I guess one thing to be clear that includes right-of-way, and it isn't -- I guess it differs from the S & L report, which is just engineering, procuring, and constructing.
Q. Okay. And so when you say right-of-way acquisition, I've heard you mention that several times, can you describe for the Committee what that means?
A. (Mr. Jocham) I guess easement acquisition.
And Clark would probably be the better person.
Q. Oh, sure.
A. (Mr. Bryner) Sorry. I was chatting with Mr. Robinson.
Q. What I was asking Mr. Jocham was if you can describe what it means for right-of-way acquisition as it relates to this project?

A. (Mr. Bryner) Okay. So, yeah, for the overhead costs for right-of-way we included the distance that we would need for a single circuit configuration if that's what it was or a double circuit configuration if that's what it was for the particular route in any area.

And then we looked at what could be accommodated within the road right-of-way, and, you know, we assumed that we would -- that would fall under our franchise. We wouldn't have any right-of-way costs --

Q. Okay.

A. (Mr. Bryner) -- but for the portion that would fall without -- or outside of the road right-of-way. Then those costs were taken at fair market value based on square footage, and that's how we estimated it.

For the underground, same process. It was just a different -- a different right-of-way width that was applied but similarly within the road right-of-way and outside of the road right-of-way fair market value.

Q. Mr. Bryner, is it your anticipation that right-of-way costs would be generally similar in that most of the -- whether it's underground or overhead would be within the right-of-way?

A. (Mr. Bryner) There are some differences.

Q. Sure.

A. (Mr. Bryner) I'd say they're ballpark similar,

but there's differences in widths, and so there were differences in the amounts.

Q. So in the case that you would be required to procure an easement, which I think is what Mr. Jocham just described, then that easement might be slightly larger because of the width of the trench?

A. (Mr. Bryner) For underground?

Q. Yes. Sorry.

A. (Mr. Bryner) Yes. I would say that would be true. That's what we found in our study is we might have larger easements.

Q. And did you at all -- and if you don't, please don't think you need to provide this, but did you, in fact, calculate an amount for either routes, any of the routes?

A. (Mr. Bryner) We calculated the amount for all of the routes.

Q. And do you have a ballpark of what that amount was?

A. (Mr. Bryner) For -- do you want it for D and 1?

Q. Sure.

A. (Mr. Bryner) So for Route D the right-of-way costs in the scenario that we're talking about of underground on the Gateway Corridor -- now, this is not just the piece in the Gateway because I have it rolled up

for the entire route.

Q. Okay. For the entire route.

A. (Mr. Bryner) Okay. So for -- and, again, this is not just underground easement, but it's a hybrid underground overhead.

Q. Sure.

A. (Mr. Bryner) But the right-of-way costs for D are estimated at -- I'm just kidding. I actually do have them in for the overhead portion and the underground portion separately.

Q. You're better than you thought you were.

A. (Mr. Bryner) Would you like them in both ways?

Q. Sure. Thank you, Mr. Bryner.

A. (Mr. Bryner) Okay. So for the overhead portion of D under the undergrounding the Gateway Corridor scenario, it's 1.8 million.

For the underground portion of D, it's 655,000.

And for Route 1, for the overhead portions of Route 1, it is 1.1 -- 1.2 million.

For the underground portions of Route 1, it is 2.6 million.

Q. Thank you.

So there's a difference between -- well, I guess on D that would be a much smaller area, so the costs are less for the easement.

Does that sound right?

A. (Mr. Bryner) Yeah. And D is a shorter route.

Q. Yeah.

A. (Mr. Bryner) And it also depends on the width of the road, right, but there's a lot of variables into it.

Q. Sure.

There is also a discussion about -- so the right-of-way acquisition that was previously not included now included. And permitting was also discussed.

Do you anticipate there being any need for additional permitting other than what you would normally do for underground versus overhead?

A. (Mr. Bryner) So we didn't actually include the permitting costs into this.

Q. Okay.

A. (By Mr. Bryner) But we -- we don't anticipate outside of like a cultural resource study.

Q. Sure.

A. (Mr. Bryner) We don't anticipate additional permitting requirements.

Q. Okay. So that's not something necessarily included in any of the costs or anything like that?

Thank you.

A. (Mr. Bryner) Correct.

Q. Let me move back to you, Mr. Jocham.

You through this study and your education have become familiar with underground transmission lines of all kinds; correct?

A. (Mr. Jocham) Correct.

Q. And you're familiar with actual in-service underground transmission lines both here and elsewhere?

A. (Mr. Jocham) Across the country, yes.

Q. The number of underground transmission lines -- and if you don't know this, please let us know, is that increasing or decreasing or staying about the same?

A. (Mr. Jocham) In comparison to overhead?

Q. No. Just in comparison to as we move forward in time, is the prevalence of underground transmission lines either increasing, decreasing, staying the same?

And if you don't know, please let us know.

A. (Mr. Jocham) It's hard to answer --

Q. Sure.

A. (Mr. Jocham) -- because overhead lines are increasing too.

So if you want to look at it in a percentage of overhead versus underground, I would say it's about the same as it was when I did my first underground line.

But it's hard to say because transmission lines across the country are being rebuilt, replaced.

Q. Sure.

A. (Mr. Jocham) And so I'm not entirely sure how to answer that question.

Q. Well, let's take the percentage just to make it a little easier.

What's the percentage of underground transmission lines versus overhead transmission lines?

A. (Mr. Jocham) Across the country?

Q. Sure.

A. (Mr. Jocham) I don't know that statistic, but I can give you some insights to like SRP identities that they have approximately -- I have that fact here -- 2,385 miles of overhead transmission in their system and approximately 10 miles of underground.

Q. Okay. So it's a small percentage at this point for SRP?

A. (Mr. Jocham) Under a percent.

Q. Might that change in different areas of the country?

A. (Mr. Jocham) Yeah.

Denser urban environments such as downtown Chicago, downtown New York, companies like ComEd have more underground transmission just purely due to the safety aspects of installing transmission lines in adjacence to large buildings.

Q. Gotcha. Thank you.

Those particular locations that you described, downtown Chicago, downtown -- obviously Tucson is not Chicago or New York, but they do pose some issues that you described about with large buildings or large structures with close to or within the right-of-way.

What are those issues that they have a problem with -- problems with?

A. (Mr. Jocham) I'm not sure I understand your question.

Q. Sure. Why don't we see overhead transmission lines in the middle of Chicago?

A. (Mr. Jocham) Oh, yeah. So in the middle of Chicago, especially in downtown Chicago in the loop you have large high-rise buildings immediately adjacent to sidewalks and roads. There's just no physical place to put an overhead transmission line. So at that point you're placing those transmission lines within the roads of the downtown environment.

Q. And in the case of a city transitioning to maybe a different streetscape, overhead transmission lines might have to be at some point undergrounded?

A. (Mr. Jocham) There have been projects that have performed that in the past where cityscapes are changing. And a good example is maybe not high-rise or density, but

SRP is putting in a 69kV underground for the City of Gilbert because the City of Gilbert's building a park, but the City of Gilbert is paying for that project.

Q. And they're doing so in conjunction with SRP; is that right?

A. (Mr. Jocham) Correct.

Q. Thank you.

CHMN STAFFORD: Mr. Lusk, we've been going for approximately 90 minutes.

MR. LUSK: Sure.

CHMN STAFFORD: I think it's time to give our court reporter a break.

How much longer -- how much more cross-examination do you have for this panel?

MR. LUSK: Not too much longer, but I'm happy with -- to take a break at this point.

CHMN STAFFORD: Excellent.

Let's take a 15-minute recess. We stand in recess.

(Recess from 10:39 a.m. to 11:02 a.m.)

CHMN STAFFORD: Let's go back on the record.

Mr. Lusk, please proceed.

MR. LUSK: Thank you, Mr. Chairman.

//

BY MR. LUSK:

Q. Mr. Jocham, I think we were talking about other projects in other cities.

Fair to say that those are -- well, actually I want to follow up on the answer that you gave us last which was with the SRP project, was it Chandler? Right?

A. (Mr. Jocham) City of Gilbert.

Q. Gilbert. Thank you. Gilbert decided that they would participate in the costing of that particular project?

A. (Mr. Jocham) Correct.

Q. And that was their decision?

A. (Mr. Jocham) From my understanding, yes.

Q. Sure. They weren't forced into it, I am guessing; right?

A. (Mr. Jocham) I don't know the details to it, but --

Q. I'll move on. Thank you.

Other projects like that that you're familiar with?

A. (Mr. Jocham) In the state of Arizona or in general?

Q. In general or in the State of -- obviously in the state of Arizona would be more helpful, I'm guessing.

A. (Mr. Jocham) I'm familiar with other projects

in the state of Arizona. They haven't been projects that S & L have been a part of, but with relationships with other utilities I hear about the other projects.

Q. Okay. Are you just generally familiar that they happen or do you have any specifics about the projects, where they are, maybe?

MS. HILL: Mr. Chair.

CHMN STAFFORD: Yes, Ms. Hill.

MS. HILL: I'm sorry to interrupt. But I just want to make sure, I would like to ask the Committee to allow Mr. Jocham to decline to answer based upon any confidentiality agreements or anything like that he may have with other clients. And only -- and just limit it to only that restriction.

CHMN STAFFORD: Yes, of course.

BY MR. LUSK:

Q. Sure. Only publicly available knowledge. Thank you.

A. (Mr. Jocham) I mean, I'm aware that projects such as Price Road Corridor and HIP were paid for by third-party entities or the difference quote/unquote was paid for by third-party entities. I don't -- I'm not privileged to the information beyond that.

Q. Are you aware what the size of those projects -- just in terms of the kV?

A. (Mr. Jocham) Yeah, those Price Road Corridor and HIP were both 230kV transmission lines.
Q. And those are in the?
A. (Mr. Jocham) Chandler area.
Q. Chandler area. Thank you.
CHMN STAFFORD: Mr. Jocham, could you get a little closer to your mic?
MR. JOCHAM: I'm sorry.
CHMN STAFFORD: You're a little faint there.
BY MR. LUSK:
Q. Thank you, Mr. Jocham. Moving on from those projects, the -- are you -- so the role that Sargent & Lundy would -- plays or has played in the past, you said you're just a consultant firm? Or would you -- would Sargent & Lundy actually be involved in any kind of design or construction or anything like that? How does that work?
A. (Mr. Jocham) Sargent & Lundy is an architectural engineering firm, so we are -- we perform design both conceptual and detailed for the energy industry.
Q. Okay.
A. (Mr. Jocham) But we do not have a construction arm. We do construction management but we do not do the

physical construction itself.

Q. So there are other firms that do just the construction piece itself?

A. (Mr. Jocham) Correct. Most construction firms purely do construction.

Q. Gotcha. And, again, I'm not presuming anything, but if the applicant, TEP, would be interested in designing an underground route of any kind, then they could utilize your services or services of another firm like you to do that?

A. (Mr. Jocham) Correct. S & L has the capability to do the underground, detailed underground transmission line design.

Q. And then they could also as you mentioned, I think yesterday, or not yesterday, Friday, that they could then hire a contractor, a construction contractor to perform the actual construction?

A. (Mr. Jocham) Yeah.

Q. Even though the applicant is not familiar with these kinds of construction techniques and this kind of work, they could sort of hire that out; right?

A. (Mr. Jocham) Correct.

Q. Okay. That obviously would come at a cost, I'm guessing? Your services aren't free?

A. (Mr. Jocham) Correct.

Q. So in terms of being able to construct the project, construct it underground or overhead, that's doable; right?

A. (Mr. Jocham) Both are constructible, yes.

Q. I want to ask you just real quickly. I notice there are multiple revisions of the Sargent & Lundy report. Is that just taking in additional information or is that a common practice?

A. (Mr. Jocham) So our first report, Rev 0, was issued in February of 2020. That initial report utilized the cable vendor standard cut sheet and the ampacity, the optimal ampacity that that cable is capable of handing that was the initial cost estimate and cost estimate 1.

So no actual engineering was performed in those first two evaluations.

After that, engineering, preliminary engineering was performed where we did run CYMCAP analysis, as I spoke about on Friday. Most of the revisions were changes in routes and/or updates in cost. As an example when we ran or when we did the initial cost estimate back in 2020. The cost of copper at that time was $2.20 a pound. And subsequently the cable cost at that time was $120 a foot.

And the latest quote that we received in 2024, that cable -- the copper price was $4.24 a pound and the

cable cost jumped to $245 a foot.

So most of it was not only updating routes and study areas, but also updating costs and as we've all experienced a large amount of inflation over the last four years. I think the bureau of statistics -- of labor statistics say the inflation has increased 21 percent since our initial report.

Q. And so mainly costs, route configurations, that sort of thing. You have access to different revisions; is that right?

A. (Mr. Jocham) I do.

Q. Okay. If I can point you to I believe the current revision, is it 7 or 8? I'm not quite sure.

A. (Mr. Jocham) There is not --

Q. I believe TEP-17?

A. (Mr. Jocham) Yeah, TEP-17 --

Q. Which provision is that?

A. (Mr. Jocham) Which is a date, it's called Final Report.

Q. And if I can direct you just briefly, you have a summary in that; correct?

A. (Mr. Jocham) I have an executive summary and a conclusion. What -- what one would you like to --

Q. -- to a page here. Sorry, I'm getting there.

So you have the executive summary which is on

page 8 of 60?

A. (Mr. Jocham) The executive summary by page number down in the bottom right is page 6.

Q. That's right. And the bottom of page 6, you additionally have a summary?

A. (Mr. Jocham) Correct.

Q. Of the executive summary; right?

A. (Mr. Jocham) Sure. Yes.

Q. Very helpful. I appreciate that. So the second paragraph from that is sort of just a discussion about how expensive it is? Is that fair characterization?

A. (Mr. Jocham) That is fair.

Q. What's the first sentence of that summary if you could read it for the Committee?

A. (Mr. Jocham) Yeah. It says, "The underground transmission line although constructible is significantly more expensive than compared to overhead alternatives."

Q. There's a change in that revision from other revisions, isn't there?

A. (Mr. Jocham) There is.

Q. And what is the change?

A. (Mr. Jocham) The prior revision said feasible.

Q. I think it said possible.

A. (Mr. Jocham) Possible.

Q. Right. Thank you.

MR. LUSK: I don't have any further questions. Thank you.

CHMN STAFFORD: Thank you.

Up next, Mr. Dempsey.

MEMBER HILL: Mr. Chair.

CHMN STAFFORD: Yes, Member Hill.

MEMBER LITTLE: I was holding on to my question until the end of the applicant's presentation, so I just have a couple of questions.

CHMN STAFFORD: Excellent. Well, Mr. Dempsey, we'll let Member Hill go and then you'll start your cross.

Member Hill.

MEMBER HILL: So my questions are for anyone on the panel that has the answer.

TEP has illustrated the importance of this line and the need to put in line in service as quickly as possible. And it does feel like there are challenges even getting it into service in 2027.

We had quite a bit of conversation about the potential delays in undergrounding even some portion of this line. We also talked about the challenge of having contractors who are familiar with undergrounding systems, maintaining undergrounding systems.

So one of the questions I have is when --

if a portion of this had to be undergrounded for whatever reason, would the contractors building the underground piece be different than the contractors doing the overhead pieces? How does TEP look at that contracting?

Do you think that would be two different construction firms or companies just based on the testimony that I heard about the undergrounding system being a different construction method and experience. What are you thinking?

MR. ROBINSON: I can take this question, Larry Robinson with Tucson Electric Power.

It's almost certain that there would be a different contracting and construction firm associated with the undergrounding portion than the overhead portion.

Both on at least the civil side putting the conduit, cutting the road, getting the vaults in place. We use a different contractor for that than our normal electrical contractors.

MEMBER HILL: Okay. That's helpful.

MR. JOCHAM: If I may add, this is Jason Jocham. If I may add, the -- at the transmission level after the civil is installed, the cable vendor, the manufacturer of the cable will then come pull the cable, do the terminations, do the splicing, so that, again,

adds maybe even another contractor into the mix.

MEMBER HILL: Okay. So we're talking about a couple of different contractors potentially to do likely the D-1 scenario because that's where we're most likely to have to do some level of undergrounding.

We also talked a little bit about just the potential for time delays.

If you had multiple contractors, so one group of contractors was doing the undergrounding, one group was doing the overhead construction, they could be working at the same time.

And I'm wondering if you could manage to, we talked about like worst-case scenarios of, like, delays with construction and time for construction. We also talked about simplified construction practices and getting it done in a much shorter amount of time.

But my question is as a practical matter, likely scenario, would TEP probably have multiple construction projects going on at the same time to complete a route?

MR. ROBINSON: Multiple contractors or multiple construction projects?

MEMBER HILL: I guess I was kind of thinking of them as the same, but maybe it's better to clarify like multiple sections being under construction

at the same time to complete the totality of the project, whatever route it is.

MR. ROBINSON: I think that's likely. That way we'd have multiple contractors working to complete the construction sections independently.

For instance, we'll have some civil distribution relocating any of the underground that we've committed to underground along with an overhead line construction contractor.

There will be a foundation contractor installing the auger pier foundations separately, and any civil contractor for the underground transmission along with the separate contractor for the underground transmission also.

That would also include a different contractor for the development of the substation site. So it's probable that we would have many different contractors working on the same project.

MEMBER HILL: That's helpful, Mr. Robinson.

It's just my observation that we can talk about worst-case scenarios and we can talk about ideal circumstances, but my observation is as a practical matter, different portions of this could be constructed simultaneously and that might reduce the overall time for construction.

This isn't a linear construction process. We can get different pieces done within a corridor, whatever that corridor is, and work towards the goal of getting it online in 2027.

That's all I wanted to establish is that as a practical measure, that could be what it looks like.

MR. ROBINSON: As an aspect of construction management, we know that there are some activities that are linear and need to be completed subsequently. And there are some that can be done in parallel. And we will always try to work as efficiently as possible to get a project complete.

MEMBER HILL: That is a much more articulate illustration of what I was trying to establish. So thank you.

CHMN STAFFORD: All right. Mr. Dempsey.

EXAMINATION

BY MR. DEMPSEY:

Q. Good morning.

Just, I guess building off of these questions that just happened, Mr. Jocham's answer to one of the questions.

So Mr. Jocham, why does the cable vendor pull the wire?

A. (Mr. Jocham) Because they warranty the wire and they won't warranty unless they pull it.
Q. So do they also pull the 69-kilovolt wires?
A. (Mr. Jocham) No, but they use different terminations and splices.
Q. So they don't warranty those wires or --
A. (Mr. Jocham) They -- I don't know the answer to that.
Q. Do you know -- I was going to get into this later but does APS use a vendor to install their 69-kilovolt wires or do they not use a vendor?
A. (Mr. Jocham) I do not know the answer to that.
Q. So you were speculating earlier when you said they did?
A. (Mr. Jocham) In what regard?
Q. You said that APS installed their own 69-kilovolt underground.
A. (Mr. Jocham) That's fair. I was assuming they did, yes.
Q. Okay. Thank you.
So, Clark, again I have other questions but these came up as a result of the questions that we just had.
So my understanding of your application and what you're requesting is that you've only asked the Line

Siting Committee to supersede the specific plans that are problematic and the Gateway Corridor. Is that right?

A. (Mr. Bryner) Let me just think about your question here.

MS. GRABEL: Mr. Chairman, I believe the application speaks for itself. I mean, I think if Mr. Dempsey looks at the application it's pretty clear what we're asking for.

CHMN STAFFORD: Mr. Bryner can answer the question because didn't you put together the bulk of that application, Mr. Bryner?

MR. BRYNER: I certainly did. With a large team.

So what we are asking for is that if the Committee chooses a route that is in conflict with either the Gateway Corridor Zone or one of the specific plans, which the two we're talking about are really the Gateway Corridor and the specific plan is the University Area Plan -- that was too fast.

So with respect to those, if the Committee selects a route that would be in conflict or in their opinion is deemed in conflict, we would request that they make a finding that -- I don't know if supercede is the right language, but would allow us to build the line in an overhead fashion.

BY MR. DEMPSEY:

Q. I believe it supercedes the language you guys used in the application.

So you're not asking to supercede any of these historic zone -- zoning -- zones that you're going to be passing through or adjacent to which could propose an equal problem as these other issues, as these other specific plans and ordinances. Is that right?

A. (Mr. Bryner) If you go back to my testimony, we believe those are not applicable, but we don't --

Q. That's just your opinion. There might be a different opinion?

A. (Mr. Bryner) Maybe that would be a question for the City.

Q. Okay. So I guess the question is that if you run into a problem with historic preservation zones or neighborhood preservation zones or any of these other zones, that could slow down the project of overhead?

A. (Mr. Bryner) Again, we don't believe there's a problem. We don't believe there's a, I guess, a link.

Q. So I guess the question kind of comes from we were doing our driving around yesterday or two days ago, or I'm sorry, last week, and I don't know if you guys noticed but at Speedway and Euclid there was a developer that was having to move historic homes; right?

I'm assuming that developer didn't want to do that. They would have preferred to just destroy the homes and build their property. But they had to do it because the historic preservation zone is pretty strict and that neighborhood, there was a pretty long fight about that issue.

And I just question your optimism with regard to putting lines down Euclid. So I guess I'm making -- I don't know if that's a question.

MS. GRABEL: Mr. Chairman, that seems to be a lot of testimony that doesn't have a question. Maybe something like that is better --

CHMN STAFFORD: Yes, could you --

MR. DEMPSEY: I will. Sorry. I apologize.

CHMN STAFFORD: It's like jeopardy. Could you please rephrase that in the form of a question.

MR. DEMPSEY: I'll move on. I'll get into it in my testimony.

BY MR. DEMPSEY:

Q. So I guess, Mr. Jocham, what voltage does FERC classify as transmission?

A. (Mr. Jocham) That's a good question. I'll have to get back to you on that one.

A. (Mr. Robinson) I can -- I can answer that the bulk electric system is considered transmission at 100kV

and above.

Q. So in -- when utilities report their annual reporting to FERC, they don't list 69 kilovolts as transmission voltage?

A. (Mr. Robinson) That's correct. It's not included as transmission voltage. It's subtransmission much like the 46kV system in our listings is listed as subtransmission.

CHMN STAFFORD: Let me jump in here real quick. So I've heard that term quite a bit, the subtransmission. Is that basically the high end of the distribution system?

MR. ROBINSON: Well, it's not technically distribution in that we would usually not hang a transformer that would go down to 120/240 that would feed residential and commercial customers directly. We would transform that voltage into a more consumable voltage at 4kV or 13.8, 14kV that then is distribution.

CHMN STAFFORD: Okay. Because I've always thought an electric system broke down to three segments: Generation, transmission, and distribution. But it seems like it's more complex than that with the distribution end being a mixture of actual distribution, which is the lower voltage that gets sent to people's homes and neighborhoods as opposed to -- and there's a

subtransmission which is below 100kV but still more akin to transmission than distribution. Is that an accurate statement?

MR. ROBINSON: Yes. And the subtransmission rarely would be transformed to feed residential and commercial customers directly. There are some commercial customers that we would feed directly. We call that primary metered where they transform the voltage themselves to consume it on their properties.

CHMN STAFFORD: So they would -- now I'm getting a little --

MR. ROBINSON: Sorry.

CHMN STAFFORD: Wide afield here, but I'm just curious and I have to know. So does that -- because I know that some customers take delivery from the transmission system and so they don't pay for the distribution system cost. But that doesn't mean they're taking it at 100kV or more. They're taking it above what kV to qualify for that?

MR. ROBINSON: They're taking it at above 100kV.

CHMN STAFFORD: Above 100kV, so they're taking it direct from 69kV, they still would have to pay distribution costs.

MR. ROBINSON: I'm going -- I would defer

to one of our rates people to testify on that.

CHMN STAFFORD: Mr. Bryner.

MR. BRYNER: I'm no rates person. But if I can maybe give an illustration since I'm not an engineer, not technical like these folks, the way I think about this is I think of the distribution serving our customers directly. Subtransmission, functionally it's transmission, you know. It's bringing the power in from somewhere so that we can then break it down to get to our customers. So I look it at the way you do. Distribution, transmission, generation. But from a FERC definition standpoint, from a siting standpoint, there's that kV threshold. So that's the way I look at it. As far as how the billing works, I don't have the answer on that.

CHMN STAFFORD: All right. I'm just going to try to get a better handle on what the -- the difference between transmission and subtransmission.

So what does TEP classify as subtransmission, then?

MR. ROBINSON: Our 46kV.

CHMN STAFFORD: Is that the bottom end of it?

MR. ROBINSON: Yeah, it's really the only end of our subtransmission. Our voltages gone from 4kV

to the 14kV to 46kV and then jump to 138.

CHMN STAFFORD: Okay. So there's no 69kV on your system.

MR. ROBINSON: Not on our system, no.

CHMN STAFFORD: Okay. Well, thank you. That clears it up. That answers my question. Thank you. Please proceed, Mr. Dempsey.

BY MR. DEMPSEY:

Q. Okay. Once again I'm going to apologize because I have a lot of questions and I've tried to organize them but it's not easy, especially as I keep adding questions.

So talking about -- I don't -- I guess Larry or Mr. Robinson, I'm not sure, you could -- I'll ask you and then if someone else knows the answer.

So how many amps is the 46-kilovolt system in this area currently running at?

A. (Mr. Robinson) I don't know the answer to that. Our planning engineers would be able to answer that question on what it's rated at.

Q. So do you have a -- so I guess you can tell me you don't know the answer to this question either.

What's the demand, the load, the peak load for Vine area?

A. (Mr. Robinson) I don't know the answer to that.

Q. Fair enough.

A. (Mr. Robinson) I can tell you what the line is designed for, and that's a peak load of 2250 megawatts -- amps. I'm sorry. Amp.

Q. And that's the new line, not the old line?

A. (Mr. Robinson) That would be the new line in this application, yes.

Q. So I'm assuming you calculated that based on existing demand, you just don't know what that is?

A. (Mr. Robinson) Our planning engineering team determined that requirement when they sent out the planning requirement and put it in our transmission plan.

Q. Okay. Thank you.

So I guess this is a question for Mr. Jocham. So you put in your slides that the overhead line would be 954 kcmil?

A. (Mr. Jocham) Uh-huh.

Q. What is the ampacity of that line?

A. (Mr. Jocham) Mr. Robinson just testified.

Q. The same?

A. (Mr. Jocham) Yep.

Q. Okay. And is that -- is that the maximum or is that what you expect to be the normal operating amount?

A. (Mr. Jocham) Larry -- Mr. Robinson, do you want to take that?

A. (Mr. Robinson) That's the emergency thermal

rating capacity of that line at 250 degrees C as defined in our planning memo.

Q. Again, I'm getting ahead of my questions here.

In Mr. Jocham's engineering report, he put that 1584 is what's required but 2294 or 2250 is what's preferred.

I'm trying to understand the difference between those two numbers.

A. (Mr. Robinson) Emergency rating on the cable is the difference.

Q. Okay. So 1584 is what you estimate what you need. 2294 is in case of an emergency?

A. (Mr. Robinson) The 1580 is the normal operating amperage.

Q. So is it traditional that by my math 2250 over 1584 is about 50 percent larger for emergencies. Is that typical? I don't have special knowledge I'm going to challenge you on this, I'm just getting it for the record.

A. (Mr. Robinson) Yeah. That's determined by our planning department and the way the system responds if a line's out of service.

Q. So is it possible -- so you have a 50 percent up -- overbuild, can it be a 30 percent overbuild? I'm just trying to understand, is that required by code?

What's the -- is it just a -- TEP picked it out of a hat? How does it work?

A. (Mr. Robinson) Our planning department would need to answer that question. I'm sorry. I don't know.

Q. All right. I'm going to change gears here again.

So, and I'm not -- I just want to make sure I understand a question you asked earlier, Member Gold.

So you said that the trench minimum depth is 15 feet. Is that correct?

MEMBER GOLD: Width.

MR. DEMPSEY: Width. Okay. All right. Never mind.

BY MR. DEMPSEY:

Q. What is the minimum width of the trench for undergrounding the 138?

A. (Mr. Jocham) Our report identifies that the typical trench width would be approximately five and a quarter feet with a one-foot cutback on either side. So approximately seven feet at grade.

Q. So, and that's -- I've been looking at the projects in Phoenix. And it's -- is it, you could change that, I'm assuming because like, for example, the Chandler project, you guys are doing essentially four this way. Could you do four this way or could you do,

you know --

A. (Mr. Jocham) You can. It changes the ampacity.

Q. Right. So but potentially if you -- if for some reason there's an obstacle or something, you could go from five to whatever the skinnier route?

A. (Mr. Jocham) I would say that's common in detail design. You will change cross sections of a duct bank from horizontal to vertical and a few in between.

MR. DEMPSEY: Thank you.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Didn't you say earlier that you needed double lines underground? So you would have four and four.

MR. JOCHAM: So the duct bank is together and the approximate width of the dual, having two cables per phase is a little over five feet wide, the actual duct itself.

MEMBER GOLD: And to put in the box, whatever that thing is.

MR. JOCHAM: That would have to be wider than the --

MEMBER GOLD: So what's the total width? I think what he's looking for is the total width.

MR. JOCHAM: Yeah, the total cut would

probably be in the six- to seven-foot range, the -- the box isn't much wider than what you would need for the trench.

MEMBER GOLD: So the images you showed us before on earlier slides where you had a box and you had a dual set of lines, so you have eight lines in it, didn't show that they were stacked, it showed that they were side by side. I thought that was for heat dissipation.

MR. JOCHAM: It is, and that's the way it's represented in our report.

MEMBER GOLD: So that would mean that the width that you would need for the box for even eight lines would be six feet?

MR. JOCHAM: Eight conduits, yes.

MEMBER GOLD: Eight conduits you could still do in six feet.

MR. JOCHAM: Eight conduits. Well, technically 10 conduits because of the spares, but you would have five stacked on five.

MEMBER GOLD: And they would be in PCV cables that are how wide?

MR. JOCHAM: The PVC schedule 40 pipes are eight-inch Schedule 40. That is what we're projecting based off of the cable size, initial cable size for this

project.

MEMBER GOLD: So you would have ten of those PVC eight-inch-wide pipes?

MR. JOCHAM: Yeah, five stacked on top of five more.

MEMBER GOLD: And how would the total height be?

MR. JOCHAM: The total height of the required duct bank would be a little -- almost two and a half feet tall. There would be a one-inch, or excuse me, one-foot additional red dye concrete on top of that. But there's a minimum depth that's required by code, and so the top of the duct bank basically starts about three feet below the surface, so the overall excavation is about five and a half feet deep.

MEMBER GOLD: So we're talking roughly six feet by six feet is all you would have to excavate.

MR. JOCHAM: If there's something in the way. And if there's something in the way we would have go underneath it, so your trench could get deeper, could go 12 feet deep.

MEMBER GOLD: And in order to do this, the equipment you would need to shut down the roads would take up how many more feet?

MR. JOCHAM: Yeah, so based off of my

testimony on Friday, you'd have a large excavator and dump -- trucks that would take up somewhere probably between 25 and 350 feet in width.

MEMBER GOLD: So how many lanes would you close down while you're doing a mile of undergrounding?

MR. JOCHAM: On Campbell that would shut down one entire -- it would shut down the southern lane, all three southern lanes because of the raised median and you'd have to transfer traffic to the other side.

MEMBER GOLD: And the businesses on that side of the street?

MR. JOCHAM: Not sure. That would have to be determined and supported in detailed design to make sure that they could have access to their businesses. I'm not sure at this stage how that would be handled.

MEMBER GOLD: All right. But it would be an open trench affecting a whole bunch of businesses that you could put steel plates on temporarily.

MR. JOCHAM: Correct.

MEMBER GOLD: Okay. And the other side, the other three lanes would have two-ways traffic; correct?

MR. JOCHAM: Yeah, two-way traffic in those three lanes that are northernly.

MEMBER GOLD: So you'd have one lane one

direction, one lane another direction, and then one lane for people pulling into someone's parking lot or storefront.

MR. JOCHAM: Potentially, yes.

MEMBER GOLD: Would create quite a hassle.

MR. JOCHAM: Yes.

MEMBER GOLD: Okay. Thank you. I hope that clarified the point that we were trying to make earlier.

MR. DEMPSEY: Yeah. Thanks.

BY MR. DEMPSEY:

Q. So I have a couple more questions now.

I'll take them in order.

So you mentioned the three-foot minimum; is that right?

A. (Mr. Jocham) To the top of the duct bank that's not -- the code-required depth is 42 inches. 42 inches is where it has to be below the surface.

Q. Is it the same for the six-inch distribution conduit that we have discussed previously? I believe that's what --

MR. ROBINSON: That's correct.

BY MR. DEMPSEY:

Q. -- Mr. Robinson said?

A. (Mr. Robinson) Our standard is 42 inches.

Q. So you'd have to be able to dig this trench either way; is that right?

A. (Mr. Robinson) I'm sorry. Can you restate that?

Q. If you have to underground distribution along this route you're going to have to dig this trench either way; is that right?

A. (Mr. Robinson) It's just a much smaller trench that we would need to dig for.

Q. Why is it a smaller trench?

A. (Mr. Robinson) Because feeder distribution fits in one six-inch conduit with a spare and 200-amp distribution fits in one four-inch conduit with spare.

This would be a 10 conduit duct bank.

Q. And you might have communication conduits as well, and my understanding is that you have to go to the same minimum depth. So you would -- would you potentially run into the exact same conflicts that you'd have to go around or under or whatever?

A. (Mr. Robinson) Yes. The nature of underground -- undergrounding anything is that there are linear obstructions that you need to avoid during construction. You try to identify those during design and anticipate what those would look like by either relocating the obstruction or by going underneath it.

But that has to happen whether it's a distribution voltage or whether it's a transmission voltage.

Q. And is undergrounding distribution voltage, given it might be not as wide, but it has to be the same depth. Is it going to close the same amount of traffic lanes?

A. (Mr. Robinson) No, the equipment needed to dig that trench is a much smaller piece of equipment. The trench is 18 inches to two feet in width. So you can have a smaller equipment with a dump truck. We would probably close one to two lanes of that traffic.

Q. Then it's the same hundred feet a day or --

A. (Mr. Robinson) Roughly give or take, yes.

Q. Okay. So then I guess, Mr. Robinson, do you know how wide the Campbell right-of-way is?

A. (Mr. Robinson) Not off the top of my head.

Q. Are you familiar with how large the setback is on the west side of Campbell between the property and the side of the road?

A. (Mr. Robinson) No, I'm not.

Q. Okay. All right. Are any of you? Clark?

A. (Mr. Bryner) I could look it up but I don't have it in my head.

Q. Would you say it's fairly large?

A. (Mr. Bryner) I'd have to look. I don't know.
Q. Okay. Thank you, guys. I appreciate it.
This is a technical question more so I guess out of curiosity for the record is Mr. Jocham. So, I mean, you guys are using this 6,000 kcmil. It looks like if you end up not having to go as deep as you might have to, you might use a slightly smaller wire or cable, whatever you want to call. You might be able to use a 5,000 kcmil or could you possibly go smaller than that if you only have to go three feet, or is 5,000 kind of the lowest?
A. (Mr. Jocham) Cable size you can go well below 5,000 down into the 2,500 range. It's purely going to depend on detailed engineering and what the thermal resistivity of the soil is. And how deep you have to go.
So the runs at this point are preliminary for cost estimation purposes and study purposes, but during detailed engineering if it was to go underground, that would have be evaluated.
But 5,000 kcmil is a conductor type that's used.
Q. Do you know the price difference between 5,000 kcmil and 6,000 kcmil?
A. (Mr. Jocham) Not offhand. We would have it quoted directly from the vender.
Q. But it's fair to say it's less than 6,000 kcmil?
A. (Mr. Jocham) It more than likely would be less,

yes.

Q. Okay. So this is my question. So let's say you have to install these vaults, let's just say one section of vault you had to go deeper than another section of vault. Can you marry a 6,000 kcmil to 5,000 kcmil if that section happens to be -- you can use a cheaper wire or cheaper conductor?

A. (Mr. Jocham) It's not normal. Let me ask my electrical because he's the one that can answer that question. You can, but it's not typical.

Q. But if cost were an overriding concern you could consider it, it sounds like?

A. (Mr. Jocham) Yeah. I'll add some anecdote to that is one part of that is now you have multiple cables that you have to store a spare. The splices are custom from different sizes, even more custom. So you're holding more materials in your storage yards, which adds cost to the maintenance aspect of the project.

Q. But if you stored a 5,000-kcmil cable it would be cheaper than storing a 6,000-kcmil cable, I assume.

A. (Mr. Jocham) I'm not going to speak for TEP on how they are going to maintain their project. But generally speaking, if you have both materials you would need to store both cables. So you would need a reel of 6,000 and a reel of 5,000.

Q. Okay. Thank you.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Just a question of physics and thermodynamics. If you're running the same voltage and you could switch from a thicker line to a thinner line, then you don't have to use the thicker line in the first place. This would be to Mr. Robinson.

I do not know of any electrical situation where you say we're running at a high voltage, we've got to prepare for the maximum, where you would say yeah, but in this section we can put in a thinner wire.

That would create far more heat. You could have used the thinner wire all along or else you wouldn't have said you would use a thicker wire in the first place.

MR. ROBINSON: Yeah, I think what Mr. Dempsey is trying to get to is -- and Mr. Jocham has testified; right. The thermal properties of cable are very important, right, and as you get closer to the surface of the earth, thermal -- thermal dissipation improves. So if you're able to put the cable closer to the earth you may be able to go with a smaller diameter cable in sections of the engineered line. I think that's the line of questioning that Mr. Dempsey's going down.

MR. DEMPSEY: Yeah.

MR. ROBINSON: It's possible that you can do that as Mr. Jocham has been testifying to. Probably not the best solution. You have to track those different materials differently, you have to store them, you have to order specialty splices. That type of stuff.

MEMBER GOLD: It wouldn't -- it just doesn't make sense to me on the surface that the doing that what you would save in cost over the short period would be far more expensive in maintenance and monitoring and everything else over the long period. I would suggest that if they're going to use a 6 mil -- 6 mil; is that the terminology?

MR. DEMPSEY: 6,000.

MEMBER GOLD: That you would make them use a 6 mil throughout the whole thing. That just makes sense to me.

MR. DEMPSEY: Well, I agree. What I would ask, though, is that, you mean your -- your engineering kind of assumes a worst-case scenario. It's, oh, we're going to have to go to 15, or 10 to 15 feet. It's possible that you'll only have to go three feet the whole. It's -- maybe it's unlikely, but it's possible that you'll be able to achieve trenching that, just like you're going to do with the distribution you would be

able to achieve using a smaller wire.

MR. JOCHAM: Knowing that there are a number of sewer crossings and other gravity fed-type underground obstructions, I would say it's highly improbable that you wouldn't have to go deeper.

BY MR. DEMPSEY:

Q. So you would have to do the same thing for the distribution?

A. (Mr. Jocham) I would assume so, yes.

Q. Okay. Sorry. Just a second. Let me get reset here. Some of my questions have already been answered.

So you brought up the City of Gilbert is paying for undergrounding. Do you know if they're using the SRP's municipal aesthetics program?

A. (Mr. Jocham) From my understanding, yes.

Q. Okay.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Just a question because I don't know the answer. Is the City of Gilbert's project where they're undergrounding new work, new developments, or is it an already existing city with infrastructure and everything else there?

A. (Mr. Jocham) Not to go into too much detail because of my confidentiality, but it is an existing line

that's being relocated underground.
BY MR. DEMPSEY:
Q. And 69kV; right?
A. (Mr. Jocham) Correct.
Q. Again, just more of a -- for the record and a curiosity thing, so you say that the aboveground transmission lines are 200C rated. That's kind of a worst case under maximum load situation; right? What's kind of the -- what temperature would they operate at on a normal basis or an average or something like that?
A. (Mr. Robinson) So our planning department determines what the operating temperature and the needed ampacity is. And they declare that in their planning memos and put that into our long-range transmission plan.
So our civil engineering and transmission engineering teams design according to the temperatures that are given to us by our planning department.
Q. Okay.
A. (Mr. Robinson) It's -- I can tell you that it is affected by the number of outages and things like that in an area that we still would want to be able to maintain service to our customers with. That's what helps determine thermal rating. And it's really an ampacity rating. More so than thermal.
A. (Mr. Bryner) I could add to that the minimum

rating is 200C, the emergency rating is 250C.

Q. Okay. Thank you.

So we've kind of already established this, but I want to do it more clearly. I guess, Mr. Jocham, are there critical parts of Arizona that are dependent on underground transmission lines?

A. (Mr. Jocham) I'm not sure what you're asking.

Q. Is downtown Phoenix dependent on an underground transmission line?

A. (Mr. Jocham) Yeah, due to the large-scale buildings, underground transmission in downtown Phoenix is a necessity.

Q. And would you say that's proven reliable?

A. (Mr. Jocham) I don't think I'm questioning the reliability of underground versus overhead. I think they're the same.

Q. So yes, it's proven reliability?

A. (Mr. Jocham) It is reliable.

Q. Do you know what size, what kcmil, what size XLPE wire was used in the Intel HIP project?

A. (Mr. Jocham) I believe from my understanding, and I don't know this to be exact, but I believe it was two 5,000-kcmil conductor per phase.

Q. So they used the smaller wire for Intel? Okay.

Now, there's this existing, you know, pipe-type

transmission system through central Phoenix that's dated and they're in process of refurbishing and reconductoring it.

There's also some 69kV systems that have been recently added to downtown Phoenix underground. Would you say that central Phoenix has less underground obstacles than Campbell Avenue in Tucson?

A. (Mr. Jocham) I don't know the answer to that.

Q. Sorry. I have so much stuff here and I kind of keep getting ahead of myself, so the questions, I've always asked them, so I have to kind of work through this, so I apologize to work through this. So I apologize.

Okay. So when it comes to sort of the traffic and the disruption conversation, is there -- I guess, Mr. Jocham, is there any reason to assume that the City wasn't aware that undergrounding would disrupt traffic when it passed these laws?

A. (Mr. Jocham) I don't know the City's intent.

Q. Is TEP a large customer of yours?

A. (Mr. Jocham) They're a large client of ours.

Q. Client. Sorry. Yes.

A. (Mr. Jocham) Yes.

Q. Do you do work on all their projects?

A. (Mr. Jocham) We do work on their overhead, yes,

and generation.

Q. And I guess outside of TEP, in the state of Arizona how many 69-kilovolt and undergrounding projects have you done in the last five years in Arizona?

A. (Mr. Jocham) For utility clients or altogether?

Q. I guess altogether?

A. (Mr. Jocham) Sure. We've done one underground job for a utility client and multiple, I think three at this stage, underground support efforts for developers.

Q. Those are 69kV?

A. (Mr. Jocham) And above.

Q. Okay.

A. (Mr. Jocham) Two of them were at the 230kV level.

Q. Thank you. So when, you know, a project goes forward, do you determine the cost or does a contractor determine the cost?

A. (Mr. Jocham) We determine the materials. The vendor determines the cost of the materials and the contractor will quote the labor costs.

Q. So it's possible that a contractor can do it for cheaper than you've estimated?

A. (Mr. Jocham) Yeah, there's a competitive bid process, so there is always the opportunity for someone to come in and bid at a cheaper price. The costs that

were provided in this estimate were quoted from a contractor and from vendors.

Q. Thank you.

A. (Mr. Robinson) Mr. Jocham, can I add?

Q. Yeah, go ahead.

A. (Mr. Robinson) It's also possible that the contractor will come back for more than what we estimated.

Q. Right. Fair enough. Can we bring up UAZ Exhibit 16? Oh, no, well, we'll get that one later. There we go. Thank you.

So are you familiar with this study?

A. (Mr. Jocham) I've read it since you had filed it. But prior to that, no.

Q. Okay. So this study says that, you know, if an XLPE wire or cable, I don't know what to call it, a conductor is operated responsibly, it might last 100 years. Do you have any reason to agree with that?

A. (Mr. Jocham) I mean, industry and cable vendors themselves will also tell you this, that insulation will break down over time as you operate the line.

And if the insulation is designed to handle the -- withstand voltage of the cable and the more you heat it up, the more potential breakdown that you have of that cable, there are studies including EPRI studies that show

normal operation of the cable, the expected life span is approximately 40 years.

Q. Right.

A. (Mr. Jocham) Now, do I think that if you don't increase the temperature of the conductor to where it could potentially hurt the cable will it last longer? Yes.

There are, I'm sure, scenarios out there in the world today and existing utilities where there are underground systems that exceed a 40-year life span based off of operation.

But there are cables out there today that are also being replaced because they have been operated at a higher temperature and the insulation has broken down.

Now, as a part of the cost estimate that we put together, and to be responsible, to try to be responsible for monitoring temperature of the cable itself to help the longevity of the cable, we are identifying the installation of a distributed temperature sensing system so that you can monitor the cable temperature to support a longer life.

Q. So it's possible, sounds like if we oversize, if we actually go with the 6,000 kcmil that you might last a lot longer than 40 years?

A. (Mr. Jocham) It depends on the load that's

applied to the circuit.

Q. Right.

A. (Mr. Jocham) That's all theory.

Q. And they discussed that in this paper, you said you read it?

A. (Mr. Jocham) I've reviewed it, yes.

Q. Okay.

A. (Mr. Jocham) There are other I think, even filings that were submitted that identify purely based off of temperature that you can degradate the insulation quickly.

Q. So -- sorry to interrupt you?

A. (Mr. Jocham) Go ahead.

Q. So is it fair to say that oversizing a wire helps keep the temperature down?

A. (Mr. Jocham) Yes.

Q. Okay.

A. (Mr. Jocham) Yeah. If you oversize the conductor you provide more surface for the electrical -- for the electrons to run down and it has less resistance.

Q. So maybe spending a little bit more money on a slightly larger wire might help it last longer?

A. (Mr. Jocham) In theory.

Q. All right. Thank you.

So I guess I'll get into this in my testimony.

Thank you.

So is it fair to say that the -- in the same setting that a 230-kilovolt installation should cost more than 138-kilovolt installation or does it depend on the wire size, I suppose?

A. (Mr. Jocham) It mainly depends on wire size. The 230kV cable will be slightly more expensive because it will have to have thicker insulation.

Q. Okay. That's helpful. Thank you. And then I assume the same is true for the 69-kilovolt, it also then would be cheaper in the exact same scenario just because it's not kilovolts and not 138 or 230?

A. (Mr. Jocham) 69 is a little unique because once you get above a certain cable size at 69kV, then you get away from cold shrink terminations, and you have to use engineered terminations at that point. So that would increase the cost of the cable itself and the cost of the installation.

Q. Okay.

A. (Mr. Jocham) But in generalities if you were comparing apples-to-apples, the 69kV conductor would be slightly cheaper due to the lesser insulation that would be required as part of cable.

Q. The trenching and everything else is more or less, it's a slightly wider trench or whatever?

A. (Mr. Jocham) Again, it's driven on cable size.
Q. Right.
A. (Mr. Jocham) The number of or the size of the conduit that's required to be put in.
Q. Thank you. Give me a second here.
I'm going to ask this question and I appreciate that you don't know the answer given your answer to a prior question, I just want to get it for the record.
Do you know the width of right-of-way on Euclid?
A. (Mr. Bryner) I assume you're addressing that to me?
Q. Whoever knows, if one of you knows the answer, whoever?
A. (Mr. Bryner) I have the data in our database. I just don't know it off the top of my head.
Q. Okay. So I want to get into this conversation about -- I believe, Mr. Jocham, you said yesterday you said, "I have never seen a spare used."
Over what period of time have you never seen a spare use?
A. (Mr. Jocham) I've been supporting underground projects for approximately six years.
Q. So over six years you've never seen a spare used?
A. (Mr. Jocham) Correct. But like I said,

following that statement, operationally, Sargent & Lundy is typically not involved so we don't always hear what the utility does after we have departed.

Q. So this -- this is a looped system; right? So if you have a problem with an underground line, you're sizing it appropriately that power can flow from the other direction so there shouldn't be a disruption. Is my understanding correct?

A. (Mr. Jocham) I'll let the TEP representative answer that.

(Mr. Robinson) Yes, that's correct. The looped system should have, we should be able to have an outage on any one segment and still maintain power.

Q. For even months at a time if you have to?

A. (Mr. Robinson) Yes. The risk is now you have that substation during those months-long outage on radial feed --

Q. Right.

A. (Mr. Robinson) -- which means if you lose that -- if you lose that radial feed then your customers are out of power.

Q. So are there any -- Clark, you know the answer to this, I know you do -- are there any, not just in TEP but in the whole -- in your sister companies, are there any parts of your system, any cities that are dependent

on a radial feed?

A. (Mr. Bryner) So if you're looking at TEP?

Q. Yeah.

A. (Mr. Bryner) We've talked about the Kino Substation.

Q. Right.

A. (Mr. Bryner) We know it is on a radial, and when you have some customers, not cities that are on radials, the large mine customers. If you're extending outside of TEP to UNS Electric, which I assume you may, so yes, the answer is yes.

Q. So and that's -- is that Nogales?

A. (Mr. Bryner) Correct.

Q. So all of Nogales is dependent on a radial feed or just part of it?

A. (Mr. Bryner) So Santa Cruz County today we have one transmission line that serves Santa Cruz County.

Q. And that has serve --

MS. GRABEL: Mr. Chairman, if I may interject.

CHMN STAFFORD: Yes.

MS. GRABEL: Thank you. I'm sorry. I'm just informed that of a policy, that TEP really doesn't like to testify about sister companies, when talking about TEP. They are different utilities that serve

different communities, and so if we could just maybe focus this examination on TEP.

CHMN STAFFORD: Well, he's kind of going towards just the existence of these radial lines. With respect to the -- I think it is Nogales, I seem to recall 20 years ago TEP, UniSource attempted to get another line to serve that, but was unable to do so because I think it was the Bureau of Land Management would not allow them to cross, to add a transmission line to get the redundancy for the provided purposes they wanted.

So, I mean there's -- it's -- what's -- I think you're trying to get to the fact that there are places where they have these radial, places are served by radial lines.

MR. DEMPSEY: Right.

CHMN STAFFORD: Where they exist, TEP has a few, UniSource has some. But I think if your ultimate goal is find out whether that's acceptable or not, I think --

MR. DEMPSEY: No, just --

CHMN STAFFORD: If that's what you have, that's what you have to have. But they would prefer other, a radius of a looped system to create the redundancy to increase the reliability. I think that's kind of the standard approach for most of the utilities

in the state.

MR. DEMPSEY: Yeah. I understand. I agree with that. I just am curious what the current state of play is, because Clark has told this to us before in public, so --

CHMN STAFFORD: He has actual knowledge of it, so --

MR. DEMPSEY: Right. So thank you. I forget what my question was. Hold on a second here.

BY MR. DEMPSEY:

Q. So, all right, so we've established what the purpose of a loop is.

If you had some catastrophic undergrounding fault, you would still have power flowing from the other direction so it shouldn't cause an outage; is that right?

A. (Mr. Bryner) Yes.

Q. So because it's a loop, Mr. Jocham, is the spare advisable? Can you get by without a spare if you're part of a loop?

A. (Mr. Jocham) You can install line and operate it without a spare. If you don't have that spare in place your outages will be significantly longer.

Now, in regards to how TEP wants to operate, I will let TEP answer that. I'm not a TEP representative.

Q. So you claim to be familiar with the Intel HIP

project; is that right?

A. (Mr. Jocham) I have indirect knowledge of the project, so correct.

Q. Do they entail a spare?

A. (Mr. Jocham) They did not install a spare on that project from my understanding.

Q. Is it fair to say that reliable power is pretty important to Intel's business?

A. (Mr. Jocham) Yes. The answer to that would be yes.

Q. Thank you. All right. So changing gears a little bit here again.

I guess any of you -- this question -- can answer this question.

I guess I'll start with you, Clark.

Are you familiar with the Broadway expansion project that happened in the area recently?

A. (Mr. Bryner) Yes.

Q. Do you know if they were slowed down by any unexpected cultural resources?

A. (Mr. Bryner) I guess I'm not that familiar with it.

Q. Okay. Fair enough. Well, this came up yesterday, too, so, I mean, Mr. Jocham, you had said that you might have to destroy and rebuild a roundabout.

Are roundabouts expensive?

A. (Mr. Jocham) Civilly, probably not.

Q. Thank you. And then I guess this goes back to the amperage question. I mean, you guys have talked about how this line is about stabilizing the whole grid, not just for this area. Do you guys have an idea of what percentage of the electricity that will flow through this area is for this area versus the rest of the surrounding area? Does that make sense?

A. (Mr. Robinson) That makes sense, but that's a question that the planning department would have to answer.

Q. But it's fair to say that it's sized for more than just the consumption of this area?

A. (Mr. Robinson) It's fair to say that it's sized to maintain reliable power for our customers in the grid, the operation of the grid.

Q. Perfect. Thank you.

And Mr. Jocham, you've, as Mr. Lusk discussed, you guys have put out, I think, eight revisions or nine revisions.

Your last final revision I believe was in September 2022. Do you know what has happened to the price of copper since then?

A. (Mr. Jocham) Since 2022?

CHMN STAFFORD: I believe they testified about this already.

BY MR. DEMPSEY:

Q. Well I think he said relative to 2020.

A. (Mr. Jocham) I have the price of copper from 2022. It was approximately three and a half dollars a pound, and the cable cost at that point was $195 a linear foot.

Q. And today?

A. (Mr. Jocham) Is $4.24 a pound, and the approximate cable cost is $245 a foot.

Q. I'm sorry. Say it again. So you said it's $4 and what a pound right now?

A. (Mr. Jocham) So the quoted price which was the price of copper at the time of the quote was $4.24 -- excuse me -- $4.24 a pound.

Q. Uh-huh.

A. (Mr. Jocham) And that equates to the quoted price that we received from the vendor of the cable itself at $245 a linear foot.

Q. And in 2022 it was what? I'm sorry. I should have been writing it down.

A. (Mr. Jocham) You're fine. 2022 was approximately $3.50 a pound was the price of copper.

And then the cable price that was quoted to us

at that time was $195 a linear foot.

Q. And that was in September of 2022?

A. (Mr. Jocham) I have it marked here as 2022. I don't know the exact date. We did do multiple revisions in '22.

Q. Okay. Thank you.

Can we switch to UAZ Exhibit, I think it's 59, please? So I just have a general question about kind of your revisions.

You in your final September 2022 -- sorry. Let me get the hang here. In your final September 2022 revision, you put the cost of Section 5 and Section 6 which are essentially the same as your Section 3 now, they go around the Jefferson Park neighborhood and UMC and all that stuff.

You had put the price of undergrounding to be approximately $15 million per mile. But in your latest revision it's gone up again I think 50 percent.

Can you explain what fundamentally changed in the last two years to have you increase -- and this is your base cost, this doesn't include any adders. Can you explain that, why you increased your estimate there by 50 percent?

A. (Mr. Jocham) The cost of the cable has increased from --

Q. From 2022?

A. (Mr. Jocham) Yeah, so you're looking at an extra $50 a linear foot for cost of cable.

The labor cost has increased. And I made a reference to the Bureau of Labor Statistics, there has been a 21 percent inflation rate which is labor and materials all together.

Other than that, I think those are the quick answers I can get to you. I can look at the two reports and make a comparison and give a more detailed response if necessary. But those are the two critical items that were changed.

Q. And those two critical items would apply to anywhere on the line, not just UMC Banner?

A. (Mr. Jocham) Correct.

Q. Jefferson Park; right?

A. (Mr. Jocham) Yes.

Q. Okay.

MS. GRABEL: Mr. Dempsey, really quickly, I understand this is an exhibit that you have created. Are the --

MR. DEMPSEY: Correct.

MS. GRABEL: -- numbers found elsewhere in the evidentiary record with respect --

MR. DEMPSEY: Yes. They are. They're all

in our exhibits. So revision zero -- well, actually, yeah. Revision zero is I think Exhibit 1 of UAZ. I believe Revision 1, I don't know if it's in there but we have it -- it was -- it's UAZ -- so in your prior CEC filing, in your prior application you kind of, Clark -- or Clark, you weren't involved, they walked through all the different revisions and what the differences were between and that's what I believe Revision 1 is pulled from, which I have it in here, I just can't find it quickly.

And then Revision 8 is the latest one that you guys have already included in your own exhibits, TEP's exhibits, so yes, everything is in here. Okay.

CHMN STAFFORD: About how much more cross do you have for this panel, Mr. Dempsey?

MR. DEMPSEY: I think I'm getting close to the end.

CHMN STAFFORD: All right. Because we're getting close to lunchtime, so do you think you can wrap it up here before lunch, or do you want to take a break and come back?

MR. DEMPSEY: I think -- 15 minutes should be okay.

CHMN STAFFORD: Okay.

MR. DEMPSEY: Thanks for your patience,

guys.
BY MR. DEMPSEY:
Q. So I was looking at your images, Mr. Jocham, and you put two vaults right next to each other. Is that just -- is there going to be two vaults right next to each other, or is that a -- is that just an illustration?
A. (Mr. Jocham) So because -- go ahead. Sorry.
CHMN STAFFORD: To what are you referring?
MR. DEMPSEY: To his report, his last -- his final -- his latest report.
CHMN STAFFORD: And that is Exhibit TEP --
MR. JOCHAM: 17.
MR. DEMPSEY: Yeah.
CHMN STAFFORD: Okay. When you ask please reference the exhibit, the specific exhibit you're talking about --
MR. DEMPSEY: Sure.
CHMN STAFFORD: -- so we can all be on the same page and know exactly what it is.
MR. DEMPSEY: My apologies.
BY MR. DEMPSEY:
Q. Just generally, is that just an illustrative thing? Are you going to have two vaults right next to each other?
A. (Mr. Jocham) I'm assuming you're talking about

the GIS maps at the end?

Q. Yeah.

A. (Mr. Jocham) That is illustrated correctly. We will have two vaults adjacent to each other. And that is due to the cables, having two cables per phase. So one set of cables will go into one vault, and the other set of cables will go into the other vault.

Q. And is that typical, I'm assuming?

A. (Mr. Jocham) It allows for some -- it allows for some potential increased reliability if there was an outage. So it was determined that two vaults would be more -- meet the reliability requirements that were requested.

You could technically do one large vault. The vault size would increase. And typically it's a little less common because you have to put cables on both sides. And so the vault width increases to allow for workability.

Q. And I don't know the answer to this question. I'm not trying to trap you or anything. I just am -- do they use double vaults in the Intel HIP project?

A. (Mr. Jocham) I do not know the answer to that.

Q. Thank you.

All right. Changing gears here a little bit. Any one of you can answer this question.

So ignoring transmission lines, long-distance transmission lines, and just looking at transmission lines in a city relative to distribution lines, what would you say is the ratio? Is it 10 to 1? Is it 20 to 1? Is it 50 to 1?

A. (Mr. Robinson) Transmission miles to distribution miles?

Q. Yeah, within a city.

MS. GRABEL: Chairperson Stafford, maybe he could specify what city.

CHMN STAFFORD: I'm assuming Tucson.

MR. DEMPSEY: Well, yeah, and I would assume it's similar --

MS. GRABEL: Cities?

MR. DEMPSEY: -- I guess, depends on the density.

CHMN STAFFORD: Well, I think as a rule of thumb there's always more distribution miles than transmission miles to serve customers. Isn't that an accurate statement?

MR. ROBINSON: Yeah, that is an accurate statement.

So off the top of my head, we have about 600 miles of 138 transmission line that goes -- so there's probably around 400 miles of transmission line in

Tucson. And I think we have around 6,000 miles of distribution line.

BY MR. DEMPSEY:

Q. Perfect. Thank you. So 15 to 1.

CHMN STAFFORD: I'll take your word for that math.

MR. DEMPSEY: Well, yeah, don't hold me to that.

BY MR. DEMPSEY:

Q. All right. Some of these questions I've already asked.

I guess this is related to Mr. Gold's concerns about, you know, trying to get this done timely, which I think all of us would like to get this done timely.

Actually, you know what, I'm not going to ask that question.

Okay. So you mentioned Underground Arizona's website. Let's just talk about that for a minute.

What projects does the Underground Arizona website reference that are older than the last few years?

CHMN STAFFORD: Mr. Dempsey, I think it's probably better to have your witness testify about what's on Underground Arizona website --

MR. DEMPSEY: Yeah.

CHMN STAFFORD: -- as opposed -- they are

only probably aware of what they've looked at and their criticisms of it, but they probably are not the best party to testify about what all is on there.

MR. DEMPSEY: Fundamentally the problem is that you testified to things that aren't even on there. And then, yeah, that's what I was trying to understand.

CHMN STAFFORD: Okay. Okay. If you can point to specific things they testified that aren't accurate, then you can ask them about those.

BY MR. DEMPSEY:

Q. He mentioned things from the year 2000, 20 years ago. I'm trying to understand what he's talking about?

A. (Mr. Jocham) So I may have misspoke from the website versus your exhibits I was making reference to --

Q. Okay. So --

A. (Mr. Jocham) -- an exhibit.

Q. All right. Then you probably did the same thing on these other things you said as well. Because I don't believe we talk about the high, the pressure filled --

A. (Mr. Jocham) Yeah, that was an exhibit.

Q. Right. Thank you.

And I disagree, I guess I don't need to walk through this. I was going to walk through why your math was wrong and my math was right, but I guess we don't need to do that. Let's just say I disagree with your

math.

Sorry. Just a second here.

So, Clark, if you had proceeded with this project in 2021 and you had followed all of the local laws, could this project be done by now?

A. (Mr. Bryner) I think we disagree on what local laws are applicable.

Q. Right.

A. (Mr. Bryner) But had we proceeded with the project in 2021 and received the certificate of environmental compatibility to build the line overhead, the line would have been in service. We would have been working on retiring 46kV substation, working on the distribution system upgrades.

Q. And if you had undergrounded the mile and a half or two miles required, could it be done by now as well?

A. (Mr. Bryner) I don't know.

Q. I mean, using the time frames that Mr. Jocham has already -- I mean, yes, you have caveats but I'm optimistically --

A. (Mr. Bryner) I would say based on those time frames we probably would have finished up next year.

Q. Okay. So I guess, Clark -- hold on. Sorry. Some of these questions I already asked.

MR. DEMPSEY: I'll stop right there.

CHMN STAFFORD: That concludes your cross-examination?

MR. DEMPSEY: One second. Let me see.

BY MR. DEMPSEY:

Q. Oh, no, I almost missed a really good one.

So table that you provided this morning, Exhibit 31, so I believe you've kind of answered this, but I want to be clear. What assumption are you using for underground cost? Is it the $25 million a mile or what is this based on?

A. (Mr. Jocham) Yeah, the underground costs for -- we worked over the weekend went back through and updated the tables based off of each alignment, it is based off of the base cost plus adders.

So approximately, for example, Route 1 is an example, was approximately 20.8 million a mile with the adders.

Q. And what about Route B?

A. (Mr. Jocham) Route -- excuse me -- B?

Q. Yeah.

A. (Mr. Jocham) Route B for the Gateway Corridor and University Area Plan Route B was 21.2 million a mile with adders.

MR. DEMPSEY: Okay. That's it. Thank you.

CHMN STAFFORD: That concludes your

cross-examination, Mr. Dempsey?

MR. DEMPSEY: Yes.

CHMN STAFFORD: All right. Excellent. With that we are approaching 90 minutes and it is lunch hour. Let's take an hour recess. We'll be back around 1:30. We stand in recess.

(Recess from 12:23 p.m. to 1:34 p.m.)

CHMN STAFFORD: Let's go back on the record.

I believe Mr. Dempsey had wrapped up his cross.

Ms. Grabel, did you have redirect for these witnesses?

MS. GRABEL: Thank you, Mr. Chairman. Yes, I do.

REDIRECT EXAMINATION

BY MS. GRABEL:

Q. Mr. Robinson, I'm going to direct the first question to you.

The City of Tucson talked to you quite a bit about the time line to construct an underground line down Campbell or, frankly, anywhere else.

I think you mentioned that you could encounter utilities or culturally sensitive artifacts during the

construction process that would further prolong the time line?

A. (Mr. Robinson) Yes. That's correct.

Q. Are you familiar with any construction projects in the City of Tucson recently that were delayed because the entity constructing the project had actually discovered utilities or other items buried belowground that they didn't anticipate?

A. (Mr. Robinson) I am. The -- actually, in 2012, the light-rail system that went through downtown and actually went through a lot of this project encountered a very similar delay that I described.

Q. Okay. Thank you.

And we are handing out an exhibit that is entitled TEP Exhibit 33, which is an article containing a press release from the City of Tucson that talks about this issue.

First of all, is the streetcar project from the City of Tucson within the same general vicinity of the Midtown Reliability Project?

A. (Mr. Robinson) Yes. The overall area runs through the U of A and through downtown Tucson.

Q. And would you anticipate that the Midtown Reliability Project would likely run into the same type of issues that the City ran into when constructing the

streetcar project?

A. (Mr. Robinson) Yes.

Q. Okay. Thank you.

And if you would read for me into the record the portion of this article that is quoting the City's press release just to talk about some of the items that they found belowground.

A. (Mr. Robinson) Sure. "As excavation began, it became apparent that some of the utilities that had been installed decades earlier were not actually placed in the locations shown on the plans or plans -- or no plans existed for the utility placement.

"This means that the current design of the new sewer line conflicts with the existing underground utilities already in place, which include electricity, gas, and water lines as well as fiberoptic banks and drainage facilities.

"To install the new sewer lines at the appropriate grade to function correctly the engineers must redesign the plans."

Q. Okay. Thank you very much.

And are you aware as to whether or not the discovery of these unexpected utilities underground resulted in a delay of the streetcar project?

A. (Mr. Robinson) Yeah. That one discovery

resulted in several weeks' delay and redesign and multiple closures.

Q. All right. Thank you very much.

Mr. Jocham, the next question is for you.

You also had a conversation with the City of Tucson's attorney about the excavation for the underground versus overhead construction, and Mr. Lusk raised -- Lusk, I'm sorry -- raised the potential that couldn't you just kind of turn the transmission line and cross the underground transmission line and cross the street and then continue on the other side of the street to avoid any potential, you know, culturally sensitive artifacts or other things discovered?

Are there any concerns or challenges associated with doing that on an underground transmission line?

A. (Mr. Jocham) Yes. So when you are turning an underground transmission line, it doesn't really turn on a dime. You have to curve it and bend it. The cables are big and thick, 5 inches in diameter as we discussed.

And so they don't bend very easily, so you have pretty large radius turns, which would basically cut across all lanes of traffic at that point and to the other side of the street, which would have some pretty significant access impacts and could potentially shut down the entire road if constructed to cross the road in

such a manner.

Q. All right. Thank you.

And would you have to do additional engineering -- detailed engineering design just to actually cross the street?

A. (Mr. Jocham) Yeah. If this was discovered during construction after the initial plans had been submitted, yeah, there would be a pretty lengthy reengineer that would be required.

For underground transmission, we have to calculate the pulling of the cable itself, which assesses sidewall pressure and the actual tension on the cable to make sure it's not exceeded. Any turns or bends increase sidewall pressure and increase tension on the cable as it's pulled into place.

Q. Okay. Thank you very much.

Mr. Robinson, I think back to you for this one.

There were questions from Mr. Dempsey about the preferred ampacity for the Midtown Reliability Project and why we needed to use a 6,000-kcmil cable as compared to a 5,000-kcmil cable.

Can you explain first why the underground transmission line would need a 6,000-kcmil ampacity?

A. (Mr. Robinson) Yes.

So our transmission planning department decides

the capacity of the overhead line based on the saturation study and future forecast loads.

So when they size that line, and when there was discussion about potentially having a portion of this line undergrounded, they wanted to match that capacity for the future growth in the saturation study. And so they asked that the underground segments have the same ampacity rating that the overhead transmission line would have.

Q. And what would be the ramifications if you were to lower the ampacity on the underground portions?

A. (Mr. Robinson) So from a planning perspective, that line segment could then become a limiting element of the ampacity or the capacity of that path.

So what would happen is potentially in the future as loads grew we might need to put in another line or a different project to account for that lower capacity.

Q. And when you say a limiting factor, do you mean that you could only count on that lower ampacity for the entire line?

A. (Mr. Robinson) Yeah. That's correct.

Our line rating is what the least -- the least ampacity carrying element is. It might be a jumper. It might be a switch. It might be a segment of conductor or

a transformer that's in the alignment path, but each path will have a limiting element associated with it.

Q. Thank you.

Mr. Jocham, I think this goes back to you.

Mr. Dempsey used the term oversized quite a bit in his examination of this panel.

Are we oversizing the Midtown Reliability?

A. (Mr. Jocham) No.

So in our report it does identify different runs that were performed in CYMCAP, and the two 6,000-kcmil conductors are required for deeper crossings, which we would expect on this project.

So sizing of the cable meets the ampacity requirements for the project.

Q. Thank you.

And Mr. Dempsey also asked you about the potential requirement to underground transmission facilities in downtown Phoenix.

Is undergrounding transmission lines in downtown Phoenix a safety issue?

A. (Mr. Jocham) Yeah. So there's clearance issues to the face of buildings, large buildings are built up right up against road right-of-way, and so there's really no place for a transmission -- an overhead transmission line to be built.

You have your electrical clearances from the National Electric Safety Code, which is the adopted code in the State of Arizona by law that we have to meet, and there just really isn't space for that. And so that's why the underground lines in downtown Phoenix are a necessity.

Q. Okay. Thank you.

And Mr. Dempsey also asked you about a report that he found that was contained in exhibit -- it showed on the screen UAZ-0205. It might have a different exhibit number today.

But are you familiar with that report?

Have you read it in detail?

A. (Mr. Jocham) I've reviewed it.

I wouldn't say I've read it in detail.

Q. Do you know what kind of conditions the author assumed to reach an estimated lifespan of 100 years in that report?

A. (Mr. Jocham) Yeah. It seems like the report was lab based and not -- not field based.

CHMN STAFFORD: Which exhibit is this?

MS. GRABEL: It's Exhibit UAZ-0205. It's the one that Mr. Dempsey displayed. Which is it? I guess it's UAZ-16 now.

CHMN STAFFORD: Okay.

MR. DEMPSEY: That's just the Bates stamp.

MS. GRABEL: Okay. Thank you.

BY MS. GRABEL:

Q. Is it reasonable to believe that an underground transmission facility operating outside of lab conditions but with in a real world environment will have a lifespan of less than 100 years?

A. (Mr. Jocham) Yeah. Line loading, as I had mentioned in my prior testimony, will impact the lifespan of an underground XLPE cable.

The hotter the conductor gets the quicker that the insulation will deteriorate and will need to be replaced over time.

Q. And do you know of any document that's used in the energy industry that estimates the lifespan of an underground transmission facility anywhere near the estimated lifespan contained in that report?

A. (Mr. Jocham) Most of the cable vendors that we use and as I had testified to prior, EPRI, all identify a 40-year lifespan typical of cable.

And as I testified prior, the harder you are on the cable the faster it will deteriorate. And if you do operate it at lower temperatures, there is the probability that it could last longer.

Q. Thank you.

And finally, do you believe -- are you aware, rather, that whether UAZ-16, was it, the report we're talking about 16 -- is a peer-reviewed report or study?

A. (Mr. Jocham) It does not look peer-reviewed. All the names on the report are identified to be part of the same company.

Q. Do you know what that company does?

A. (Mr. Jocham) I believe they produce cable.

Q. Thank you.

Mr. Dempsey also asked you a question about whether there was a spare cable on the SRP HIP project.

Do you recall that?

A. (Mr. Jocham) I do.

Q. And I believe you testified that there was no spare phase; correct?

A. (Mr. Jocham) I'm not aware of one. I'm -- I was not part of that detailed design, but I'm not aware that there is.

Q. Do you know whether they installed a spare conduit to later include a spare line if one became necessary?

A. (Mr. Jocham) Yes.

So as part of the -- their CEC filing, which was publicly available, they identified spare conduits and a position for a spare circuit in the future.

Q. All right. Thank you.

And so even without the spare, do you know how else Intel might be provided with power if the underground line went out?

A. (Mr. Jocham) Yeah. As a part of those series of projects, and it's visible from the highway and from the road, there is a double circuit overhead line running down the backside of Intel along the Gila River Indian reservation property.

Q. So they are fed from additional transmission facilities that could serve as a backup source of power; correct?

A. (Mr. Jocham) There are two other circuits that support Intel, yes.

Q. All right. Thank you.

And finally, if you could turn to Exhibit UAZ-59. And that is the spreadsheet that Underground Arizona had displayed on the screen that listed various figures contained in prior versions of the S & L study.

Do you recall that?

A. (Mr. Jocham) Yes.

Q. Did you have a chance to review that in greater detail over the lunch hour?

A. (Mr. Jocham) I did.

Q. Do you have anything that concerns you about the calculations or errors that you discovered in Underground Arizona's document?

A. (Mr. Jocham) Yeah. I think there is a few items.

One, the document here and the difference that's identified as taking the underground minus overhead cost and then sub -- and then dividing it by the overhead -- the total overhead cost, it is not taking the total underground cost and dividing it by the total overhead cost, which is the multipliers that we're identifying in our report -- in the S & L report, excuse me.

So he -- the Exhibit UAZ-59 is basically taking the difference between underground and overhead and then dividing it by the overhead cost. Not quite an apples-to-apples as the way the S & L is representing it.

In addition, though, the numbers that were explicitly asked to me in cross are correct. They are for segments 6 and 7, not for 5 and 6 as identified in testimony.

In -- I guess one more item is the overhead cost per mile that's identified in the spreadsheet on the screen, UAZ-59, it identifies a use of $4.1 million per mile as the overhead cost.

And as we had discussed prior, that number I

believe -- and I'm not going to completely assume so, but I believe that comes from UAZ-8, which is an APS document which, again, identifies a double circuit 230kV line with double circuit 69kV underbuild. And those numbers, they provide two sets of numbers, right-of-way and construction costs, and then a total cost.

If you take that total cost, you get about 4.1 to 4.3 million dependent on the line segment that APS identifies.

If you take the right-of-way cost out, it's all the way down to 3.3 million or less.

And then, again, that's a quad circuit line, not a single circuit 138kV line.

So the number -- overhead number that's being utilized is inflated versus what TEP is representing as their overhead cost of 1.2-ish million, which, again, was represented in our -- in the TEP-31 document that truly identifies the costs that Clark and TEP have generated as far as overhead costs for the 138kV line.

Q. Thank you.

MS. GRABEL: That's all the redirect that I have, Mr. Chairman.

CHMN STAFFORD: All right. I believe some of the members had questions.

MR. DEMPSEY: Can I do follow-up as well?

CHMN STAFFORD: No.

MR. DEMPSEY: No? Okay.

CHMN STAFFORD: Members, questions?

I thought you had a question, Member Drago.

MEMBER DRAGO: So I wanted to build off of Member Gold's question about the storm last night and the pole types that fell down due to the storm.

We were wondering -- well, I'm wondering if we'd be worth putting on the record -- and I'm not sure who this goes to, but in your attempt for reliability, in that reliability context, is there a design specification for wooden poles versus steel poles and what those poles can handle in terms of a storm event, wind, things like that?

MR. ROBINSON: I'll do my best to take that question and answer it to the best of my knowledge and ability, right.

So Tucson Electric Power's new standard -- and it's been a standard for quite a while -- is the use of steel poles over wood poles. And the use of the governing codes that require safety factors for steel poles is different than that for wood poles.

And it's a little more -- and I hate to use to word robust, but it's more complete and more scientific than the wood pole strength calculations that

are used.

So we still will use a wood pole where -- in a distribution setting, not in a transmission setting but in a distribution setting where it might be on a back lot line or in a distribution crossing configuration where the -- where the wood and the nature of the wood being insulated makes it a safer pole to use for the crews while they're installing the pole, right.

So we'll still install some wood poles on our system due to safety consideration, but our standard is a steel pole because of the reliability and the additional strength and the additional design consideration that goes behind the engineering of the poles themselves.

MEMBER DRAGO: Thank you.

I guess I'm trying to understand that could we say that -- if this project was completed as of last night and that significant storm occurred, would we have been out of power for that long?

MR. ROBINSON: I think we could easily say -- confidently say that the impact of that storm wouldn't have been as significant as it is today.

MEMBER DRAGO: Thank you.

MS. GRABEL: And if I can follow up on that, Mr. Chairman.

Is it true that the Midtown Reliability Project not only replaces wooden poles with steel poles, but it's actually burying a significant number of wooden distribution poles?

MR. ROBINSON: Yes, that's true.

The application as filed would reduce the number of wood distribution poles and transition them to underground in this project.

MS. GRABEL: And would you agree that further mitigates the impact of a microburst like Tucson saw yesterday evening?

MR. ROBINSON: Yes.

MS. GRABEL: Thank you.

Anything further?

CHMN STAFFORD: So does that conclude your direct case?

MS. GRABEL: Except that we do have the road corridor map that the Committee asked for. If you would like us to put that on now or whenever you want.

CHMN STAFFORD: Is that going to be TEP-32? Because that's the gap --

MS. GRABEL: It is. Yes.

CHMN STAFFORD: -- I have in my exhibit list.

MS. GRABEL: It's TEP-32.

CHMN STAFFORD: Okay. Let's do that.

MS. GRABEL: And we'll do this through Mr. Bryner.

CLARK BRYNER and MR. ROBINSON,
called as witnesses as a panel on behalf of Applicant, having been previously affirmed or sworn by the Chairman to speak the truth and nothing but the truth, were examined and testified as follows:

DIRECT EXAMINATION

BY MS. GRABEL:

Q. So, Mr. Bryner, while Mr. Ancharski is handing this out, I'm going to ask you to first just discuss the various pages that the Committee is getting because they're voluminous.

A. (Mr. Bryner) Sure.

So you're getting a map set just of our preferred route, so that's Route B and 4 that shows a proposed -- a proposed corridor width that's more minimal than our 400-foot blanket corridor that we'd requested before.

So the top page shows sort of a key that shows you what the pages after that are. So there's 10 pages in total.

So the top one, again, is sort of a map key, and it shows you where page 1, 2, 3, 4, 5 through 9 are located with respect to the overall routes.

And if you go to each of those route maps, you'll see the proposed corridor overlaid on an aerial image with parcels. So you can see residential, commercial, different parcels from Pima County's parcel database are overlaid there.

So that's what's on the maps.

Do you want me to talk about the widths?

Q. Yes. Why don't you do that.

A. (Mr. Bryner) Okay. So the way we've done this is we understood --

CHMN STAFFORD: Are you going to put this up on the screen?

That would be very helpful I think to everybody.

Have these been sent to Tod to send to Member Somers and Little?

MS. GRABEL: Yes.

CHMN STAFFORD: Excellent. Excellent.

BY MS. GRABEL:

Q. Okay. So we know there were concerns about some of these corridors overlapping two, three kind of lots deep along either side of the intended transmission line

route. And so we wanted to illustrate how these diminished or minimized corridors would affect adjacent properties.

But basically, we're still taking a somewhat blanket approach because we wanted to request a corridor -- and let me just caveat all this, while we're illustrating this for Route B-4, this same approach would be true for any of the routes.

So we took 200-foot -- so 100-foot on either side of the center line for the road for any of the arterial streets, so that was like Grant Road, Campbell, 36th Street, those major roads, with the one exception being Euclid.

Euclid is classified as an arterial, but, as you saw when we went out on the field trip, it's not nearly as wide as some of those other roads. So we're asking for 120-foot-wide on Euclid, 60 foot either side of the center line. And that was the same distance we were asking for on any of the collector streets like Park, Tucson, those would have been considered collector streets. And then 100-foot wide, 50 foot either side of center line for any residential roads.

So that was just to account for while it still does cross into lot lines or parcels, it gives us the road right-of-way plus a reasonable -- I'll say a

reasonable buffer to ensure that, Hey, if we've got to get a private easement for an aerial overhang on a private parcel that it would be included in that corridor.

And then the last thing I wanted to mention is we wanted to still ask for the 400-foot width on crossings of Aviation, the Aviation Highway. It's ADOT railroad right-of-way right there, so it's not necessarily affecting private parcels, but it just gives us a little bit more wiggle room for those taller spans and micrositing the placement of those poles.

MEMBER RICHINS: Chairman.

CHMN STAFFORD: Yes, Member Richins.

MEMBER RICHINS: What governs the right-of-way, the existing rights-of-way and easements that you have now?

Is it the franchise agreement or is it something within the City of Tucson or is it something done through us?

How does that exist now?

MR. BRYNER: Let me clarify.

So you're talking the legal land right or you're talking the width?

MEMBER RICHINS: The legal land right.

MR. BRYNER: So of various means.

So with the City of Tucson we have our franchise agreement. So that gives us the right to place our facilities with any City of Tucson owned rights-of-way.

We have -- with like ADOT we would get, I believe, they grant licenses to be within their rights-of-way. Private property, we'll secure easements. And those are we don't have to ask for your permission for that. We just go out and we secure that.

MEMBER RICHINS: So I think I'm hearing, like, four or five different ways that your rights-of-way are governed.

MR. BRYNER: There's many different numbers.

If you go across federal land, you're going to get special use permits and different things.

If it's your land --

MEMBER RICHINS: Has your --

MR. BRYNER: -- you'll get leases. Sorry.

MEMBER RICHINS: No. I'm trying to be way better for Jennifer. I've been on her naughty list, and I want to get off it.

So does your franchise agreement renewal address anything that -- I mean, could the potential renewal address anything that is helpful for you guys in

your right-of-way?

And, I mean, I'm trying to understand the functionality of the franchise agreement within granting a corridor.

So the City grants you in the franchise agreement certain rights of city-owned rights-of-way that you can use for utility infrastructure?

MR. BRYNER: Correct.

MEMBER RICHINS: Assuming they will limit that depending on their own infrastructure needs.

MR. BRYNER: I think so. Yes.

MEMBER RICHINS: Yeah. Okay. Thanks.

CHMN STAFFORD: Quick question. So how does TEP secure an easement on private property?

MR. BRYNER: So kind of our process is we'll do an appraisal of it, find out what the fair market value is, we'll extend on offer to that landowner, and begin negotiations from there.

CHMN STAFFORD: And typically they will -- you'll reach some sort of agreement with the property owner?

MR. BRYNER: Almost every time.

CHMN STAFFORD: And the not every time, that's -- what's the remedy?

MR. BRYNER: So that would lead to

condemnation, which is something we always try to avoid and almost always have been able to avoid.

CHMN STAFFORD: Excellent.

MEMBER RICHINS: Chairman.

CHMN STAFFORD: Member Richins, do you have a question?

MEMBER RICHINS: Yes. Who has the condemnation right?

MR. BRYNER: The utility.

MEMBER RICHINS: TEP?

MR. BRYNER: TEP.

MEMBER RICHINS: The City has one.

MR. BRYNER: So -- yes. But TEP --

MEMBER RICHINS: You guys also have condemnation authority.

MR. BRYNER: That sounds right.

CHMN STAFFORD: Oh --

MEMBER RICHINS: I did it again. I'm so sorry.

MR. BRYNER: You can put that one on me.

CHMN STAFFORD: Yes. Gentlemen, one at a time, please.

MR. BRYNER: Yeah. So the utility TEP also has condemnation authority.

CHMN STAFFORD: Any other questions from

members?

(No response.)

CHMN STAFFORD: I'm going to allow the parties to cross-examine the witnesses on the two new exhibits that were introduced on redirect, TEP-32 and TEP-33.

Ms. De Blasi.

MS. DE BLASI: I do have one question, Chairman.

And thank you for putting these together. It's really helpful.

CROSS-EXAMINATION

BY MS. DE BLASI:

Q. Mr. Bryner, I recall that you said you were going to be asking for a wider corridor along the routes D, 1, and 6 that would go along Lester or Ring Road.

Is that still accurate? Or 400-foot corridor?

A. (Mr. Bryner) So -- yeah. So you're talking about just west of Campbell getting into the Vine Substation?

Q. Correct.

A. (Mr. Bryner) So if that were selected, that would be our preference for maximum flexibility. Knowing that Ring Road is owned by Banner and so we don't have an

existing land right, and from conversations with Banner, I understand that you wouldn't really be agreeable to a land right on Ring Road.

So if that remained the case, then we'd want to ensure that our corridor at a minimum encompassed Lester where we did have a land right so we would have a viable route.

Q. Okay. Thank you.

So I'm just wondering -- and I know you're generating these, so thank you for doing that, but do you yet have any kind of exhibit showing that?

I know you haven't entered it yet, but we're about to have testimony. It would be helpful to see it if you did.

A. (Mr. Bryner) I don't have it.

Q. Okay.

A. (Mr. Bryner) I was working on creating something, but I think if that becomes a route that the Committee is looking at selecting, then we will definitely create an exhibit so that you can see it.

MS. DE BLASI: Okay. That was all I have.

CHMN STAFFORD: Now, where -- that would be on -- are you talking about that would be in Section 4 of first map of this exhibit of Exhibit TEP-32?

MR. BRYNER: It would be sort of on

Section 4, but primarily extending outside of Section 4 to the east.

CHMN STAFFORD: Oh, okay, so it would be outside of the box -- the Section 4 box.

And to the east you said?

MR. BRYNER: Correct. So this -- the maps we created for TEP Exhibit 32 are just of the preferred route, and so that would be pertinent if D or 1 or 6 became -- or were -- we were discussing those routes.

CHMN STAFFORD: Okay. All right. Thank you.

Any other questions from members?

Ms. De Blasi, does that conclude your questions?

MS. DE BLASI: That's all I had, Chairman.

MEMBER RICHINS: Ms. De Blasi, I just had one question.

CHMN STAFFORD: Oh.

MEMBER RICHINS: So with the narrowing of the routes, particularly on page 4 where it goes into the Vine Substation, is this the space -- we talked about chicanes and the opportunities for poles that may be sitting in the roadway that also go along with the City's desire for traffic calming. Would that be a route where that would be evaluated?

MR. BRYNER: In my mind, that would be an ideal location.

MEMBER RICHINS: Okay. Thank you.

CHMN STAFFORD: Are you talking about on Adams Street?

MEMBER RICHINS: Yes. Where the Vine Substation where it comes in off of the line from 4 from at down Adams and also --

CHMN STAFFORD: Vine.

MEMBER RICHINS: Yeah. What's the other north/south street?

CHMN STAFFORD: Vine Avenue, it looks like there.

MR. BRYNER: Yeah. So between Park Avenue --

CHMN STAFFORD: You're talking about Park Avenue? You're talking about Park Avenue?

MEMBER RICHINS: Yes. Park.

CHMN STAFFORD: Okay. So we're talking about Park Avenue, Adams Street, and Vine Avenue?

MEMBER RICHINS: Yes.

CHMN STAFFORD: Okay. Mr. Bryner, do you have something to add?

MR. BRYNER: No. I apologize.

CHMN STAFFORD: Does that conclude your

cross, Ms. De Blasi?

MS. DE BLASI: Yes.

CHMN STAFFORD: All right. Mr. Lusk.

MR. LUSK: Thank you, Mr. Chairman. Just real quickly.

CROSS-EXAMINATION

BY MR. LUSK:

Q. Mr. -- actually, I'm not sure who entered TEP-33. Is that the news article, was it?

A. (Mr. Robinson) Yes.

Q. Oh, I'm sorry, 32.

Was that you, Mr. Robinson --

A. (Mr. Robinson) Yes.

Q. -- that discussed it?

Just to be clear, that was not an archaeology issue. That was a utility coordination issue?

A. (Mr. Robinson) Yeah. It was a utility conflict resolution. Yes.

MR. LUSK: Thank you.

CHMN STAFFORD: Mr. Dempsey.

MR. DEMPSEY: So the only questions I would have would be math questions, and I don't know if that's -- I can save it for my testimony and walk Mr. Jocham through the math or I can ask him questions

right now if you'll allow it. I can ask him one or two questions.

CHMN STAFFORD: About the map?

MR. DEMPSEY: No. So that's why I was --

CHMN STAFFORD: About the article?

MR. DEMPSEY: No.

CHMN STAFFORD: Okay.

MR. DEMPSEY: All right.

CHMN STAFFORD: What did you have a question about?

MR. DEMPSEY: He had mentioned that our math was wrong, and I wanted to point out how it wasn't.

CHMN STAFFORD: Oh, you can do that on your direct then. Okay?

MR. DEMPSEY: Perfect. Fine.

CHMN STAFFORD: Okay. All right. Any further redirect?

MS. GRABEL: No further redirect, Mr. Chairman.

CHMN STAFFORD: All right. Thank you.

All right. Well, let's go to your exhibits.

I think we've covered everything except for, like we said, TEP-18 and 19.

I presume you're holding those as a

rebuttal witness.

MS. GRABEL: Yes, Mr. Chairman. We will be calling rebuttal witness if determined necessary after we hear the direct cases of intervenors in this matter.

CHMN STAFFORD: Okay. Well, with that, we'll admit Exhibits TEP-1 through 17 and Exhibits TEP-20 through 33.

(Exhibits TEP-1 through TEP-17 and TEP-20 through TEP-33 were admitted.)

CHMN STAFFORD: All right. Ms. De Blasi, are you prepared to call your witness?

MS. DE BLASI: We are, Chairman.

CHMN STAFFORD: Would you like a brief recess to reconfigure the witness area with your witness setup?

MS. DE BLASI: That would be terrific.

CHMN STAFFORD: Okay. Let's take a five-minute recess to allow the next panel to convene. We stand in recess.

(Recess from 2:08 p.m. to 2:16 p.m.)

CHMN STAFFORD: Let's go back on the record.

Ms. De Blasi, would you like to call your witness?

MS. DE BLASI: Yes.

Just before I start, I provided our exhibits to all the Committee Members and the parties. I believe TEP also put them on the Committee Members' iPads. So I believe everybody has those.

Mr. Barkenbush, would you --

CHMN STAFFORD: Call him to the stand first and let's get him sworn in.

MS. DE BLASI: Oh, go ahead. Sorry. Jumping ahead.

CHMN STAFFORD: Mr. Barkenbush, would you prefer an oath or affirmation?

MR. BARKENBUSH: Oath.

CHMN STAFFORD: Do you swear the testimony you will give in this matter will be the truth, the whole truth, and nothing but the truth so help you God?

MR. BARKENBUSH: Yes, I do.

CHMN STAFFORD: Please proceed, Ms. De Blasi.

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MARK BARKENBUSH,

called as a witness on behalf of Banner University Medical Center and Banner Health, having been previously affirmed or sworn by the Chairman to speak the truth and nothing but the truth, was examined and testified as follows:

DIRECT EXAMINATION

BY MS. DE BLASI:

Q. Okay. Mr. Barkenbush, can you please state your name and your business address.

A. Mark Barkenbush. My business is 2901 North Central, Suite 160, Phoenix, Arizona 85012.

Q. And to whom are you employed and what is your role?

A. I'm employed by Banner Health. I am currently the vice president of facilities services for Banner Health.

Q. And did you prepare or direct to be prepared Exhibits BUMCT-1 and the presentation marked as BUMCT-2 for your testimony?

A. Yes, I did.

Q. And is that content true and correct to the best of your knowledge?

A. Yes, it is.

Q. Can you please briefly discuss your professional experience.

A. I have been employed by Banner Health for the past 17 years. Prior to that I've worked for two other health care systems, one in Phoenix and one in the Midwest.

I'm a degreed engineer with both undergraduate and graduate degrees in electrical engineering. I focused my entire career in the health care facility services field.

Q. And with respect to this project, can you just briefly describe your facilities experience?

A. I've been a part of Banner - University Medical Center Tucson since our acquisition of the University of Arizona Health Network. I had familiarity obviously with the campus being born and raised in Tucson and going to the U of A, but my professional role started in 2014 where I was leading our campus expansion project that we embarked upon shortly after our acquisition and have been a part of supporting the campus and the facilities ever since.

Q. And with respect to your presentation on Exhibit BUMCT-2 as filed, were there any changes to that presentation?

A. We made one change to it to add page numbers in

case we needed to move back and forth between them.

Q. Okay. So referring to your slide presentation, can you please provide an overview of Banner Health and Banner - University Medical Center Tucson?

A. Sure. Let me provide just a few, I guess, broader contextual remarks about Banner Health for some of the members who might not be familiar with us.

We're the largest employer in the State of Arizona with over 50,000 employees in Arizona. We operate, though, in six states. The majority of our operations are in Arizona, but we do have facilities in six states.

We're one of the largest not-for-profit health care systems in the country. And then let me start to drill down a little bit deeper into kind of the specific options here in Tucson.

The main campus or the Tucson campus that we refer to as the main campus has 649 total licensed beds. 184 of those are intensive care, 36 of those are neonatal intensive care, so a sizable number of those beds are high acuity beds.

Some 2023 operating statistics. We had over 25,000 total admissions, that represented as another way in 167,639 total patient days, a little over 18,000 surgeries, 2,746 newborn delivers. It's a busy emergency

department with nearly 70,000 emergency department visits. And in total there's 3,210 full-time equivalent employees.

Our facility is one of two Level 1 trauma centers in southern Arizona. The other one is the Carondelet St. Jose's Hospital. We have been a Level 1 trauma designation for quite some time.

We're the primary teaching affiliate for the University of Arizona College of Medicine both here in Tucson and in Phoenix.

There's multiple clinical specialties that we offer in the oncology or cancer area, cardiology, neurosciences, and pediatric services as well.

We also are very proud of our ranking on the U.S. News & World Reports as the number one hospital in Tucson and the number two hospital in Arizona. In the health care industry that's a bit of a coveted type of gold standard to have those types of ratings.

To drill down a little bit further, the -- just a little bit about our history in Tucson. We acquired the University of Arizona Health Network and about 30 acres of land in 2014. The land was under ownership of the Arizona Board of Regents.

And at that point in time the University of Arizona Health Network was struggling financially in very

dire straits on the verge of bankruptcy. Banner was one of the probably only health care systems in Arizona that could step in and assume that risk and take on the challenge of trying to turn around the operations fiscally as well as make a sizable capital investment because capital investments had been constrained and deferred for several years.

So in 2014, planning began for a new bed tower, which includes new operating rooms, new diagnostic imaging, a new front entrance, along with some other important support services like kitchen and dining services.

We relocated the majority of the ambulatory services into a building that we refer to as the North Campus. It's further north on Campbell Avenue at Allen Road close to River Road. A large building there was built to accommodate that. And that was to separate out a lot of the ambulatory traffic that was on the main campus so that we could devote more of that specifically to inpatient traffic.

There is still some ambulatory services on the campus, but mostly it is now all inpatient services, so we decanted a lot of traffic out of there. And in the process of doing so we significantly improved the patient and visitor access.

Well, that investment that we committed to at the time of the acquisition was $500 million. But since then, we have completed 129 separate projects, including that one at 500 million, bringing the total investment as of 2024 to just over $700 million on the campus.

BY MS. DE BLASI:

Q. I think there is one more slide.

A. I'll give you a little bit of context on the campus in some upcoming slides with some aerial images. So some of this is text, but it sets the stage.

But the history of the campus started in the late '60s, and then was expanded in the early '90s, expanded again in the mid-2000s.

And all of that growth was under the auspices of ownership under the Board of Regents, and thus was not required to comply with City of Tucson zoning codes and standards.

And as a private developer, and owning the land and the property, we were aware that we would have to comply with all of City of Tucson zoning ordinances. So things like stormwater retention and detention property setbacks, building heights, and parking requirements were all things that we knew we would have to comply with.

And we were fine with that. But undertaking that required that we put into place the City of Tucson

refers to it as a planned area development or a PAD type of zoning because the other zoning classes don't suit themselves very well for a hospital type of use.

And that's not uncommon. That is not a criticism of the City's zoning ordinances. We run into this in many of our municipalities. And so we set out to put a PAD in place. And a part of that involved significant outreach with surrounding neighborhoods that were impacted by our proposed development in an outreach process that was very similar to what the Committee has heard in Tucson Electric's testimony about their outreach efforts.

We pride ourselves on being a good neighbor and a responsible developer, and so we had significant communication with all of the neighborhood associations. But one that you're going to hear more about is our neighbor directly to the north, the Jefferson Park Neighborhood Association.

Q. So given all of that would you say that Banner is a unique and critical hospital and medical facility for the Tucson community and larger region?

A. We believe that we are for a few different reasons. As I mentioned, we are a Level 1 trauma center. And there is one other, St. Joseph's Hospital.

But the breadth of services that we offer at the

main campus is arguably a much higher, much more complex level of services than offered elsewhere. I think we're recognized in southern Arizona for the Level I trauma center designation.

If there were a president visiting the Tucson market, we would be designated as the location where the president would be taken. So the reputation for the hospital and the relationship with the college of medicine clearly distinguishes ourselves.

Q. And can you talk just a little bit more about some of the services that are provided there, specifically what types of things that make the hospital medical campus so unique?

A. So we have a fair number of solid organ transplant programs. We have specialty cardiology and neurosciences or brain specialties.

The pediatric specialties speak for themselves. We have a large neonatal intensive care unit and take care of some of the most fragile babies. We have a pediatric bone marrow transplant, adult bone marrow transplant, stem cell transplants, so things that you only find at a handful of hospitals in any state.

Q. Okay. Let's move into some of the history.

If you'd like to go through the slides. And we apologize. We understand these are little bit hard to

see, but they're a little bit older overviews.

So, Mr. Barkenbush, can you sort of orient us to some of the landmarks around the campus.

CHMN STAFFORD: Member Hill, I believe you had a question for this witness.

MEMBER HILL: Yeah. I just wanted to go back to the previous slide.

MR. BARKENBUSH: Sure.

MEMBER HILL: It's mostly that I wanted to confirm a little bit about time lines and entitlements to the property.

When you purchased the property in 2014, when was the PAD approved?

MR. BARKENBUSH: The PAD was approved, I believe, in 2016. It was a couple -- at least a solid year, year and a half.

MEMBER HILL: Okay. And in the previous slide even -- you talked about the new bed tower, potentially some new structures.

Are all the structures that you've added to the facility, were those added once the PAD was approved, or were there some exceptions made prior to the official approval of the PAD?

MR. BARKENBUSH: No. They were all added after the PAD was approved.

MEMBER HILL: Okay. Thank you.

MR. BARKENBUSH: You're welcome.

BY MS. DE BLASI:

Q. Okay. Mr. Barkenbush, please proceed with the sort of orienting us on the photograph and then some of the history.

A. Sure. I've tried to find some historic aerial images. This first one is a little dim, and so I'm using the laser pointer to help orient you.

But the next several aerial ages are all organized the same way where Campbell Avenue is at the right-hand side of the image, and the Ring Road -- although not shown in this because it didn't exist back in the '70s, but the Ring Road and Lester portions of some of the routes are at -- essentially at the top of the image.

So back in the early '70s, what existed on the campus of note was the original hospital, these two towers where the cursor is moving, the college of medicine. And of note, there's a helipad. It's hard to appreciate from this aerial image, but this is a ground-mounted helipad. So it's down at grade.

And then those of you from and familiar with Tucson will remember the polo fields and polo village that existed in that vicinity back at the time.

As the campus grew, I picked a few different snapshots. So this is a 2001 aerial image. And so those original structures are called out with blue callouts, but at this point what we refer to as the north expansion had occurred as a four-story addition. There was a parking structure added for visitors and staff.

You can now see portions of the Ring Road that had been developed. And these buildings that are called out with hospital security and maintenance and facility and office/research buildings, these were temporary buildings. They were modular trailers. They were moved on to site. They were intended to be there for just a few years back in 2001 and remained there for many, many more years than ever intended. And you'll see in the next slides that those were eventually removed.

Progressing forward to 2008, in this image the major change that had occurred was the addition of the Diamond Children's tower. That's this backwards L-shaped building that I have called out with the red callout.

The remaining portions of the campus were essentially the same, but that was a significant addition to the campus back --

CHMN STAFFORD: Member Drago, I believe you had a question.

MEMBER DRAGO: Yeah. Hi. Can you point

out where we stood when we did our field trip --

MR. BARKENBUSH: Yes.

MEMBER DRAGO: -- in that garage.

MR. BARKENBUSH: We -- so we were not in this garage. We drove past it. As the shuttle buses entered the campus from Campbell, we were driving past it.

The Vine Substation -- you'll see in the next image the parking garage that we saw from the proposed Vine Substation location is where this surface parking lot is. So we were standing on the tour approximately where my cursor is positioned right there in that image.

MEMBER DRAGO: Thank you.

MR. BARKENBUSH: You're welcome.

I included this --

CHMN STAFFORD: Please proceed. Go ahead.

MR. BARKENBUSH: Thank you.

I included this 2015 aerial image because it shows that parking structure that had been added and where we were standing. But it sets the stage for what remained on campus and what changed with our $500 million project.

So it's a pretty good reference point as progressed through this. So when Banner entered the

picture and acquired the property, this is how things looked at that point in early 2015.

Advancing to the current aerial image, a few things I want to point out.

So many of those or all of those modular buildings had been removed. So they were in this image close to the Ring Road.

The Ring Road has been altered and widened, and I'm going to point out a number of features.

So just as point of reference Diamond Children's is positioned here in this backwards L-shaped building. In this image the resolution is high enough where you can see two helipads, one where my cursor is and the second where this is. These are now roof-mounted helipads, so they are approximately seven stories above grade.

The bulk of the new patient tower and the podium that it sits on is this portion of the campus. This is a nine-story structure. And in front of that is a small portion of the building that is the front entry.

The parking -- second parking structure is off to the left. And two points that are hard to appreciate in this aerial image, there's about two million gallons of underground water retention underneath this surface parking lot. And then secondarily this --

we refer to it as the north green. We had pointed it out on the tour. This is a very large stormwater retention detention basin as is this basin right here.

So as part of the zoning requirements in addressing years of development on the campus, we committed to the neighborhood and tried to eliminate as much flooding as possible and improve the situation over the years with the development on the campus.

None of that had been addressed. And so literally during the monsoon season, many of the streets in the Jefferson Park neighborhood had significant short-term flooding episodes. It would evenly subside, but it had become a long-standing concern because all of the topology of this area conveys water from south to north to the Rillito River where it is collected.

So these became important measures to address the neighborhood concern and our responsibility to handle our own stormwater along with what else we receive from the south from the other portions of the university campus.

You will note also that there were a number of residences or houses. They weren't all private residences. Some were occupied by Banner and some by the university. A number of those were removed as part of this so that we could create this stormwater detention.

The -- you'll hear some additional feedback about these and some features.

But I want to point out, maybe while this image is showing, we also have -- recognizing we have two rooftop helipads and require elevators to get there, we always try to be mindful of contingency planning and what-if events because having elevated helipads requiring elevators to get there bring with it some risks. We have two side-by-side elevators that serve that. We have to take one out for service. But if we were ever in a situation where both were out of service, we would be out of the use of the helipad because taking a stretcher through a stairwell is a last resort that we would ever want to do.

So having learned from past experiences on other campuses and other disaster planning, we purposefully kept the landscape planting in this rentention basin very sparse so that should we ever have to in an emergency situation, we could use this surface area as a spot to land an aircraft.

BY MS. DE BLASI:

Q. Okay. And while we're still on this -- and the slide numbers didn't make it on to the slides that are on the iPads, but -- or that we're looking at now.

But this is slide number 9. Can you just show

what we were briefly discussing with -- I know we don't have an applicant's overview showing the 400-foot corridor that would be asked for through here, but given this overview can you just sort of give us a general idea of where it would go through this area and understanding that Lester Road is on the north end of that kind of cut off at the top of the photo.

A. Yes. Let me try to get the pointer to work.

So this approximately 400-width band that we've seen from TEP kind of skirts across the northern end of this parking lot, somewhat across a portion of this structure and find its way out towards Campbell sort of clipping this retention basin.

Q. Okay. And similar to the north of Lester it would run along --

A. Correct. North of Lester -- and Lester is just at the top of page. This is the sidewalk where my cursor is pointing just out off of Lester. So it is just outside of that. So above this image we would encompass the north end of that 400-foot path.

Q. Okay. Great.

And so you had started to talk about the Jefferson Park agreement. And so I think you have a slide talking through the contractual arrangement?

A. Yes. So there's -- it's part of our PAD

development and outreach to neighbors. Our involvement with the Jefferson Park Neighborhood Association was the greatest given they're our closest neighbor.

We're buffered a bit on the west side by some university buildings and some fraternities and some other sort of less sensitive uses, and then Campbell Avenue on the east side of our property. So we have gotten to know many of the neighbors in the Jefferson Park Neighborhood Association.

And that's not new to Banner. That has been a long-standing relationship. But recognizing that we were encroaching further upon them, we framed an agreement that is a recorded agreement that both parties have signed.

And within that agreement, it speaks to stormwater drainage and other improvements and the creation of what is named in that the North Green as a buffer between the neighborhood and our campus.

There's an expectation -- well, there's an allowance that we could use that North Green for some of the stormwater detention, but an expectation and desire to have some Park-like landscaping, some pedestrian and bicycle paths, some benches and tables and shade structures that we would maintain that North Green and that if possible in the future, we would extend that

North Green further to the west should any of the remaining residences that are private residences become available. And we have honored that.

So that was -- that we agreed to that. The term of the agreement is in perpetuity. However, there are provisions that either party upon mutual agreement can propose changes to it. But it has some teeth is my point.

We have -- we constructed it, and we have made those improvements, and we continue to maintain that. And so we pride ourselves, we felt like we showed the neighborhood that we can be a good neighbor.

It's also an amenity that is something that we wanted. We enjoy the landscaping. We know that coming to a large hospital campus can be confusing. Coming as a patient or a family member with a patient or to see a patient can understandably be an anxious point in time. And so we tried to make sure that getting -- finding your way to our parking lot, to your front doors is as easy as possible.

So we did not feel that adding these types of amenities at the entry was just for the benefit of the neighbors. We wanted it as well. And other campuses that we have developed have had similar features. It's just this one is serving kind of double conduit because

we're in a more dense urban environment encroaching upon residences.

Q. Can you describe a little bit more the community outreach process to reach that agreement?

A. Certainly. So we held a series of information sharing meetings and listening meetings, again, very similar to the process TEP used. We approached neighborhood associations and hosted some ourselves or attended some of their regularly scheduled neighborhood association meetings.

The City requirement for creation of PAD required, you know, one or two formally scheduled meetings where all would be invited, but we tried to exceed that and tailor discussions to each neighborhood. Because they were slightly different given the proximity to the campus.

In addition to this agreement with Jefferson Park Neighborhood Association, there was another agreement or document that Banner Health inherited. It's a memorandum of understanding between now Banner Health and the Jefferson Park Neighborhood Association regarding helicopter traffic.

We back in the '80s, early '90s, I'd have to look back at the original creation of it, but helicopter traffic was a point of concern. And when we elevated the

helipads to the roof of Diamond Children's, it added emphasis to the awareness of the helicopters, the noise of the helicopters. An evaluated helipad can be noisier and a bit more impactful to the neighbors.

And so we have a route that we ask the pilots to fly when possible. It's referred to as the fly friendly route. And that route is east and westbound along Speedway or further south and northbound once they hit Speedway above Campbell and then turning left into the campus.

And that route is intended to stay away from above homes. It's in close proximity because there's not a lot of space. But I can share with the Committee that we have continued to honor that MOU. We take it very seriously. We monitor all of the traffic on the helipad. And I'll share a bit more of that data in a bit.

And we strive to work with the pilots to get them to understand the fly friendly route and to follow it whenever possible. They have permission, and they must ensure the safety of the aircraft themselves and the patients to stray from that also due to weather. But whenever possible we ask them to adhere to that agreement as well.

Q. So would a large power line in this area impact the operations, the viewshed, the life flight operations

and other amenities at the medical campus?

A. It certainly would.

I'll share more images here in a bit about the viewshed. But that contingency plan for the ground-mounted landings or the ground landings would be directly impacted by routes along the Ring Road and along Campbell. The --

CHMN STAFFORD: Which routes are those?

MR. BARKENBUSH: D, 1, and 6, I believe, Chairman.

BY MS. DE BLASI:

Q. We're going to go into more detail specifically to each route shortly.

A. The height of the poles, as TEP has testified, will be certain -- and you'll see this in some of my upcoming images -- certainly in our viewshed but getting close to the height of our helipads. Our helipad is just above the height of the poles, but it's putting high voltage lines, you know, in close proximity to the flight path to and from the helipad.

I described, you know, the helipads themselves. I would also testify that this helipad is an active helipad. We have monitored the number of flights for many, many years, and on average right now for the past few years we have about 1200 flights per year.

A flight includes an arrival and a departure. So it's 1200 arrivals and another 1200 departures. So 2400 encounters, if you will, in close proximity to the power lines. So on average, you know, we're seeing three-ish or so flights per day.

We can go -- I've seen as many as 10 on a very, very busy day. And then sometimes we'll be lucky or in the neighbor's opinion lucky and not have any flights for a couple of days.

Q. So we drove past the medical campus on Ring Road on a couple of occasions during the tour last week.

Can you show us some of the features of the hospital and medical campus with the photographs?

A. Yes. I'm trying to make it advance. There it goes.

Q. There you go.

A. Make sure I didn't go too far.

So let me just back up and make sure I did -- okay.

This image is taken standing more or less on the Ring Road looking to the south, or if you recall in the buses, it would have been out the left-hand windows of the bus tour. So it's standing approximately where you would turn off the Ring Road into arrive at the emergency room if you were bringing a patient to the emergency

room. It's not where the ambulances drop off.

So looking at the building, the -- this upper portion is what I would refer to as the patient tower, and it's sitting upon a four-story what I refer to as a podium.

You'll notice a fair amount of glazing on this couple stories of glass here and then a couple stories of glass to the right. And then windows from the patient rooms on the patient tower here. Windows all along here. And then some -- in this portion of the building there's some staff areas as well. And I have some views out of those that I'll share with you in a minute.

But just to orient you to the building, the -- I mentioned we relocated all of the imaging and diagnostic and treatment functions into the tower, so that's on Level 2. And we have a very large waiting room on Level 2 for family members and friends for who have patients who are having imaging scans or having a cardiac cath procedure or some sort of diagnostic procedure.

Surgery -- our waiting room is on the third floor, and all of the surgical suites are behind that waiting area on the third floor.

We have a rooftop terrace sitting above this portion of the building that we host special events on when the weather is cooperating and cooler. And then we

have visitor lounges in this portion of the building at floors five through nine and then patient rooms in floors five through nine in this portion of the building.

As I advance, the image on the left is taken from one of the family waiting areas in the patient tower. These are rather small waiting areas because all of the rooms are private rooms, and family members are encouraged to stay with their family as much as possible and as much as they care to.

But we know that there are times where family members themselves need a break. They may have to have -- the patient may need to have a procedure that would be more comfortable for the patient if a family member or a sibling or someone were not there. And then we know there's also some difficult decisions that have to be made in the course of some of the care and having a family member in the hospital.

And so these lounges are rather private, and they're kind off the path. But as we were designing the building, we took advantage recognizing that there can be some life-altering discussions and decisions being made. We tried to make these rooms or these areas a bit of a quiet respite area as well.

And so they're appointed very nicely, but, as you can see in the image on the left, we positioned them

to enjoy the views of the Catalinas.

The image on the right is a café destination. I had referred to a large two-story glass area on the left-hand side on the exterior image. This is a location I liken it to grand central station because it's the terminus of all the north/south traffic occurring from the college of medicine and older portions of the building and then into the new tower.

So it's a decision point. It's a gathering point. There's casual meetings held there. Modest food service you can't see -- we don't have it open. This picture was taken just as we were stocking the café. But on the right is the small café so you can purchase a cup of coffee or some light snacks. And, again, taking advantage of the views to the north and to the northeast.

These two images, the first one on the left is from one of those waiting rooms. This looks to be the third story waiting room or the surgical waiting room. So it's standing behind the information desk looking out. You can see one visitor sitting there. So there's a variety of different seating arrangements to handle a variety of different sizes of groups and gatherings. But, again, situated to take advantage of the views to the north.

And then the image on the right-hand side of the

screen is a typical patient room in that portion of the tower. So the patient bed is situated with the headwall behind it and patient able to turn to their right if they were laying on their back to look out, a guest sofa or sleeper couch situated by the window and views there.

What you don't see in here is a patient recliner. There's a recliner in the room. And we encourage patients to be up and ambulating as much as possible. So it while it looks sort of like a side view, the patients do take advantage of the views to the north if they're in one of the north-facing rooms.

Q. Mr. Barkenbush, do you recall Mr. Bryner's testimony regarding KOP 29, which is on page 757 of TEP's application?

A. Yes. I do.

Q. Could we pull that up on the left-side screen?

Okay. So that would be the bottom photograph in this depiction?

A. That is correct.

It's the bottom photograph that has superimposed in it a pole that is situated, and it appears to have the power lines on both sides of that. On my particular screen it looks like there's a lot of birds on those power lines.

But it's clearly in the -- this picture was

taken from Mr. Bryner's testimony from the original parking structure. It's a four-level parking structure that is equivalent to a second story or the roof of a second story of a typical building. So this would be what one would see clearly out of those waiting rooms on the second or third floor.

CHMN STAFFORD: So that's the view from the waiting room?

MR. BARKENBUSH: It would be very consistent with that, Chairman.

BY MS. DE BLASI:

Q. If you want to go back to Slide 11 or the previous slide.

A. So in this image that pole would be situated approximately where my cursor is -- or pointing -- the laser is pointing.

CHMN STAFFORD: And that's on the second or third floor?

MR. BARKENBUSH: This one happens to be the third floor.

BY MS. DE BLASI:

Q. And do you recall that Mr. Bryner's testimony or it could have been Mr. Robinson's the pole is about 95 feet tall?

A. That is correct.

Q. The 136kV would be?
A. Yes.
Q. Okay. With respect to the photograph that's KOP No. 29, can you read what's on the bottom of photograph?
Which routes do this depict?
A. Alternative routes 1, 6, or D.
Q. Okay. And so if you're in the building, as opposed to a homeowner who this line would be above their home and not in eyesight, would this line be directly at eye level for someone standing in the building?
A. It would be eye level for the majority of our floors in our patient tower.
Q. And would this interfere with the whole purpose of the amount of investment in your patient areas and your towers?
A. Yes. It would. And I might add in some of our past discussions with TEP in evaluating these routes, one of the beliefs that I have is the FAA would require the installation of some of the -- or I don't know the technical term. I don't recall right now. But the orange or red safety balls I'll call them. I'm pretty butchering that. But that would further call to anyone's attention as they're supposed to do in that type of setting the top of the line.
I believe there's also a potential that the FAA

might require those few poles structures to have an illuminated warning light at the top of the pole as well given the proximity to an active helipad, again, further drawing attention to those structures.

Q. Okay. And we'll get into more detail of each route and the impact shortly.

But so I think we had prepared next to start talking about the different routes and how they impact or not --

A. Yes.

Q. -- the campus.

So do you want to -- let's start with the applicant's preferred Route B.

So if we could have slide TEP route map Slide 56 on the right screen and our Slide 9 on the left screen.

Grace, do you mind? Whichever side is fine. But slide TEP route map Slide 56.

CHMN STAFFORD: And just to clarify, that was the KOP 29 that was the view similar to the view from the hospital that you're talking about?

MS. DE BLASI: Correct. That's directly out the front of the hospital.

CHMN STAFFORD: Okay.

MS. DE BLASI: Both the children's tower and the main hospital.

Okay. Wonderful.

BY MS. DE BLASI:

Q. So let's talk through the different routes.

MS. DE BLASI: And for the Committee, this -- some of this testimony's going to be repetitive, but we wanted to make sure that the impacts are the same -- you know, the impacts are stated for each route as we're discussing them. And, again, these are only the routes that are immediately near the campus.

BY MS. DE BLASI:

Q. So with respect to applicant's preferred route referenced as Route B, what is Banner's position on this route?

A. Banner supports the applicant's preferred route referred to as B.

Q. So let's talk through some of the reasons why. And some of them you've touched on already.

But referring to the two slides above, can you -- let's start with the life flight operations.

Can you talk about Route B with respect to how it avoids any of those issues with the -- with those flights?

A. It does. And so my pointer -- will my pointer work on the map or just my presentation?

I can use the laser. It's just the members --

Q. I think she's adjusting it.

MR. BARKENBUSH: Are you adjusting it?

A/V TEAM: You should be good if you hold it down.

MR. BARKENBUSH: Red or yellow one? Which one?

A/V TEAM: Red.

MR. BARKENBUSH: There it goes. Okay.

CHMN STAFFORD: And they can see that on the broadcast; right?

MR. BARKENBUSH: Yes. They can see this on the broadcast.

So the Vine Substation where we visited is here. And then all of our buildings are situated to the east of that substation. So as you can see on Route B, stay west of our development and out of the way of the helicopter flight path and that fly friendly route that I referenced along Campbell and turning left into the campus of that fly friendly route would come above Campbell and turn left into the helipads.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: We're talking about flights of helicopters at this point in time, so I'd like to have some specifics.

How tall is the helipad in feet? How far aboveground?

What's the actual height of the helipad?

MR. BARKENBUSH: Approximately 120 feet.

MEMBER GOLD: So the helipad is 120 feet.

What is the tallest power line in the area that they're presenting earlier?

MR. BARKENBUSH: I believe the testimony was between 75 and 85 feet.

MEMBER GOLD: So let's say 85 is the tallest in the area, and the height of your building is a hundred and --

MR. BARKENBUSH: The approximate elevation of the helipad would be 120 feet.

MEMBER GOLD: So 85, 95, 105, 115, roughly 35 feet below the height of your helipad; is that correct?

MR. BARKENBUSH: Correct.

MEMBER GOLD: Okay. So helicopters don't come up to your building, they would come down to your building?

MR. BARKENBUSH: That is correct.

MEMBER GOLD: So just assuming for a second that your primary interest is the visual appearance from your building, not the security based on the helicopter

flying in, because the helicopter flying in would not hit those poles. There's no reason for him to fly nap-of-the-earth.

MR. BARKENBUSH: That is correct.

MEMBER GOLD: So we're talking about the visual appearance from your window if I'm correct.

MR. BARKENBUSH: That is of primary concern.

MEMBER GOLD: Thank you. That's what I wanted to know.

MEMBER HILL: I actually have a follow-up --

CHMN STAFFORD: Member Hill.

MEMBER HILL: -- related to that.

CHMN STAFFORD: Member Hill.

MEMBER HILL: There is the potential and I'm kind of curious that this -- that a helicopter would need to land on the ground if you had an issue you have like a reserve helicopter spot on the ground.

So that having power lines around Ring Road or on Campbell, can you talk about the challenge with that if you had to use the reserved helicopter spot for setting a patient down?

MR. BARKENBUSH: It would create a significant conflict with trying to land an aircraft in

that detention basin that I had shared.

I have to admit it's an emergency contingency plan. It is not something that we would do for long periods of time, but the scenario exists, and we have a scenario planned through that.

MEMBER HILL: Can you -- have you ever had to land a helicopter there?

MR. BARKENBUSH: No.

MEMBER HILL: So it is a contingency plan?

MR. BARKENBUSH: That is correct.

MEMBER HILL: Worst-case scenario, maybe even power outage and the elevators didn't work?

But, okay, that's helpful. Thanks.

CHMN STAFFORD: And that reserve helipad is on the ground?

MR. BARKENBUSH: Yes, sir.

CHMN STAFFORD: Thank you.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Where else could you put reserve helipads in that area?

MR. BARKENBUSH: We don't have any other choices that are practical. We have surface parking.

MEMBER GOLD: Yes. Exactly.

MR. BARKENBUSH: But to get if -- our

parking is very constrained on the campus and a challenge. And so in order to clear out a few hundred employee vehicles out of a surface lot or elsewhere on campus where we don't have control of the lots would take quite some time, so that aircraft would choose another facility to go to.

MEMBER GOLD: So we're assuming a worst-case scenario where a helicopter has crashed on the helipad, the helipad is not usable, and you have to use another location, and that has not happened to date?

MR. BARKENBUSH: It has not happened to date.

MEMBER GOLD: Thank you.

MEMBER LITTLE: Mr. Chairman.

CHMN STAFFORD: Yes, Member Little.

MEMBER LITTLE: Could I ask if the existing 46kV line on Campbell Avenue causes a potential problem with that contingency landing area?

MR. BARKENBUSH: It does not. It is on the right-hand side of or the east side of Campbell Avenue, and I'm speaking from memory. It may have stopped at that point. I'd have to refresh my memory of street views.

MEMBER LITTLE: Thank you.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Okay. I'm assuming this is a very, very miniscule likelihood of happening.

I've spent a thousand hours of helicopter, and we've landed in very awkward positions, sometimes landing where rotors are two feet from something that they can hit.

I would still say your primary focus is the visual impact to people who are either patients or visiting your hospital; is that not correct?

MR. BARKENBUSH: That's correct.

MEMBER GOLD: Thank you.

CHMN STAFFORD: Please continue.

BY MS. DE BLASI:

Q. Just a couple of things on that. I don't believe there is a 46kV on that route. Perhaps the applicant can confirm.

I don't believe there's a 46kV on Campbell?

MEMBER LITTLE: Yeah, there is.

CHMN STAFFORD: Yeah. We saw the power lines on Campbell Road. I don't know if they're that far north or not.

MS. DE BLASI: That far north.

CHMN STAFFORD: But I do recall seeing them on Campbell Road.

MS. DE BLASI: Yeah. I don't believe they're that far north.

BY MS. DE BLASI:

Q. But with respect to the helipads, was the testimony that the line behind the -- or going through that area would be 95 feet?

A. I recall 85 feet.

Q. Okay. 85 or 95 I'm sure can be adjusted, but it's tall?

A. Yes.

Q. Okay. Do hospitals plan for normal conditions or emergency conditions?

A. We strive to plan for emergency conditions given the types of services that we're providing, so we need to be certain that we can address the needs of the community.

Q. Okay. And you mentioned the elevators for the two existing helipads.

If for some reason the power was down, your generators went out, and you needed to land in that space but there was a power line there and you couldn't land there, where would they go?

A. My contention would be they would take the patient to another facility such as TMC or one of the other facilities in town.

Q. Okay. Which time might be of the essence in that emergency situation?

A. Time would be of the essence in an emergency situation, and they may not have the services that the patient needs.

Q. Understood.

And so whether you're landing from above, I'm sure there's FAA requirements for landing near power lines or below, does the hospital want to maximize its ability to deal with emergencies in the area?

A. Yes, we do.

Q. Okay. And let's say there's a situation as last evening where you have an emergency and it's very windy and so the helicopters need maximum capacity to be able to land and have different routes to be able to do that to maneuver those conditions.

Is that something that the hospital would consider important?

A. Yes, it is.

Q. Okay.

CHMN STAFFORD: I have a quick question. So the route we're talking about is Route D because that's the one that's north of the Vine Substation on Campbell; correct?

MR. BARKENBUSH: Correct.

CHMN STAFFORD: All right. And maybe I missed this. Can you show us where on the map is the reserve helipad and what is its distance from Campbell Avenue?

MR. BARKENBUSH: Bear with me. This -- my laser is a little smaller on this, but that reserve landing area is where the cursor is moving. Campbell Avenue is right here and the Ring Road is right here.

So the corridor width that TEP is asking for clips through a portion of this retention basin, a portion of the garage, and so potentially that power line could be in very close proximity to this detention basin.

CHMN STAFFORD: So where in that detention basin would the helicopter land exactly? Is it --

MR. BARKENBUSH: The center. It's flat in the center.

CHMN STAFFORD: Okay. I was going to say because it looked like it kind of sloped down from the sides.

MR. BARKENBUSH: It does slope down. It's about, as I recall, a 30-inch deep retention basin that's pulling surface water from this vicinity kind of along this portion of Ring Road and what comes off here.

So the majority of the water enters here and flattens out rather quickly. There were no

requirements for safety rails or anything like that. It's not that deep of a retention.

CHMN STAFFORD: Okay. So what's the distance? What's the span?

I mean, so if it's right in the middle, that's going to be how far from the road either both what's it Ring Road and Campbell Avenue?

MR. BARKENBUSH: I would estimate 50 feet from each of those.

CHMN STAFFORD: 50 feet. Okay.

And then so it serves as a stormwater retention area; correct?

MR. BARKENBUSH: Correct.

CHMN STAFFORD: So if there's a -- if the emergency we're facing that caused the power outage is a storm and that's full of water, you wouldn't be able to land a helicopter there anyway, would you?

MR. BARKENBUSH: Not in that situation we would not.

CHMN STAFFORD: Okay. All right.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Would Mr. Barken --

MR. BARKENBUSH: Barkenbush. That's okay.

CHMN STAFFORD: Mr. Barkenbush, is that --

MEMBER GOLD: Barkenbush.

CHMN STAFFORD: Yes.

MEMBER GOLD: Mr. Barkenbush. I'm sorry.

Mr. Barkenbush, would you point to the helipad on your map.

MR. BARKENBUSH: Yes.

The preferred one that they use the most is right where my cursor or the laser is.

MEMBER GOLD: So that is the preferred helipad about the size of the red dot that you're putting up on the screen; correct?

MR. BARKENBUSH: Yes. The other one --

MEMBER GOLD: You said there was another one?

MR. BARKENBUSH: The other one is at that same level closer. It's just closer to the new tower.

MEMBER GOLD: Okay.

MR. BARKENBUSH: And so it's used -- the winds are a little bit shifty in that area.

MEMBER GOLD: Understood.

But it's about the size of that red dot; correct?

MR. BARKENBUSH: Correct.

MEMBER GOLD: Would you put the red dot back on the storm detention area.

That's a lot bigger than any of your helipads.

MR. BARKENBUSH: Correct.

MEMBER GOLD: So he could land technically anywhere in that area the size of your red dot and be -- have plenty of room in an emergency to land.

However, the primary reason I'm asking this is if you have an emergency in your primary helipad, you have an alternative helipad?

MR. BARKENBUSH: Yes.

MEMBER GOLD: And if it's a storm that's keeping him from landing on the primary helipad, it would also keep him from landing on the secondary helipad assuming the winds are 70 or 80 miles an hour like last night.

And chances are, as the Chairman said, your water detention area would be flooded. He couldn't land there either.

In an emergency, is there a street or something else -- if you would put your pointer on that street to the north, not Campbell, but that -- a little lower -- no. Lower on the street.

CHMN STAFFORD: Ring Road.

MEMBER GOLD: Right on the Ring Road.

I mean, he could land on Ring Road if he

had to.

Are there any telephone poles or --

MR. BARKENBUSH: No. We --

MEMBER GOLD: -- power lines there?

MR. BARKENBUSH: As part of our development, we cleared out with TEP's assistance all of the local distribution. And so everything in this area currently is undergrounded until you get north of Lester.

MEMBER GOLD: Okay. So you could land there?

MR. BARKENBUSH: We could.

There are -- there is some landscaping in the area where there's some trees that are starting to get mature that could be risky.

MEMBER GOLD: But we could set something up where you have a tertiary landing area only because I'm concerned about Banner.

MR. BARKENBUSH: Correct.

MEMBER GOLD: You could have a tertiary alternate landing area that's not in a drainage basin.

MR. BARKENBUSH: Correct.

MEMBER GOLD: So a stormwater or flood you could still land even if both helipads were not available. I would recommend you designate something, you know, on a road.

You know, people don't realize the interstate highway systems in this country have many areas that are not blacktop. They are concrete. The purpose for the concrete is the interstate highways are an alternate landing field in case of emergencies for aircraft.

And I believe you would probably have something like that or at least you should have something like that for Banner in case of, you know, unquote, quote a worst-case scenario.

MR. BARKENBUSH: I -- I would agree with you. My only concern would be it further exacerbates the challenge of routes D, 1, and 6.

MEMBER GOLD: Let's put it this way: My feeling -- my gut feeling is that you don't want the route on Campbell Avenue because it will put a power line right in front of your patients' views, and that makes sense to me.

The helipad, you know, using that stormwater drainage area really doesn't. But I would recommend that since we're bringing the subject up and you are the facilities manager for Banner that you recommend they plan on something on one of those roads, a designated area and mark it --

MR. BARKENBUSH: Yes, sir.

MEMBER GOLD: -- where a helicopter could land in an emergency. That would make much more sense.

And just between you and I, I would recommend you do something like that.

MR. BARKENBUSH: We can evaluate that.

CHMN STAFFORD: I have another question.

So we've talked about the planned area development.

Is that the same as the University Area Plan, or are those two different things?

MR. BARKENBUSH: They are two different things.

This is a specific document. I've lost track how many the City has. I think it's in the low 30s, but it's unique for a specific landowner and developer to have these where the zoning ordinance doesn't suit the type of development that a developer is bringing forth.

CHMN STAFFORD: And that's the PAD you're talking about?

MR. BARKENBUSH: Yes.

CHMN STAFFORD: And what is the University Area Plan?

MR. BARKENBUSH: I'm not a subject matter expert on this myself. And I think the City's witness

will speak to that.

But my understanding is it's a comprehensive plan that lays out some development guidelines for the broader university area.

What I would share with the Committee as part of my testimony is I've reviewed that university plan. And knowing our PAD -- it's in the City of Tucson records. It's PAD No. 28. The requirements we put upon ourselves as part of our future development are very consistent with the university -- the principles in the University Area Plan.

CHMN STAFFORD: Okay. So the PAD plan, that was approved by the city council. And then the University Area Plan was something that the --

MR. BARKENBUSH: I don't have specific knowledge of --

CHMN STAFFORD: All right.

MR. BARKENBUSH: -- which body --

CHMN STAFFORD: Okay. Well, I'll get to that when we -- when the City puts on its case, then, so -- I just thought maybe since you might know and you were on the stand and I thought I'd ask you.

MR. BARKENBUSH: Thank you. Yeah.

CHMN STAFFORD: All right. Please proceed.

//

BY MS. DE BLASI:

Q. Just a quick question.

Might there be a storm that's windy without rain?

A. There certainly could be.

Q. Okay. And would Banner want to be forced to alter any of its helicopter life flight operations as you said as you pointed out previously the number of emergencies you had, when there's a perfectly good route that could be chosen, multiple actually here?

Is that what we're looking at?

A. We would prefer not to.

Q. Right. I think your patients might also prefer not to, but -- okay.

Let me get back to your -- I believe you said -- would you say that your -- the safety of your helicopter operations are as important as your viewshed concerns?

A. I would say that the safety of the flight operations are of more importance.

Q. Okay. I just wanted to make sure that's understood.

And that -- and that whether it's 85 feet or 95 feet, you know, power line, do you recall the testimony of TEP that -- well, we'll get to that slide in the double circuit area. But whether it's along that

line and Campbell, might that then restrict your ability to access the medical campus from both of those sites?

A. Yes. It would.

Q. All right. Let's move on to some of the other impacts.

What about noise sensitive equipment, that sort of thing, from a large power line, if the applicant, you know, was able to site it within that close proximity to the hospital, has that been tested with the hospital?

A. It hasn't been tested in a hospital in my experience. I've supported and maintained many hospitals throughout my career, and I don't have one that I could recall that was in close proximity such as this to a transmission line of this voltage.

Q. Okay. But it could present an issue to some of your very sensitive equipment that you have?

A. I certainly believe it could and is a point of concern that we have.

Q. Is that something that you would want to have to test after the line was sited or approved?

A. No. Testing it after or experiencing it afterward would be a significant challenge and potentially interrupt our operations while we mitigate that situation that's found.

Q. Okay. And then let's again talk about the North

Green area.

Potentially within that corridor if approved they could really site it right down the middle of it, could that not?

A. That's what our understanding is.

Q. Okay. On the right screen, we have applicant Slide 56. Does Route B go near that Gateway Corridor that's an issue in the case?

A. It does not go near Campbell Avenue. It only crosses Oracle Road.

Q. Okay. And is that a significant issue of controversy in this case?

A. The Gateway Corridor certainly is.

Q. Okay. We heard pretty substantial testimony from Mr. Jocham about construction delays, noise, and that sort of thing.

How would that impact whether the line and especially I guess if the line was undergrounded, how would that impact the operations, access, patient experience, and otherwise to the operations of the hospitals?

A. If it were undergrounded along the Ring Road or in the Ring Road, it would create very significant impact to accessing the hospital. We -- our primary point of entry for visitors as well as Staff, candidly, is off of

Campbell Avenue on to the Ring Road and into the campus. So there's an opportunity to Park in this parking structure. There's two points of entry into it off of the Ring Road.

There is a surface parking lot for the emergency room. Again, this is patients coming to the emergency room not via an ambulance.

The main surface parking lot for the hospital and entry into the hospital is situated where my cursor is. And then this parking structure to the west side is largely used by staff. We have begun stacking some visitor cars in this garage with a valet service.

So all of our access -- I'm sorry, the majority of your access to the campus is off of the Ring Road.

This surface parking lot south of the tower where we have underground stormwater detention is used by Banner employees. Most still access that coming around the Ring Road and into it. However, there are pathways to that surface lot from the streets in and amongst where our buses traveled as we were coming to and from the proposed Vine Substation area. I would not want to try to detour our visitors through those small streets. It would be a wayfinding nightmare.

So with the construction that Mr. Jocham described, the widths of the trenching and the equipment,

I contend could barely be accommodated along this portion of the Ring Road that's -- sorry -- a little bit wider, but as it narrows down here at this curve, it would completely shut down the Ring Road if we tried to place it in there.

I also happen to know of an underground conflict. There's a four-foot-diameter stormwater pipe that travels north. So in some of the testimony that they offered, that would create a deeper -- we're not moving that stormwater line, gravity needs to work. So it would need to traverse under that.

CHMN STAFFORD: What -- what -- excuse me. What route goes along Ring Road?

I don't recall any route actually using Ring Road. I remember -- it's Grant to --

MR. BARKENBUSH: It's D.

CHMN STAFFORD: -- Campbell; right?

MS. DE BLASI: Applicants are asking for potential to site on Ring Road for routes D, 1, and 6.

CHMN STAFFORD: D. But I'm looking at D, and it doesn't have it on Ring Road. It has it going down Grant to Kino.

MS. DE BLASI: I think -- correct me if I'm wrong, but I think that's the corridor that -- the 400-foot corridor that's being asked for is that.

MS. GRABEL: That's correct.
CHMN STAFFORD: It doesn't -- it's not on Grant. It goes to Ring Road?
MR. BARKENBUSH: It comes down Grant to Campbell, down Campbell and in to the campus.
CHMN STAFFORD: Oh, I see. It's coming from the west.
MR. BARKENBUSH: The east.
CHMN STAFFORD: From the east to the -- going west --
MR. BARKENBUSH: West.
CHMN STAFFORD: -- to the place -- okay. That's where it is. Because I'm looking -- okay. That makes sense. I got it now. Thanks.
MEMBER HILL: Mr. Chair.
MEMBER GOLD: Mr. Chairman.
CHMN STAFFORD: Member Hill.
MEMBER GOLD: Gold.
CHMN STAFFORD: No. She went first actually. She sounded the buzzer just before you did.
MEMBER HILL: What is -- no. I have to do it in the form of a question.
Mr. Barkenbush, can you -- you might have ponied this out, but can you remind me where the ambulances come in?

MR. BARKENBUSH: Yes. I have --

MEMBER HILL: Do they use Ring Road and kind of where do they normally come in?

MR. BARKENBUSH: If they used Ring Road here -- we have only done that when there's been construction south of the campus.

So the ambulances come in via Cherry and from the south and traverse in, and the drop-off is right where my cursor -- or the laser is pointing.

So they come in I'll refer to it as the backside. It's where our loading dock -- it's in the vicinity of our loading dock and elsewhere. And so they're -- all of the EMS services and the ambulance services understand the route. It's a targeted audience that we could educate.

And it's not -- it's purposefully not signed so that we don't get visitors confused or the public confused trying to find their way to emergency that way.

MEMBER HILL: Great. Thank you. That's helpful.

MR. BARKENBUSH: You're welcome.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Yes, Member Gold.

MEMBER GOLD: Okay. I don't know who to

address this question to. I think it may be Ms. De Blasi.

I'm having trouble because there's something that is glaringly missing from those pictures. Why don't we have Banner hospital on your slide showing us where it is in relation to the routes?

MS. DE BLASI: That's not our slide. That's applicant's slide.

MEMBER GOLD: Well, where's your slide that shows Banner Hospital and the routes? That's what I would like to see. I want the see how these routes impact your hospital. And every time I look at that I'm trying to remember where's Banner. I mean, here I see it. This is clear.

MS. DE BLASI: We have it on applicant Slide 236 if you want to bring that up.

MEMBER GOLD: Can we put that up there instead of this?

MS. DE BLASI: This is just showing the preferred route, but that might help.

MEMBER GOLD: Where's Banner on --

MS. DE BLASI: It's I belive applicant Slide 236. One more.

CHMN STAFFORD: Yeah. Look at the constraints slide. It's the big red oval, isn't it?

MS. DE BLASI: Yes.
MR. BARKENBUSH: Yes, it is.
CHMN STAFFORD: I think keep going.
MS. DE BLASI: It's the next slide.
MEMBER RICHINS: Chairman, really the easiest way is to remember it's right next door to the Vine Substation.
MS. DE BLASI: RIGHT.
MEMBER RICHINS: And if you can find Vine, you can find the hospital.
MS. DE BLASI: Correct.
CHMN STAFFORD: Oops, it jumped to Slide 111.
MEMBER GOLD: Well, that's what I've been seeing.
MR. LUSK: Mr. Chairman, this is Roi Lusk from the City of Tucson. If I can assist.
In the bottom right corner there's a number, and that number should be 236.
There it is.
MEMBER GOLD: There we go.
CHMN STAFFORD: Okay. Yeah. It's the smaller oval --
MR. BARKENBUSH: Correct.
CHMN STAFFORD: -- is the medical center.

And then the larger oval is the campus; correct?

MR. BARKENBUSH: Correct.

MS. DE BLASI: Correct.

CHMN STAFFORD: There you go, Member Gold.

MEMBER GOLD: Okay. Now I see where the hospital is. And we were there. And I know what the area looks like.

Now, where is Campbell Avenue?

Is that that brown line --

CHMN STAFFORD: That's the red line to the right.

See the word "Vine," the red line going north/south? That's Campbell Avenue.

MEMBER GOLD: Okay.

CHMN STAFFORD: It's red because it's a Gateway Corridor Zone.

MEMBER GOLD: All right. And the route that -- the preferred route, where is that on this map or --

MS. DE BLASI: It's a different map. But that's back up to line -- TEP Slide 56. We were trying to use applicant's maps so we weren't creating a bunch of new ones.

MEMBER GOLD: No, it's right --

MS. DE BLASI: So on this slide, Chairman

or Member Gold, the campus is right next to the Vine Substation and the yellow triangle.

MEMBER GOLD: Okay. I would ask, Mr. Chairman. It would make it -- you know, I know what the ground looks like. I've been there.

But I would like the see the routes with the hospital on it since we're saying this is going to be -- these routes have an effect on the workings of the hospital and the patients of the hospital and a lot of other stuff.

Is it possible that we could annotate even the placemat here, just with a magic marker put the hospital on it so we could see it?

I see Campbell. I see the Vine Substation. I see the Route D -- it's either D or 1 goes from east to west to the Vine Station.

Is the hospital right where that route is?

Is the hospital right above it?

CHMN STAFFORD: Mr. Bryner to the rescue. He has a marker to --

MS. DE BLASI: A Sharpie --

CHMN STAFFORD: -- a Sharpie to put the hospital on that placemat.

MEMBER GOLD: Thank you.

MR. BRYNER: Anybody else?

CHMN STAFFORD: Thank you, Mr. Bryner.

MEMBER GOLD: Okay. So thanking Mr. Bryner, Ms. De Blasi, he saved me a little because I have trouble looking at this.

So from what I'm seeing the location of the hospital, the Vine Substation, the people looking out the window to the north will see that transmission line if they use this green route on the table map, which is D-1 I believe.

CHMN STAFFORD: Or just D.

MEMBER GOLD: D.

CHMN STAFFORD: This section is only D because this is the -- the letters are from the DeMoss Petrie to the Vine.

MEMBER GOLD: Okay.

CHMN STAFFORD: And then the numbers are all from Vine to Kino.

MEMBER GOLD: All right. But the Kino to Vine also has a green line going there also.

CHMN STAFFORD: Right. But it's a numbered line, not a lettered line.

MEMBER GOLD: That's a 1.

CHMN STAFFORD: Right.

MEMBER GOLD: Okay. I got that.

So as I'm looking here. People, patients,

doctors, visitors looking from your building to the north will see a transmission line, but they won't see one looking to the south, looking to the west, but they will also see number 1 looking to the east. So they will see a transmission line.

If you look at the preferred route, and I think that's --

CHMN STAFFORD: It's on the screen on the right.

MEMBER GOLD: -- B.

CHMN STAFFORD: B, yeah.

MEMBER GOLD: Yeah, but I don't see the hospital on.

CHMN STAFFORD: It's -- well, it's -- do you see where it says "Vine" and then "Ring Road"?

MEMBER GOLD: Yeah. Right under Ring Road is the hospital.

CHMN STAFFORD: Yeah.

MEMBER GOLD: So right there.

CHMN STAFFORD: So right by that yellow triangle and then to below that Ring Road that's all where the -- that's what this picture to the left is.

MEMBER GOLD: Wait a second. Somebody is signaling for help. That's --

MEMBER LITTLE: One at a time.

THE COURT REPORTER: One at a time, please. Thank you.

MEMBER GOLD: Please.

CHMN STAFFORD: All right. So what I'm saying again -- so where he's pointing with that green cursor, that's where the hospital is.

The road across the top that curves, that's Ring Road. It's -- you can slightly -- you can't see the curve as much on the right-hand map because it's smaller scale.

But that's right to -- to the right of that yellow triangle and below that Ring Road that's where -- that's where this picture is. That's where the hospital is.

MEMBER GOLD: Gotcha. So one at a time. Me.

Now, when you look to the north with this route, you do not see a transmission line to the north, but you do see it to the west.

So you're still staring at a transmission line even on this route.

CHMN STAFFORD: Yes. But I think the difference is that the way the building is constructed they look -- the big windows face to the north and to the east and not so much to the west because it overlooks

houses and not the mountains.

Is that -- is that correct, Mr. -- your name again?

MEMBER GOLD: Wait.

MR. BARKENBUSH: Barkenbush.

MEMBER GOLD: Barkenbush.

MR. BARKENBUSH: Very good.

That is -- that is correct.

There are some rooms on the other leg of the tower that do have views to the west.

Those rooms happen to all be intensive care rooms, and the patients are not as ambulatory and not moving as much. They still have to have a window by code, but there are a portion of the rooms that do look out to the west.

MEMBER GOLD: Okay. So we're still looking at power lines whichever route we choose, and power lines are lower than the height of the helicopter pads.

I mean, I'm just trying to say the aesthetics -- well, let me ask your opinion.

In your opinion, Mr. Barkenbush, aesthetically, are we better off having power lines to the north or power lines to the west?

MR. BARKENBUSH: To the west.

MEMBER GOLD: Gotcha. Thank you.

CHMN STAFFORD: Ms. De Blasi.

BY MS. DE BLASI:

Q. So just on that point real quick. And then I want to get back to the construction question.

But did Banner spend hundreds of millions of dollars on a building with the viewshed of the Catalinas and such to the north or to the west?

A. To the north.

Q. So with respect to the construction, do you recall the testimony of Mr. Jocham that construction may occur at night when it's cooler and might there be loud noises and such impacting patients trying to sleep?

A. Yes. I recall that testimony.

Q. Okay. And might that impact the patient experience in the hospital trying to heal with loud construction outside?

A. Yes. It would.

Q. Okay. And also do you recall the testimony of Mr. Jocham that they may have to shut down an entire lane to be able to put in the proper trenching?

A. Yes. I do.

Q. Might that shut down Ring Road entirely?

A. Yes.

Q. Okay.

CHMN STAFFORD: All right. Well, I'm

getting signal that it's time for a break. We've been going almost 90 minutes, so our court reporter needs to rest her hands. So we will take approximately a 15-minute recess starting now. We are in recess.

(Recess from 3:39 p.m. to 3:56 p.m.)

CHMN STAFFORD: Let's go back on the record.

Ms. De Blasi, before you start I believe Member Richins had a question.

MEMBER RICHINS: Yes, thank you. You just testified about construction impacts to patients. And I was curious how you mitigated construction impacts for patients during the construction of your towers and parking garages on the campus.

MR. BARKENBUSH: Sure. So in trying to get the pointer to work again.

During the construction of the new tower -- there we go. It's moving -- bear with me. Thank you, support group.

MEMBER RICHINS: That thing is kicking your butt. You are losing the battle with that thing.

MR. BARKENBUSH: I am definitely losing the battle. It worked for a moment. With the construction of the new tower here, we at that point in time, the previous entrance to the hospital was off of Campbell

Avenue down to the south -- I apologize. The pointer is not pointing to it again.

But where the callout box, where it says "Original Hospital," so right wherever the cursor was moving there, that's where the entrance was located until we opened the new tower. So we had the opportunity to get to this parking structure.

Use this one -- we had the -- I'm sorry for the members on the -- calling in.

We had the opportunity to get to this parking structure on this portion of the Ring Road while we widened this.

We had no public coming here where we have today. The -- I take that back. There was some public coming to the emergency entrance here that we did have to work around and then we were able to detour staff to this parking structure from the surface streets to the west of the campus.

But our primary point of entry was off of Campbell on to here, so it avoided the majority of this while we constructed it.

We did have to work through some phases through that, but we weren't -- we were able to develop and widen the Ring Road in phases and maintain some flow. There was a portion of time that it was closed.

So we had to rely upon exclusively coming in and out of Campbell here and directing staff around, but it was not the extent of the construction that we've heard testified where we would have the depths of trenches, the multiple trucks on this Ring Road now given the amount of volume that we're putting on it today.

MEMBER RICHINS: So are you confident in TEP's ability to provide sufficient mitigation or not for egress and patient comfort in your towers during construction?

MR. BARKENBUSH: I have concerns. I've been delivering construction for 37 years and this task in front of them to try to underground on these roads is very difficult. I would not look forward to trying to manage this type of work and maintain access to our front door off of our Ring Road.

MEMBER RICHINS: So when you say these roads, do you specifically mean Campbell, the Campbell ingress/egress?

MR. BARKENBUSH: The Campbell ingress/egress -- now I'm dancing. I'm sorry.

MEMBER RICHINS: That thing is whupin' you.

MR. BARKENBUSH: Kicking my butt. Bear with me.

MEMBER RICHINS: We need some remedial

training here. Just teasing, Mr. Barkenbush.

MR. BARKENBUSH: Thank you. Access on and off of Campbell would be challenging, but largely the construction if it were to occur in the Ring Road is very concerning to me on how we would maintain operations.

CHMN STAFFORD: Are you talking about underground construction or aboveground construction or both?

MR. BARKENBUSH: Specifically certainly undergrounding construction. The preferred route that we support does not impact the Ring Road. If this were overhead along the Ring Road, as we've heard testified, and I agree with the testimony, placing a pole foundation is of less impact than digging a very significant trench and putting in a duct bank.

CHMN STAFFORD: Thank you. Member Richins, you still had additional questions?

MEMBER RICHINS: No, I think that's sufficient. Thank you.

CHMN STAFFORD: All right. Any other questions, Members, before I hand it back to Ms. De Blasi?

MEMBER HILL: I have a couple of questions.

MEMBER KRYDER: Mr. Chairman, may I interrupt?

CHMN STAFFORD: One second. Member Hill asked first so I'll let her question and then you can go after that, Member Kryder.

MEMBER KRYDER: Thank you.

CHMN STAFFORD: Member Hill.

MEMBER HILL: So I really appreciate all the work that Banner's demonstrated with the neighborhood with the north -- the Jefferson Park neighborhood. You've tried to create a good buffer when you didn't have a lot to work with because the university controlled the site and didn't have to follow land use regulations that are local.

You've worked really hard to ensure that helicopter traffic isn't flying over the neighborhood homes and things like that.

And I do think that one of our jobs with this Committee is to try to reduce the impacts of new transmission and infrastructure on neighborhoods.

So I think that there are a couple of corridors that have been identified by TEP. Some have more neighborhood impacts than others. And I do continue to kind of look at that Campbell alignment and recognize that sending this infrastructure through commercial areas would definitely reduce the impacts on neighborhoods.

Can you talk a little bit about -- you've

talked about how your preference is for aboveground because it reduces the amount of construction and the time of construction versus underground.

But if we are looking at the route along Campbell, would you prefer it underground for transportation reasons, or the helicopter reasons? Or do you have a strong feeling about that?

MR. BARKENBUSH: Along Campbell, I would prefer it be underground to minimize the impact with flight operations.

MEMBER HILL: That's helpful. Thank you.

CHMN STAFFORD: Member Kryder.

MEMBER KRYDER: Thank you very much.

In looking through all of this, and I really appreciate the siting of your main tower there where we got to look out at the Catalinas and then suddenly in that one that I was trying to look at what -- which key observation point this was, but the one that showed the one pole kind of right directly in the vision looking north toward the Catalinas. Could that be brought up again?

MS. DE BLASI: It's KOP 29 on slide --

MEMBER KRYDER: I think this is the one we have here.

MS. DE BLASI: Correct.

MEMBER KRYDER: I'm not sure who to address this to, but I don't -- this pole stands right in the middle of your magnificent view of Catalinas. Could it be moved, say, to the right on that screen toward Campbell Avenue and another pole be put to the left kind of off the edge of the screen and leave the view open, so what we would see would be wires rather than one or in that case two poles?

This probably is a question to TEP, but I'm not sure who should be answering it.

CHMN STAFFORD: Well there's only one witness on the stand, that's Mr. Barkenbush, so if you have questions for TEP we'll have to ask them at a different time.

I think that we may have to -- when the Committee begins to deliberate and kind of discuss things, I think we're probably going to have a primary narrow discussion before we actually begin deliberations, is that we'll probably have to recall some of the company's witnesses to answer some of these questions about technical feasibility and placement of poles and things like that, because that's who more prepared to answer as opposed to Mr. Barkenbush, because I don't think he's prepared to answer that question.

MEMBER KRYDER: Thank you, Mr. Chairman. I

appreciate that.

CHMN STAFFORD: Unless you want to take a stab at it, Mr. Barkenbush.

MS. DE BLASI: Chairman, I think I could help with asking some pointed question as to whether or not that would even matter.

CHMN STAFFORD: Please proceed.

BY MS. DE BLASI:

Q. Okay. So looking at this KOP 29 which is a rendering of the 136kV or 138kV looking at the Catalinas.

Mr. Barkenbush, would it matter where the pole was in relation to that side of the campus? Wouldn't at some point someone be looking directly at a pole and at power lines, and as you testified probably flight indicator blinking red lights and red, you know, balls on the line?

A. Yes.

Q. Would it matter?

A. I don't believe it would matter. It would be visible largely from any view looking to the north.

Q. Okay. And is that the case whether it's on Ring Road or Lester Road?

A. I believe it's essentially the same. We're talking about a modest difference between north and south distances whether it's on the Ring Road or whether it's

closer to Lester.

MEMBER RICHINS: Chairman, just to reconfirm this particular view of key observation point 29, the lower, both images were taken from the top of the Banner parking garage; is that correct?

CHMN STAFFORD: I believe so.

MR. BARKENBUSH: That is correct.

MS. DE BLASI: From the fourth story of one of the parking garages; correct, I believe.

MEMBER RICHINS: So not from the patient tower but from the garage.

MR. BARKENBUSH: It was taken from the parking structure because they had easier access to get to that top deck.

MEMBER RICHINS: Perfect. Thank you.

MS. DE BLASI: Are we good?

BY MS. DE BLASI:

Q. I just want to get finished with B and get on to the other three routes that we're going to be discussing. So just in case someone's questioning the hospital, the importance of these helicopters to the hospital, when someone's in a helicopter getting to the airport as opposed to an ambulance, is that because they can take their time getting there? Or is there a reason

that a helicopter is used to get a patient to the hospital?

A. It's used when time is of the essence and clinically necessary.

Q. Okay. So might seconds count when you're trying to navigate -- a pilot's trying to navigate to the helipad, whichever one they might be using?

A. Yes, it would.

Q. Okay. And might that be why they deviate from the agreed-upon general route that you try to reach, but it's to the pilot's discretion?

A. Yes, it is.

Q. Okay. Might that be important to having unfettered access to the hospital from any direction where it might be coming up Campbell or across on Ring?

A. It's important to us.

Q. And is it important to those patients?

A. Absolutely.

Q. Okay. Just closing out this discussion on Ring Road and alternative B. If we could get TEP Slide 56 back up on the right.

Okay. What are indicated on that -- the black dots on the line, is that the current 46kV line according to the route map?

A. The black dots are --

Q. Distribution?
A. -- overhead distribution to be undergrounded.
Q. Right. Right. So is that another reason that Banner supports it, because that would clean up those areas?
A. Yes, it is.
Q. Okay. So moving on to Route 4, if we could have TEP route map Slide 75 on the right screen.
And, again, Mr. Barkenbush, could you please orient the Committee to where the hospital is in relation to that line?
A. Certainly. The hospital is situated immediately to the right of the yellow triangle depicting the Vine Substation.
Q. Okay. And this is applicant's preferred Route 4 going south; correct?
A. Correct.
Q. Okay. And what is Banner's position on Applicant's preferred Route 4?
A. Banner supports TEP's preferred route number 4.
Q. Okay. And with respect to the other routes going south out of Vine, which would be routes 2, 3, or 5, does Banner have a position on those routes?
A. We do not.
Q. Okay. Now, let's talk about the reasons why

Banner supports preferred Route 4 near the medical campus.

Would this route impact the flight operations that we've been discussing at length?

A. It does not.

Q. And does it impact the viewshed along to the north that you've indicated are very important to the operations and patients in the hospital?

A. It does not.

Q. Okay. What about sensitive equipment and noise along that area?

A. It's further away and thus does not impact that.

Q. Okay. What about the North Green buffer?

A. It has no impact on the North Green.

Q. Okay. Is that route following parallel along any Gateway Corridor?

A. Not parallel to any Gateway Corridor.

Q. Okay. And does it avoid construction-related delays to the hospital? I mean, would any of that construction cause a significant impact to your operations?

A. No, it would not.

Q. Okay. And does it also allow for retirement of overhead distribution?

A. Yes, it does.

Q. Okay. So moving along to the other routes near the medical campus, and these would be as we've indicated Route D, 1, and 6, if we could talk about -- if we could pull back up that constraint map, Slide 236 on the right side.

Are you familiar with this slide, Mr. Barkenbush?

A. Yes, I am.

Q. And is it labeled "Opportunities" or "Constraints"?

A. Constraints.

Q. Okay. And that typically means what?

A. It would be impactful or difficult for entities in the vicinity of that to stay in operation.

Q. Okay. And on the left screen could we put up TEP Slide 90, please? Okay. Can you just orient the Committee to the location again of the hospital and the medical campus and also the Route D.

A. So on the left-hand screen, the hospital and medical campus is located again immediately left of the yellow triangle and below the word "Ring Road."

Q. To the right?

A. To the right.

Q. Okay. And then the alternative Route D goes in which direction? You call out the direction?

A. It comes from the north down Campbell Avenue and then turns into I'll say our campus or to the west at the northern end of our development.

Q. Okay. On which road is it showing here?

A. It shows the Ring Road.

Q. Okay. And, again, you recall the testimony of the TEP witness that the line was somewhere 85 to 95 feet above on that road?

A. Yes, I do.

Q. Okay. And what is your position on Route D?

A. We oppose Route D.

Q. Okay. And so as we've been discussing, would Route D impact or cause a constraint on the direction of the helicopter emergency operations at the medical campus?

A. Yes, it would.

Q. Can we bring back on the right side our Slide 11, please -- or 9. Sorry, 9.

CHMN STAFFORD: From Banner Medical's Exhibit 2?

MS. DE BLASI: Yes.

BY MS. DE BLASI:

Q. So can you orient us on the Banner's slide on the right as to where that Route D would impact again what -- given the 400-foot corridor that the applicant is

looking for?

A. I'm trying to.

CHMN STAFFORD: This slide is numbered 9.

MS. DE BLASI: Yes.

CHMN STAFFORD: Is it 11 on the --

MS. DE BLASI: It's 9. I'm sorry. I corrected it. It's 9.

MR. BARKENBUSH: So Route D would enter the campus somewhere in this vicinity, and has impact on potential access to our helipads situated here and here, and contingency landing spot either in this retention basin or perhaps upon the roadway as discussed earlier.

BY MS. DE BLASI:

Q. Okay. And what about the same issue with the KOP 29, would that route still be on that same --

A. It would be identical to KOP 29.

Q. Okay. And would it impact the viewshed out of the multiple buildings at eye level there?

A. Yes, it would.

Q. Okay. And what about noise for construction and operations of the hospital as we've talked about?

A. All of those same concerns --

Q. Okay.

A. -- apply to Route D.

Q. And what about the sensitive equipment issue

with the proximity of a very large power line there?

A. It has that same potential impact.

Q. Okay. Could we bring up, please, bring up TEP Slide 95 on the right side? The left side is fine.

Could you -- are you able to read the last bullet? Can you see that? We might have to switch it to the right side?

A. If it's not a problem to switch it to the right side, it'll be easier.

Q. If we can swap those.

A. Thank you.

Q. That's fine, too. Could you read the last bullet?

A. The last bullet reads, "Possible route share occurs if Route D and 6 are selected from Stone to Campbell on Grant, from Grant to Lester on Campbell, and from Campbell to Ring on Lester."

Q. So of all the impacts we've talked about on a single line coming through there, would a double line just be more impactful to that viewshed and all the other impacts?

A. Yes. It would.

Q. Okay. And this would be at eye level; correct?

A. Yes.

Q. Okay. And then what about the impact on the

North Green in terms of the utilization and uniqueness that you've spoken about?

A. Those are the same impact as well.

Q. Okay. And same -- would that be the same whether single or double with respect to the sensitivity of your equipment?

A. The sensitivity of the equipment could be exasperated by a double line given it's more EMF fields emitting signal.

MEMBER GOLD: Mr. Chairman.

CHMN STAFFORD: Member Gold.

MEMBER GOLD: When you're mentioning sensitive equipment and effect on it, what is affecting -- what equipment are we talking about and what effect are we talking about?

BY MS. DE BLASI:

Q. Can you talk about some of the specialized equipment that's within the hospital?

A. Certainly. So on the second floor, we have sensitive imaging equipment, a number of MRIs, a number of CT scanners, a number of PET scanners. It's a type of nuclear scanning.

We have cardiac cath labs with detectors that pick up the signal from an X-ray tube as patients' vessels are being imaged, and if it's a diagnostic

procedure then they're taking actions.

In the operating room, the third floor, we have a number of imaging systems within the operating room. We refer to them as hybrid rooms. So it's a combination surgery and imaging occurring at the same time.

So those are the what I would characterize as the most sensitive pieces of equipment that we have that have specifications around different EMF fields and the MRIs themselves have -- they're sensitive to moving metal objects so we don't position them near roadways and above loading docks and that sort of stuff.

Q. Okay. So electromagnetic frequencies which might be emitted from that equipment could be -- could be impacted; is that correct?

A. It could be, as I had testified I have not seen a facility this close to transmission lines of this size. And so it is of concern to me.

Q. And --

MEMBER GOLD: I'm sorry. Would be concern to me, too, but my question is what is the distance from the transmission lines and what is the strength of the electromagnetic fields when you go to the distance of your hospital?

What is the -- how strong is it? I think it's measured in gauss I believe is the terminology, but

I'm not certain. But I do know that the further you go from the transmission lines, the less the field effect.

In your experience, or perhaps this is something we may later have to ask the people from TEP if this electromagnetic field is affecting your equipment, then you can't have those power lines there. But if it doesn't affect your equipment, then it shouldn't affect.

MR. BARKENBUSH: That is correct. It's just for me it is an unknown because I've not had a facility that is in this close of proximity to that voltage of line.

MEMBER GOLD: So address Mr. Chairman. Will we have an opportunity later to ask this same question to people from TEP? Because this is a serious question.

CHMN STAFFORD: I think we're going to have to recall some of TEP's witnesses.

MEMBER GOLD: Thank you, Mr. Chairman.

CHMN STAFFORD: Not today, but later this week after the rest of the parties have a chance to make their direct case.

MEMBER GOLD: Okay. Thank you, Mr. Barkenbush. Thank you, Ms. De Blasi.

BY MS. DE BLASI:

Q. And I believe your testimony, Mr. Barkenbush, is

not that it would or would not. It's that you don't know and given the siting of -- the close proximity of siting wouldn't be something you would want to test, and I don't know that TEP has tested it either next to -- this close to your hospital that it might impact it. That wouldn't be something you'd want to know in realtime as it's being sited, as it's been built?

A. Correct.

Q. Is that correct?

A. That is correct.

Q. Okay. And going back to, I think we were at TEP slide 90. Could we get that back on the right side?

Okay. And going back to Route D, does Route D travel down parallel with a Gateway Corridor?

A. Yes, it does.

Q. And is that a significant issue of controversy in this case?

A. Yes, it is.

Q. Okay. Let me also ask you, we heard some testimony again from Mr. Jocham talking about the construction and the undergrounding of the line. And you've testified that that would be a very large, significant impediment and maybe even close down the Ring Road.

If they were sited along this road, though, as

Mr. Bryner's testified, on a private road and a condemnation proceeding was pursued, would Banner strongly contest any condemnation along Ring Road?

A. Yes.

Q. Which is Banner's private road?

A. Yes, we would.

Q. And would that condemnation process, which is a litigation process, further delay the construction of the line?

A. I believe that it would.

Q. Okay. Let's go to Route 1, if we could have TEP Slide 106 on the left side. And Slide 111 -- or Slide 236 on the right screen. Sorry. I'm making them jump around. And it's 106.

Mr. Barkenbush, could you please orient the Committee again on the left screen, which is Applicant's Exhibit 106 showing alternative Route 1 where the campus is and where the route goes?

CHMN STAFFORD: It's Exhibit 1, page 106, I believe -- Slide 106.

MS. DE BLASI: Sorry. Slide 106. Thank you, Chairman.

MR. BARKENBUSH: So on Slide 106 the hospital is located just to the right of the yellow triangle where the Vine Substation is shown where the

cursor is moving, and below the Ring Road or the green line depicting the route.

BY MS. DE BLASI:

Q. Okay. And just orient us to the direction of the route.

A. The direction of the route leaves the Vine Substation traveling to the east along the Ring Road and then turning to the south traveling down Campbell Avenue.

Q. And what is Banner's position on Route 1?

A. We do not support Route 1.

Q. Okay.

CHMN STAFFORD: I need to correct myself. It's actually Exhibit TEP-8, not 1. 1 is the application, 8 is the slide. Please go ahead. I just wanted to make sure I corrected that, because I made a point to say it was TEP-1, but it's TEP-8.

MS. DE BLASI: Thank you.

MEMBER LITTLE: Mr. Chairman.

CHMN STAFFORD: Yes, Member Little.

MEMBER LITTLE: May I point out that this map indicates that there is overhead distribution all the way up to, looks like up to Ring Road. Currently existing on that line on Campbell Avenue.

CHMN STAFFORD: Yes, that's what the dots recognize that it's overhead distribution that will be

undergrounded in the event of an overhead 138 line.

MEMBER LITTLE: Right. In a previous discussion there was some question whether there was 46kV distribution existing on that line that far north. And there is.

CHMN STAFFORD: Yes, to Ring Road. Correct.

BY MS. DE BLASI:

Q. Do you recall the testimony from TEP that the 46kV is at about 45 feet?

A. Yes, I do.

Q. Okay. Is going down this route, you said Banner opposes it. Does this Route 1 create the same restrictions access for the helicopter landings for the medical facility?

A. Yes.

Q. And does it also create the same issue as shown in KOP number 29 with the viewshed to the north?

A. Yes.

Q. And is that whether it's on Lester or Ring Road?

A. Yes. That is correct.

Q. Okay. And similar situation or same, I guess, situation related to the sensitive equipment?

A. Yes, it is.

Q. Okay. And what about construction and noise

along that route?

A. It has the same constructability challenges.

Q. Okay. Can we get TEP Slide 111 on the right side, please?

Could you read the last bullet on this slide?

A. "Possible route share occurs if Route D and 1 are selected from Campbell to Vine Substation on Ring/Lester."

Q. And as you previously testified, would this impact great -- have an even greater impact on that viewshed and the other impacts that you've testified to?

A. Yes, it would. Because of the double lines.

Q. Okay. And also with respect to the condemnation of that road, if it were to be sited along Ring Road, which is a private road?

A. Yes. We would oppose condemnation.

Q. And might that condemnation process further delay the construction of the line?

A. Yes, it would.

Q. All right. Moving to Route 6, if we could have TEP Slide 193 on the left. And Slide 236 on the right. Okay. That works too.

Mr. Barkenbush, can you -- thank you. Could you orient us on the slide on the left which is applicant Slide 193 showing route alternative -- wait, we should be

on -- alternative Route 6.

A. Sure. The hospital campus as in other images is immediately to the right of the yellow triangle below the word Ring Road and this route.

Q. Okay. And the direction of the route?

A. The direction of the route leaves the Vine Substation, travels to the east and north of our properties to Campbell Avenue where it turns to the north on Campbell Avenue and proceeds north to Grant Road, and then turns on Grant Road and travels a good distance to the west to Stone and then south on Stone and finds its way ultimately to Kino.

Q. Okay. And what is Banner's position on Applicant's alternative Route 6?

A. We oppose this route.

Q. And would Route 6 impact to the north the same, cause the same restrictions on your helicopter emergency operations?

A. Yes. It would.

Q. And what about the viewshed in relation to KOP 29?

A. It has the same impact.

Q. Okay. How about the sensitive equipment and the proximity of a large line next to the hospital?

A. Those are also the same concerns.

Q. Okay. And what about construction along that Ring Road or Lester Road area with respect to either undergrounding or overhead lines?

A. Those are the same as well.

Q. And the same with restricting access to the hospital?

A. Yes. Those are the same.

Q. Okay. Could we get TEP Slide 198 up on the right side?

It doesn't have to be on the right side. It's really small.

Are you able to read the last line? It's like a vision test.

A. Yes, I am. It says, "Possible route share occurs if Route D and 6 are selected from Stone to Campbell on Grant, from Grant to Lester on Campbell, and from Campbell to Ring on Lester."

Q. Okay. So again, would a double line along this road be even more impactful to all the different issues that you've already talked about?

A. Yes, it would.

Q. And if siting along the private road, Ring Road, would Banner contest that condemnation process?

A. Yes, we would.

Q. And might this condemnation process further

delay construction of the line?

A. Yes. It would.

Q. Okay. And I just have some -- some general questions.

Have you been directly involved in conversations with TEP on the different route alternatives both in the previous application and this application?

A. Yes, we have.

Q. Was Mr. Bryner involved in those discussions or was it someone else from TEP?

A. On the original application it was other representatives from TEP, and just Mr. Bryner -- Mr. Bryner and others on this current application.

Q. Okay. And I believe in that application, the preferred routes were along Ring Road; correct?

A. Yes. They were.

Q. Okay. And did Banner provide its adverse position on any routes along the Ring Road/Lester Road area previously discussed?

A. Yes, we did.

Q. And what were those conversations?

A. They were very similar to my testimony today where we immediately opposed those routes, citing all of the types of reasons that I have testified to today.

Q. And so in this application, the preferred

alternatives which you've testified avoid those routes, is that the reason that Banner supports the routes B and Route -- Route B and Route 4?

A. Yes, it is.

Q. Okay. And just to close out, would routes D, 1, and 6 be detrimental to the operations of the children's hospital as well as the other hospital and the medical campus as a whole?

A. Yes, it would.

MS. DE BLASI: That's all I have, Chairman.

CHMN STAFFORD: Thank you. Any cross from the applicant?

MS. GRABEL: I didn't, but I have just one quick thing based on something Mr. Barkenbush testified about.

CROSS-EXAMINATION

BY MS. GRABEL:

Q. Mr. Barkenbush, I believe that when Ms. De Blasi asked you what the word constraints meant as shown as Slide 236 of Exhibit TEP-8, you testified that it meant that it would be, "Difficult for entities to stay in operation." Do you recall saying that?

A. I do.

Q. Okay. Were you here for the testimony of

Mr. Bryner?

A. Can you repeat that?

Q. Sure. Were you here for the testimony of Mr. Bryner last week?

A. Yes, I was.

Q. Specifically did you hear him talk about what the meanings of opportunities and constraints meant during the TEP siting process?

A. I recall him saying that. I don't recall the specific definitions he provided.

Q. Okay. Well, would you defer to Mr. Bryner's testimony about what the word constraints meant to TEP within the context of the siting study?

A. Yes.

Q. And would you defer that even if it's in conflict with the definition you provided here this afternoon?

A. I believe so. My testimony today was very focused on our specific operations and so perhaps not as appropriate to the broader TEP context.

Q. Okay. So if Mr. Bryner testified that generally speaking that constraints means that these are factors that make construction of an aboveground or an underground transmission line more difficult to TEP, would you defer to that over your definition was it would

be difficult for your entity to stay in operation?

A. Yes. I'm comfortable with that.

MS. GRABEL: Okay. Thank you.

CHMN STAFFORD: Mr. Lusk.

CROSS-EXAMINATION

BY MR. LUSK:

Q. Mr. Barkenbush, I just have to ask you, and if you don't know the answer that's fine. You work at the hospital; correct?

A. I do not office there. My assignments are companywide, so I'm down here at least once a month.

Q. But you're familiar with the area?

A. Yes, sir.

Q. My understanding is there's no transmission line on Campbell in that area. Is that right?

A. I am not aware of any transmission, certainly not any 138kV transmission lines. I believe the largest or the highest voltage is 46kV.

Q. Can we get TEP-111 up?

MS. HILL: The Company will stipulate that there is no 138kV transmission line on Campbell.

CHMN STAFFORD: Thank you.

BY MR. LUSK:

Q. I guess what I'm -- Member Little suggested

there's a 46kV line on Campbell. Is that your understanding, Mr. Barkenbush?

A. I don't know the voltage that it is at. From what I have gleaned from this hearing, I suspect it could be 46kV.

Q. We can recall TEP, if that's okay.

CHMN STAFFORD: Now?

MR. LUSK: Not now, no.

CHMN STAFFORD: Because I was going to say I -- no. We're not recalling TEP right now.

MR. LUSK: No, not right now.

CHMN STAFFORD: I seem to recall that yes, that was the meaning of the dotted line on that previous slide. It was overhead line to be undergrounded if a 138kV line was built overhead on that stretch of road.

So I think that's pretty clear. I mean, we can follow up with TEP again later, because I'm -- my discussion with Members earlier, we're going to have to recall them, some of the witnesses to ask some follow-up questions at some point. But I think perhaps Ms. Grabel could stipulate to that. I mean, that was their own exhibit, that's what it says.

MS. GRABEL: Yes, we will stipulate that the lines that are running down Campbell are not transmission lines. They are distribution lines.

MR. LUSK: Thank you, Ms. Grabel.

CHMN STAFFORD: Do you have any other questions, Mr. Lusk?

MR. LUSK: No, that was it.

CHMN STAFFORD: Okay. Mr. Dempsey.

CROSS-EXAMINATION

BY MR. DEMPSEY:

Q. I just have a couple easy ones.

So Mr. Barkenbush, you mentioned that you invested money based on the views. Is it fair to assume that other investors in the area have made similar calculations?

A. I'm not sure what you mean by calculations.

Q. They've invested in the views?

A. Are you talking about commercial development?

Q. Any investor that has a view?

MS. DE BLASI: I don't know, Chairman, I don't know that Mr. Barkenbush can testify to other developers' intentions or I don't --

CHMN STAFFORD: Then I guess his answer would be I don't know.

MS. DE BLASI: Right. I'm sorry. But I don't. I don't know.

MR. BARKENBUSH: I was going to comment

that I can't speak for the other developers.

CHMN STAFFORD: "I don't know" is a perfectly acceptable answer.

BY MR. DEMPSEY:

Q. Yeah. Thank you. So just generally speaking, do you expect the City to enforce its ordinances and plans that protect views?

A. Yes, I would.

Q. Thank you. And this is just I guess more of a curiosity question. So is it not possible that the substation itself, no matter the route, could cause interference?

A. We haven't experienced interference from the existing substation that is being retired. And so based on that, I'm less concerned about the substation itself.

Q. Okay. Thank you.

MR. DEMPSEY: That's it.

CHMN STAFFORD: Any redirect, Ms. De Blasi?

MS. DE BLASI: Just a quick -- I think since there is a question about the level of distribution lines that are going in the Campbell -- up Campbell, if at some point when TEP is recalled, if they could just clarify that, I think it would be helpful for everyone, because I think there was some question about the size of those lines in there and actually their proximity to the

medical campus.

That would be our request.

CHMN STAFFORD: All right. Because I'm sure Mr. Bryner will be on the stand once again before this is all over with, and he's the perfect person to clear up all these questions.

MS. GRABEL: We'll have a cleanup panel.

CHMN STAFFORD: All right. So that concludes your testimony.

MS. DE BLASI: That concludes it.

CHMN STAFFORD: All right. And you had two exhibits, 1 and 2.

MS. DE BLASI: Correct.

CHMN STAFFORD: They are both admitted.

(Exhibits BUMCT-1 and BUMCT-2 were admitted.)

CHMN STAFFORD: I don't think we're going to start the next witness seeing how it's 4:41. Tomorrow, we'll begin with your witness, Mr. Lusk.

MR. LUSK: That's correct.

CHMN STAFFORD: Okay.

MR. LUSK: Chairman, yeah, I think that's right.

CHMN STAFFORD: Great. And then after that we'll move on to you, Mr. Dempsey. But let's get through

Mr. Lusk's witness first. So be prepared to start tomorrow. I'm not guaranteeing that you will, but be prepared to start.

Anything further from any of the parties? Members?

All right. With that we will recess until tomorrow morning. We'll come back here at nine. We're in recess.

(Proceedings recessed at 4:42 p.m.)

STATE OF ARIZONA)
)
COUNTY OF MARICOPA)

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