

Dealing with Private Property Programs – What Really Happens Webcast • August 24, 2005

OPERATOR: Good day, ladies and gentlemen, and welcome to the Water Environment Federation conference call on Dealing with Private Property—What Really Happens? At this time all participants are in listen-only mode. If anyone should have a question at any time, you may type it in the designated area on the Web presentation and then click submit. If anyone should require assistance during the conference, please push star, then zero, on your touch-tone telephone. As a reminder, this conference is being recorded. I would now like to introduce your host, Ms. Joan Hawley. Ms. Hawley, you may begin.

JOAN HAWLEY: Welcome to the Private Property Webcast. My name is Joan Hawley and I'm with Superior Engineering and I'm one of the two moderators on this Webcast. The other Webcast moderator is Laurie Sharon of FMSM Engineers in Columbus, Ohio. Both Laurie and I are WEF Collection System committee members. This committee is sponsoring the Webcast. Both Laurie and I have been active in the committee. Laurie has participated in the program and she's actually done a majority of the work for this Webcast and I've also participated in it as well and I will be the new upcoming vice-chair for the committee. Our WEF staff member who has also participated and done a lot of work is Renee Mantei.

As many of you know, across the country, private property issues have been an issue. If you started doing this maybe fifteen to twenty years ago, going to the private property, you were pretty much kicked out immediately. People tried unsuccessfully to move to the private property. I would say within the last five to six year, people have been more successful.

Last year at the Collection Systems Specialty Conference in Milwaukee we had a fullday workshop on Private Property. It was sold out and the number of questions and participants was very active, so this is obviously an important part of people's criteria to eliminate overflows. For those of you who have started to address this, who realize that you have to go to the private property to really try to reduce overthrows, people across the country have been doing this, whether it's via loans, you're paying for it yourself, fees attached to your tax rates, and other mechanisms.

So today we think we have a great program with three distinguished speakers who are actively pursuing private property. Our committee is very proud to announce these people. We have a format. What we thought we would do is each speaker is going to speak for about twenty minutes and then have a question and answer for about five. You'll have an opportunity at the end, probably about 45 minutes, for an active open-end

answer question to any of the speakers, and Laurie Sharon and myself, who have also participated in private property programs.

So I'd like to introduce all the speakers at once. We have three speakers: Ken Roley, Raj Bhattarai, and Larry Cox, and these three speakers represent active utilities pursuing private property as well as they have represented small, medium, and large utilities.

Ken will be our first speaker. He's a Facilities Engineer at the city of Salem, Oregon, and manages the Environmental Services Section as well as engineers and technical staff that provide engineering services to the Public Works Operations for sewer, water, and storm drainage divisions. He's been with the city for over twelve years and has managed numerous collection system projects. He holds a BS and MS in Civil Engineering for Oregon State and is a registered PE in Oregon.

Raj is the Manager of the Environmental and regulatory Services Division of the Austin Water Utility. He has a BS in Civil Engineering from the IInstitute of Technology in India, and an MS in Environmental Health Engineering from the University of Texas at Austin. He is also a registered PE and a diplomate of the American Academy of Environmental Engineers and serves as VP of the Environment Association of Texas. He is the recipient of several WEF awards.

Larry is our last speaker, and he's General Manager of the Downers Grove Sanitary District in Illinois, a position he's held since 1979. He's a graduate of Northern Illinois and he got an MA in Public Administration in 1986. He has been responsible for the operation, maintenance and rehabilitation of the District wastewater collection system for over 30 years.

So with that short introduction I'll let the speakers go and Ken Roley will be our first speaker.

KEN ROLEY: Thank you. I'd like to take this opportunity to thank of all you joining this Webcast today. I've been asked to share with you the way the city of Salem, Oregon has been working with homeowners in helping to solve the problem of inflow and infiltration from private property into our sewer collection system. I want to emphasize that the process I'm going to describe to you is not the only way. In fact you'll be hearing three very different and unique approaches today, but it is one way to combat the I/I problem on private property that has evolved in the city of Salem over a number of years and it seems to be working for us in our community.

I want to give you a brief overview of what Salem's wastewater treatment system consists of and talk a little bit about the history of our I/I removal program, tell you what our current program is, describe very briefly some modeling efforts that we're doing to track the I/I removal and determine what our system performance is, and then give you some brief lessons learned.

Salem's wastewater treatment system is a regional facility that serves over 210,000 people. It consists of about 700 miles of pipelines that range in size from 6" to 75" and range in age from the early 1900s up to the present day. We operate separate sewer and storm drain systems.

The next slide shows the service area for the city of Salem. That consists of about 70 square miles. It includes the cities of Turner and Keiser and the areas of West Salem and several smaller sewer service districts around the surrounding area. The highlighted area is in the middle of the map. Those are locations where the majority of our R/R projects are currently taking place. I'll come back to those a little bit later. Those are also study areas that we're using to track our progress in terms of how much I/I is actually being removed from the system.

The next slide indicates that we have approximately 0-12 SSOs each year. We discharge approximately 160 million gallons of raw sewage into the Willamette River each year on the average. Our Sewer Master Plan was completed in 1996, and that was updated in 2002.

We have been under a Memorandum of Agreement and Order with DEQ, the Oregon Department of Environmental Quality, since 1998 and that MAO requires the city to be able to treat and convey up to a five year, 24-hour storm event without having a sewer system overflow, and we have to have that completed by 2010. A five-year, 24-hour storm event is equivalent to about 2.7" of rainfall in our area in 24 hours. We in Salem get about 36 inches of rainfall each year and we're currently able to convey and treat about 1" of rainfall during the wettest portion of the year when antecedent conditions and groundwater levels are the highest in our area, so this is quite a large increase for us and something that we're estimating is going to cost about \$400 million for the city to be able to meet these regulatory requirements.

If you look at I/I history in the city of Salem, I don't think that we're much different than most other areas around the nation. If I were to characterize the '70s and '80s, I would describe them as a smoke-testing age because it was during that time that most people believed that we could attack the I/I at the source and eliminate SSOs by eliminating I/I, and it was recognized during that time that a lot of the problem was on the private property side in addition to what was in the public right of way.

Our entire sewer collection system was smoke-tested and in fact is continuing to be smoke-tested today and we have tested it several times, but we have also eliminated hundreds of sources of inflow within our system, but we recognized during the '70s and '80s that smoke testing and trying to eliminate leaks in sewer laterals was not effective, and in fact we were spending a lot of time just chasing infiltration inflow around in the system, so we have put a greater focus on new services during that time period, making sure that new services that are installed are watertight as much as the technology will provide and we have also stopped requiring improvements to leaks in sewer laterals because that was determined to be ineffective, but we still continue with smoke-testing and eliminating sources of inflow such as roof drains and open cleanouts and those types of things.

If you look at the system in the 1990s, our philosophy regarding I/I had significantly changed. As I mentioned, the Sewer Master Plan was completed in 1996 and as a result of the consultants' recommendations and our work on that Master Plan, it was determined that it was less expensive to convey and treat I/I than it was to try and eliminate it at the source. That doesn't mean that we abandoned an I/I reduction program, but it meant that we were putting our treatment focus and meeting regulatory requirements on building a larger conveyance system, improving and increasing the capacity of our treatment plants, and also more recently building a satellite treatment

facility that will be designed to treat sewer system overflows, and in fact it's the first one licensed in the state of Oregon and one that we expect to have completed by 2008.

During this same time period, we had a number of sewer storm inter-ties that were eliminated. We developed a hydraulic model of our system and there was a much greater focus placed on private property issues that kind of helped form our current program that we have today. Currently we're spending somewhere between \$3-4.5 million a year on our sewer rehab and replacement program. That program, like in a lot of communities, has evolved from where we were originally just replacing the sewer mains and laterals to the property line, and we recognized that that was wasn't enough to really have an effective program, so then the decision was made to extend our R/R program onto private property and replace the sewer laterals at public expense all the way up to the house.

There has been quite a debate about public funding of private services, but we feel that the most convincing argument in favor of this approach is that removing I/I and the need to treat I/I in the future benefits all ratepayers and therefore all ratepayers should share in the cost of doing that. The most frequent argument we hear against this policy is that homeowners who have purchased a new house have a tight and good sewer service lateral and not contributing I/I shouldn't be forced to pay for failing laterals of other property owners when it's their responsibility.

The next slide shows really the division of responsibility of service laterals, and per our city code, the property owner is responsible for maintaining the sewer service lateral from the house all the way to the connection with the sewer main, and that includes that portion of the service lateral that is in the right of way, and these can be quite expensive. Our records indicate that the property owner very rarely does much maintenance on his line. In fact he's willing to suffer through a number of repairs and callouts to plumbers to keep his line in service over a number of years before having to necessarily replace it when total failure occurs. As a result, the R/R program—and that's another reason why we feel that it's very effective in paying with public funds the replacement of the service lateral and getting those replaced and upgraded at the time that the sewer main is replaced.

We've had a number of private property issues that we've had to deal with over a number of years. In 1995-96, we had the wettest winter on record in the city of Salem with over 2.5" of rainfall four days straight in a row. That resulted in extensive flooding throughout Salem and over 500 basements we estimated during that one storm event suffered from sewer backups. This created a tremendous outcry of our citizens regarding basement backups and they demanded that something be done about this.

As a result, there was a study done and we determined where our most critical needs were in terms of basement flooding and developed a program to prevent basement flooding and correct these problems and prevent basement flooding in the future. We called this program the Positive Protection Program and as a way of funding this program, the city provided a zero interest, deferred payment loan to the property owner. The way these loans work, they become liens against the property. There is no interest paid by the property owner. The city pays for the cost of these projects up front and then the lien method allows for a repayment of that loan in the future when the house is sold.

There have been basically two alternatives that the homeowner had to choose from. One was the installation of a backwater valve and retrofitting that to the existing plumbing system. These were homes that would have a very low risk of basement flooding that would maybe only be on the scale of once every 30 years with a very large storm event, and a basement backwater valve would be protecting the home during that type of an event.

The more common approach that was used by most homeowners is with homes that had more frequent experience with basement flooding, and some homes had several events that they would experience each year. In this alternative, a new sewer service lateral is installed at a higher elevation that serves the main floor of the house and then an injector pump is placed in the basement and tied into the existing plumbing that serves all the fixtures within the basement and pumps sewage from the basement into the new service lateral.

In both alternatives, as shown on the next slide, we have installed a sump pump that redirects the footing drain wanter, and the sump pump in the photo on the right is the pump on the right-hand side. This pump takes the footing drain water and water from underneath the basement floor and pumps it to the curb or to a catch basin. The injector pump is located on the left and you can see in this photo the service lateral that has been redirected to the injector pump that is now pumping that flow into the new sewer service lateral.

This program was funded at about \$880,000 per year and since 1997 we've completed well over 350 projects and loaned out over \$1.6 million. For the injector pump, sump pump type of installation, the average cost has been about \$12,625.

If we look at our Private Property Program today when we're dealing with our R/R projects, we have several steps that we go through with the private property owner. First of all, we include the private property in the survey of the city mains and include that as part of the plans and contract documents that go out for bid. The resident is sent a letter that describes the project, when it's going to take place, and what their responsibilities are. And then we have a contractor that is hired by the city that goes out to each homeowner and does an inspection during the design phase of the project to map out the existing laterals and determine sources of extraneous water. We provide that contractor with a checklist and a map of the property and he places all the information on the map and returns it to the city.

After that takes place, then we work with the property owner to get the extraneous water removed from the property and the extraneous water portion or the portion that is within the footprint of the house is also eligible for a zero interest payment loan, so if the property owner doesn't want to pay for that themselves, then the city provides that money and makes that money available to make the project go.

We make sure as a part of this process that all footing drains—and we estimate that we probably still have 5,000 or more footing drains connected to our system—all the footing drains, roof drains, and sump pumps are disconnected at the end of our R/R project for each of the areas where we're doing that work.

The next slide shows a breakdown of our annual funding for private property systems. That includes the grant money that pays for the new service laterals, extraneous water

loans, the Positive Protection portion of the program that ended in 2004. We had a Retrofit Program that we used to go back on earlier projects and do the private portion of those projects when we didn't have that program in existence. Then we also have a program for miscellaneous lateral replacements that helps low income folks that have failed laterals to get those fixed, and those could take place anywhere within the city. If you look at the total spending, then, for our program, which is about \$4 million, \$2.5 million of that or about half of it is on private property.

Next I'd like to just briefly talk about our I/I removal forecasting model and what we're doing to try and monitor the amount of I/I that is being removed as a result of our R/R program and helping us to determine how effective that program is. One of the study areas that was shown on the earlier map is shown on this slide, and the green lines on this map show all the lines that have been replaced as a part of our R/R program, and the shaded lots are the homes that have been involved in these programs. We've been monitoring flow within these basins both prior to the time that construction is taking place and during construction, and continue to monitor flow in these study basins.

As a result of the modeling effort that we've done, the next slide shows the reduction in I/I on these basins for different storm events, and this would be the reduction in peak flow. The blue line shows the peak flow predicted during wet weather during different storm events for different size storms, and then the red line shows the new hydrograph for different size storms after rehabilitation has taken place, so the difference between those two lines is how much I/I has actually been removed as a result of actual flow measurements that are being taken on these basins.

Now there is one caution when monitoring. You have to be very careful with these models to make sure that you're accounting for varying antecedent conditions from year to year as rainfall events and the level of groundwater can vary dramatically from one year to the next, and the way our model accounts for that is by developing hydrographs based on the entire rainfall record, which we have over 40 years of rainfall records for the city of Salem, and comparing like records to different times, and I would be happy to share more information about the model and how that's being developed if you would request that information. I have that written up in a paper that I'd be happy to share with you.

This slide shows a comparison between one of the test basins and a study basin. We reserved a study basin that we continue to monitor the flow where no work was conducted, and the blue line shows the comparison for identical storm events between the study basin and the control basin, and the red line shows post-construction the same comparison between these two basins. You can see quite a dramatic decrease in peak flow as a result of the projects that have taken place.

So as a result in this one study basin we found that after replacing 60% of the existing collection system and spending about \$3.15 million on this basin, the model was predicting that we have reduced peak flows within that basin by about 22%. We're currently expanding this model to allow us to evaluate the performance on the entire sewer collection system so that over time we can measure how much I/I has been reduced.

The next slide shows the cost effectiveness of these projects and how much we're spending to reduce I/I based on dollars per gallon per day. You need to keep in mind

that these cost figures are based on the fact that 30% of the cost is in the form of loans to the property owners that eventually goes back into the city.

So what have we learned from this entire process and over the last 20-30 years? I think we've learned that in the short term, to meet regulatory requirements we need to have the ability to convey and treat excess flows within our system, and that is the approach we're taking to meet these short-term needs and meet the regulatory requirements. We're building a peak excess flow treatment facility that is used to treat wet weather flow. The process that is used is rapid sedimentation and ballasted flocculation to take the solids out of the SSO flow and then UV treatment to kill bacteria before it's released into the Willamette River, and we believe this system will provide secondary treatment and is currently being licensed as part of our permit with the state of Oregon. That system will be online by 2008 and will cost approximately \$30 million to construct.

In the meantime we're continuing to fix holes within our system and reduce I/I as part of our R/R program. We think we have an effective R/R program that is reducing I/I over the long term. I think we've definitely learned that the private property side cannot be ignored and that the inspection of private property during design is really a key element in terms of insuring project success and being effective in reducing I/I in your program.

And then finally I think the zero interest deferred payment loan program has really been a key driver in keeping these projects moving. At least in our area we've found that normally the home owner doesn't have available the funding to fund the private property portion that he should be responsible for, so I think we've created a good compromise in sharing responsibility between the public and the private sector to insure that these projects can be able to move forward and we can have an I/I reduction program.

That completes my presentation. I'd be happy to answer questions at this time.

JOAN HAWLEY: Thank you, Ken. At this time if you guys would like to submit your questions, we have a couple of questions that I'll defer to Ken, but at the same time you can continue to submit and then after five minutes we'll just keep the remaining questions. The first question to Ken is, are the reductions in peak flows in the slides with the graphs strictly for private laterals or for everything?

KEN ROLEY: It's for everything. The flow monitors that we have in these sub-basins measure all the flow that is leaving that sub-basin.

JOAN HAWLEY: And the second part to the question, is there any estimate on the reduction strictly related to the private laterals?

KEN ROWLEY: We don't have that broken down and we haven't come up with a way to measure just the flow coming off of private property. That is very difficult in the way that our system is designed. I have tried to do some work in terms of measuring the amount of flow that's coming from footing drains by placing some meters on the diverted lines that go to the storm drain system on the sump pumps that have been installed as a part of our Positive Protection Program and I've found that that flow can vary greatly, of course, depending on rainfall conditions and the groundwater level within the system, but for the most part those flows are definitely significant and I feel are a major contributor to our SSO problem, and that's why we put a high priority on removing footing drains within our system.

JOAN HAWLEY: Then the next question is what type of total suspended solids and BOD limits do you have on the PF treatment facility? 30/30, 45/45, and what is the capacity?

KEN ROLEY: We'll be building a 50 million gallon a day peak excess flow treatment facility in the satellite plant that is being constructed and it has to meet the same secondary treatment requirements that are licensed as part of our treatment plan.

JOAN HAWLEY: The next question is, are you using any new types of connections to insure water tightness in new construction, and how do you prioritize the projects?

KEN ROLEY: We're using the most modern plumbing techniques. I mean most of our new sewer service laterals are constructed out of PVC pipe. They're all rubber-gasketed and they have to pass an air test or a water exfiltration test, so we have a fairly high level of confidence that those systems are pretty tight. In fact we have done flow monitoring in some of our newer subdivisions, and the flow monitoring results show that these newer systems that are being put in are much better and perform much better than systems that were constructed even 30 years ago. What was the second part of the question?

JOAN HAWLEY: How do you prioritize the projects?

KEN ROLEY: The way we prioritize the projects is that we have a priority ranking system that we use with our sewer collection system. It's based on TV inspection records and the number of defects that we have in our system in addition to the risk of failure of those systems, the number of repairs that have been made on those lines, and other operating and maintenance problems such as root intrusion, in addition to the I/I component and the amount of I/I that we know exists in those areas. Not surprisingly, most of our R/R work during the last decade has been in the oldest part of our system where we've had the largest problems with basement flooding and also have had the largest amount of I/I.

JOAN HAWLEY: The next question, and we're going to keep them short because we're running out of Q&A time, is it mandatory on the private property side and what type of techniques are you using for the private lateral construction?

KEN ROLEY: Our code requires that the homeowner participate in this program and they can either participate by allowing the city to replace their sewer service lateral at no cost to them—as a grant, in other words—or they can participate by replacing it themselves, and we found very few people that refused a free service lateral as a part of the R/R project. What was the other part of the question?

JOAN HAWLEY: What types of activity—the R/R on the private property—are you doing? Are you doing open cut? Are you doing lining, etc.?

KEN ROLEY: Many of the service laterals are open cut. We have also used boring and those types of methods where we have extensive landscaping or a lot of solid surface areas that we have to get under or whatever, but we haven't used a lot of lining or those types of systems. Most of them have been pipe replacement type of programs.

JOAN HAWLEY: We have quite a few questions so I'm going to save them until the end, and so we'll designate that these will be for Ken or potentially Raj or Larry, so with that I would like Raj to start his presentation.

RAJ BHATTARAI: Thank you, Joan and Laurie. I also thank the WEF Collection Systems committee for organizing this Webcast and for inviting us to speak, and I thank the WEF staff, particularly Renee Mantei, for her excellent help in coordinating the entire event. And of course last but not least, thanks to all of you in the audience for your interest.

Let me start out by acknowledging my coauthor, Gopal Guthikonda. He was the program manager for the Austin Clean Water Program—did the bulk of the work on this. I'm simply a surrogate who is speaking today.

For those of you who don't know where Austin is, the location is shown by the star on the map at the right. Of course Austin is the capital of Texas and there's no other way to say it, but we're deep in the heart of Texas. Okay, no more singing after this. The city area is about 270 sq. miles. Our service population is about 700,000 or a little over that. The entire metro area is over a million, but what we serve is a little over 700,000. Our collection system length is approximately over 2,320 miles and we have over 168,000 service connections. The annual average system-wide wastewater flow is 85mgd.

Next slide please. This shows the typical sanitary sewer lateral, pretty much similar to what Ken Roley just showed us earlier. You notice the property line there, slightly to the left of the center of the slide. Everything to the right of the property line on the private property is the responsibility of the private property owner and everything to the left of that and beyond is the responsibility of the utility, and the city. You'll notice one other thing. There are no basements here because we hardly have any basements here in Texas. In fact I think there are only twenty houses with basements in the entire city.

Next slide please. This one shows some of the typical problems that we could have with sanitary sewer laterals. There are illegal roof drain connections, missing cleanout caps from which rainwater could enter. There could be broken pipes or defective cleanout, breaks or cracks in the pipe of course due to root penetration, separated joints, breaks, cracks, and holes throughout, so all of that could be a problem. And you can see that this slide with the problems is slightly fuzzier than the previous slide, which is a lot sharper. That shows the extent of our problem, even in the slide.

Next slide please. Now why are the private lateral problems such a big deal for us? Because they contribute the extraneous flows that we really don't want in our collection system. They can represent roughly 50% of the entire collection system, the length of the private laterals, and therefore an have up to 50-75% of the I/I could be entering this collection system through the laterals, and typically they are beyond utility control because they are on private property and traditionally we have been reluctant to go onto private property and expend capital expenditures there. And of course excess flow can cause SSOs and negatively impact public health and the environment, leading to higher O&M costs both for the collection and operations managements as well as the treatment plant.

Next slide please. Now this is not the way for you to find out about your system. Unfortunately, this is the heard way we learned. We received an administrative order

from the EPA. It was issued in April of 1999. That required us to eliminate the SSOs by December 2007. That date has now been changed to June 2009. The administrative order required us to carry out fourteen very broad and separate tasks to eliminate the SSOs and the utility decided to take a very comprehensive look at its entire collection system. We conducted I/I studies and sewer system evaluation surveys. When we did that, we looked at any defect in the collection system. We looked at the SSO potential as well as the potential for I/I.

Next slide. Now during the I/I and SSES studies, we found out that approximately 50% of the extraneous flow contributions could come from the private laterals. Of course this is an estimate. We haven't done this for the entire collection system yet. We have extrapolated from whatever studies we have done in limited areas and extrapolated that to the entire city, and based on the studies done so far we estimate that about 6% or about 10,000 private laterals—6% of our 168,000 connections would be approximately 10,000—may need repair or replacement to avoid significant I/I, and this is also an estimate. We think the cost could range anywhere between \$1,000 – 3,000 for the majority of private lateral repair.

Next slide please. Now we do have an existing ordinance here in the city. It is still in effect, even though I call it the old ordinance. That requires that if there is a defect in the private lateral system, the owner is given 60 days to repair his private lateral system and there is provision in the ordinance for the water and wastewater service to be terminated if it isn't completed within 60 days of the notice. Now the excess wastewater in the ordinance is defined as 250gpd/inch diameter/mile of pipe. That proved to be big trouble for us.

Next slide. So with the old ordinance, finding the defect itself wasn't enough. We had to show significant flow contribution due to the defects, and that was extremely difficult for the utility to prove. We took certain recalcitrant homeowners to the court, but we had a difficult time proving it and then the whole case was thrown out of the court, so basically the old ordinance, the old approach, lacked enforcement teeth and as a result we haven't had much success in encouraging property owners to repair their private laterals and maintain them in good working order.

So we decided to take the new approach. Next slide please. We said we have to develop a new plan and we started out by looking at a survey of other utilities' practices, and Austin believes in participatory democracy and it's extremely crucial for anything here which involves the public, and private laterals certainly do, so it requires public input—it's very crucial—so we were going to have a citizen advisory group and we were going to draft a new ordinance, which will have more enforcement, but will also provide incentives to the homeowners—the carrot and the stick approach—and it will require better installation practices and will also require us to give the homeowner's a certain schedule within which to complete that.

Next slide please. We already have a standing citizen advisory group for the Austin Clean Water Program. It is a diverse group of 33 members from throughout the city. There is a geographic as well as interest group diversity. There are business leaders as well as representatives from neighborhoods, environmental advocacy groups, and the restaurant association. Why the restaurant association, you might ask? Because the number one cause of our SSOs is due to grease. We love our food here in Texas, but that leads to a buildup of grease in our collection system and that's why it was essential

for us to bring the restaurant association also as part of the citizen advisory group. The citizen advisory group holds quarterly meetings, and they pretty much reviewed and commented on almost all aspects of the Austin Clean Water Program which involved the public, including of course the private lateral issue, which was a subset of the entire Austin Clean Water Program.

Next slide please. Now the Private Laterals Task Force was a subset of the citizen advisory group. We got eight volunteers from the CAG. We held eight meetings from 2003 to 2004 and instead of doing our own survey of various utilities throughout the nation, we relied on the working draft conducted by Miami-Dade Water and Sewer Department. The copy that I have is dated December 2002.

We presented information from that to the Private Laterals Task Force and the range of options we discussed ranged all over from the utility paying for the entire private laterals work repair and maintenance to a private lateral insurance program where the homeowner would pay \$1 or \$2 a month and the utility would go and repair and maintain the private laterals, and there were some other utilities which used a flat charge of \$1,000 for all necessary work on private laterals, whether it cost very little or a lot more than \$1,000. And then we went to another extreme of cutting of water and wastewater service if the repair work is not done by the given deadline.

Next slide please. The task force favored a new ordinance during a lot of discussion through 2003 and 2004, and they pretty much wanted to provide incentive to the homeowners and they also wanted stronger enforcement, as I had outlined earlier. After two years of work, we finally had a consensus on a Private Lateral Financing Program. This was going to be basically zero interest financing and then we were also going to put penalties—both civil and criminal penalties—for not completing the work in the designated time.

Next slide please. The Private Lateral Financing Program, the financing part itself, was modeled after its sister city department, the Austin Energy Department here in the city of Austin. They have a Total Home Efficiency Loans Program where they give low interest or interest-free loans to the homeowners to install energy-efficient equipment—air conditioners and washers and dryers and other equipment in private homes—so we decided to follow a similar pattern and the Austin Water Utility would then buy down the interest, so basically it would be an interest-free loan, and the loan would be made by a private lender. And we sent out requests for proposals from financial institutions and we already have a private lender interested in servicing the loan, and we also prepared our proposed ordinance, and the financial program is tentatively scheduled for city council approval either next month or the month after that. It's been a lengthy process. We went through the citizen advisory group committee and then there's a Water/Wastewater Commission here, which is a citizen advisory group to the city council. They approved that and now we're waiting for the city council approval.

So let's discuss in a little more detail what the ordinance does. These are some of the highlights, some of the main headings of the proposed ordinance. It requires the owners to maintain private laterals and once the utility inspects and sends notices to the owner, either through smoke testing or TV testing or through sometimes in really grossly negligent cases through visual observation is there is a problem, and they have a certain time to repair that and we have very strict repair and replacement standards and after

repair and replacement, the utility will come do the inspection and testing. Initially we used to do the water testing, but now we're going to be requiring air pressure testing.

Of course there is a financing program that is an incentive, and there is an application that the homeowner has a choice to do that, to take advantage of that, and the failure to repair within the given time is an offense, both criminal and civil, and the water and wastewater service could be terminated and then restoration would only be done after the repair and replacement is completed, and as I point out already there are criminal and civil penalties and all these penalties could be cumulative. All the remedies—just one remedy alone won't preclude an others.

Next slide. The eligible homeowners, of course they have to be a customer, they have to have an active utility account. They must be the owners of the residence. It does not apply to rental properties, and it must be a single-family home or an owner-occupied duplex. As I said, commercial or multifamily properties are ineligible. Prior to any construction, of course the utility has to inspect the lateral and declare that it's not in compliance with our requirement, and then final inspection must be done and approved by the utility.

The eligible cost items—approved cost of repairing or replacing the laterals from the property line to immediately outside the house, including the backfill, and also the cost of installing necessary cleanouts, because not all existing homes have the necessary cleanouts, so if a new one needs to be installed we're going to be funding that also.

Next slide. Again, the cost of removing or decommissioning the old one that's defective and then any cost of the necessary permits, and one of the main issues that we're grappling with right now is what do we do with folks who don't either qualify for the loan or cannot afford to pay for the repair? The whole financing program is for the people who qualify for a loan, so we're looking at some neighborhood housing outright grants for people who qualify for that, for the low-income people.

Next slide. Some of the cost items that are ineligible would be the cost of repairing or replacing internal plumbing or any trees or landscaping that are damaged during the construction and replacement, and paving materials—those are all not allowed.

Next slide. Of course any surface treatments or concrete slides—all of these are not allowed. If there are any hazardous materials that show up at the site, we are not going to be responsible for that, and if there are old septic tanks and other appurtenances, we are not going to allow the cost for that.

The minimum loan amount would be \$1,000, as I said earlier, and the maximum would be \$3,000. That's our estimate. We may change that later as we proceed, and the loan proceeds must be used only for eligible cost items. Current plans are to continue this program even after the conclusion of the EPAs Administrative Order on June 30, 2009.

We estimate the total cost—the entire cost of the repair and replacement program to be on the order of \$20-30 million and if you have any questions, I would be glad to take them. If you require additional information, you can contact either Gopal, my coauthor, or myself at the addresses and phone numbers shown there. I'd be happy to take any questions now.

JOAN HAWLEY: We have a boatload of questions here, so we're going to start going through them and then we'll save them for the last. For those of you who may have joined later, all of the presentations will be available and we're also going to update the transcripts and submit them to each of the sites. I tried to lump the questions in different areas. Did Austin make any changes to the FOG program ordinances in this process?

RAJ BHATTARAI: The FOG program, meaning fats, oils, and grease?

JOAN HAWLEY: Yes.

RAJ BHATTARAI: Yes, that has already been revised. We recently submitted our revised pretreatment program to the state and it has just been approved a couple of months ago. The FOG program, it used to be a much more loosey-goosey ordinance that was difficult to enforce and that has been tightened also. As you can tell, we brought the restaurant association in for all of them to buy in.

JOAN HAWLEY: When are you scheduled to approve the new ordinance?

RAJ BHATTARAI: We are hoping it will be September or otherwise by October. The main issue right now has been how do we handle people who don't qualify for the loan or cannot afford to pay for the repair themselves.

JOAN HAWLEY: A couple of combined questions—what is the city's liability if the resident defaults on the loan and does the city replace the public portion of the lateral?

RAJ BHATTARAI: The public portion of the lateral, of course we are responsible, and if they default, their credit rating will be bad. The private lender will go after them and I think that's the risk that they are taking. What's happening with them is they look at the credit rating of the applicant and they charge them separate interest rates depending on their credit rating. A high-risk applicant would have a higher interest rate, so basically the city would be paying higher money for that amount of interest, and the low-risk people with high credit ratings would be paying low interest.

JOAN HAWLEY: Are there legal issues in using public funds for private property repairs?

RAJ BHATTARAI: Yes, historically that has been the problem in Texas. Everybody has been reluctant to go there. The system could be abused by spending public funds on private property, and that's why we have been very cautious, but as Ken pointed out earlier, I think there is now a general understanding—the public officials and the citizen advisory group, everyone felt strongly that there is a tremendous amount of benefit if we control the I/I from the private laterals. We just could not let things stand as they were and unchanged.

JOAN HAWLEY: How did they inspect the laterals to determine if they were defective and what standard did you use to determine the condition, and someone else had asked about the NASCO standards as well.

RAJ BHATTARAI: Okay, we can do smoke testing as well as TV inspection. In addition to our regular TV inspection cameras, we have minicams, which can go into really smaller lines and go up the private laterals and look at the defects and the new

draft ordinance proposes basically that any defect in that would be enough to trigger enforcement action.

JOAN HAWLEY: We have time for one more question. What are the criteria to determine if the private laterals are defective other than what you have said, and I actually think this is a question we'll ask all of the speakers.

RAJ BHATTARAI: Mainly smoke testing—when you see a good amount of smoke coming out, and as I said earlier, during our I/I and SSES studies, we normally look at the potential for SSOs. We not only look at I/I potential, but also the potential for SSOs. We want to avoid both of those, and any cracks or defects, anything like that, we would like to go and fix that. That's been our priority right now.

JOAN HAWLEY: We do have a lot of questions, which we'll get to after the next speaker, so hang on to your questions and we'll try to answer them. The next speaker is going to be Larry Cox from Downers Grove Sanitary District.

LARRY COX: Good afternoon, everyone. I'd also like to thank Joan and Laurie and Renee for setting things up and for Ken and Raj for sharing their expertise with us and for all of you for calling in. We have close to 150 sites I believe signed up for Webcast today.

The Downers Grove Sanitary District is a special unit of local government. Our sole responsibility is wastewater collection and treatment. We operate and maintain a 237-mile public sewer system. Those are separate sanitary sewer systems, nine pumping stations, 20 square miles, a suburb of Chicago, just under 20,000 building connections and 62,000 people, and the arrangers of this Webcast have given you a nice mix of different sizes of communities as you can tell. We're about a tenth of the size of Austin and about one-third the size of Salem. Those 19,600 building connections that we have under the Sanitary District's ordinances, the building owner is responsible for the maintenance of repair of that service all the way to the public sewer out in the right of way.

The district, like everyone else, began the I/I business back in the '70s. We actually suspected that private sector I/I was the problem from the beginning and in 1973 we started inspecting homes for illegal connections, downspouts, sump pumps, etc., primarily looking for the easy fixes, if you will, the things that could be easily diverted by the homeowner, rerouting a discharge from a pump or a downspout, and we've been through every building at least once, some areas obviously more than once.

That obviously didn't prove to be sufficient and we were drawn into the SSES and Sewer Rehab in the '80s under a USEPA grant. Under that grant we did some I/I removal projects, about \$2.6 million worth, which was supposed to reduce our peak I/I flows. It was only partially successful, like most projects of that era, but also at that time we built the conveyance capacity in our treatment system, or collection system rather, and also the treatment ability at our wastewater treatment center to handle our high flows, so as opposed to Ken's discussion earlier where they're looking at that now, we have that in place so our focus now is trying to maintain our flows within the capacities that we built for ourselves.

We used the same techniques that everybody has talked about in the 1980s, but our I/I problems have continued. Our normal dry weather flow is 8mgd. We'll hit a peak wet weather flow of 80mgd in a pretty serious rain event. Probably 2-3" of rainfall on saturated ground will get us to 80mgd, and as a result we have about 18 SSOs per year and about 37 basement backups per year.

Next slide please. The district, again, has suspected for years that it's a private property problem, so what we did was embark on a problem in 1994 where we picked a small basin, about 5,316 LF of sewer, 8" and 10" diameter pipes, and we installed a CIPP liner in all the mains. We grouted and lined all of the manholes, and then we installed a CIPP liner in all of the services—there happened to be 85 services in this basin—and what we were trying to do, we were trying to determine what I/I reduction we would receive were we to totally rehabilitate all of the sewer that was located in the public right of way, and quite honestly we were expecting that there would be some reduction, but unfortunately we saw basically no reduction in I/I, which confirmed to us that the problem is on the private property.

So we embarked on a new—basically just rethought our whole approach and tried to zero in on the private property part and come up with a comprehensive program. One element of that is obviously flow metering—the other two speakers have referred to the flow metering in their areas. This is a slide that details what we're doing here. We're doing pretty intensive flow metering. We're dealing with flow meter basin sizes of 8,200 lineal feet on average and we meter the basin for nine weeks. Every three years we come back and meter it again. We are now going into our fourth go-around. We started in 1996, so we've starting going into the fourth time on the very first basin.

Next slide please. What we decided to do—we had some questions already on how you prioritize your sewer rehabilitation funding. We decided to prioritize our funding on three components. I don't know about in your areas of the country, but in our area of the country we work closely with our local road authority, obtain the areas they're planning to do their road projects, and obviously that area becomes a high priority for us for any repairs we need to make to the sewer system in that area. We also have ongoing maintenance problems where we need to replace a sewer because of a pipe sag or something like that, and then the third one—and these are not listed by order of priority, by the way, they're just listed in order here—I/I reduction projects where we have targeted a rehab basin that we decided to go after.

Next slide please. Again, we had a question previously on how you select your target basins. We selected based on four criteria and developed a somewhat basic scoring system. One is the frequency of SSOs that could be attributed to that basin, the frequency of basement backups in the basin, the flow monitoring data, and the system age and characteristics, kind of like what Ken talked about.

So what we decided to do here, we decided to totally rethink our rehabilitation approach. In the 1970s, that SSES work that was done was all the old point repair approaches where you TV the sewer and flood tested it and you identified a leak and you fixed only the leak, and what we have found and what I believe everybody is finding, the water just moves. You really have no effective I/I reduction. So we felt that the only way to address I/I issues was a complete rehabilitation of everything in the basin.

In addition to that philosophy, we also looked at the funding level that we're supplying to our sewer rehabilitation and I don't think we're alone in this, but as recently as probably ten years ago if you took our annual sewer replacement budget and divided it by a reasonable estimate of our sewer replacement cost of our entire system, we were about in a 500 year cycle. I don't know about you, but I don't know of too many assets in this world that you could reasonably expect to last for 500 years, so the other component of our sewer rehabilitation program, my board of trustees of my district has decided to get that repair frequency or that repair cycle down to 100 years, in other words, that we would spend an amount every year that would replace the system over a 100-year period.

So we made the decision to pick out the worst flow meter basin that we had, again based on the four criteria I mentioned earlier, and that happened to be this basin I-H-9. It's in an area of our district where sewers were built right after World War II, so it isn't the oldest in the district, but it has by far some of the highest I/I numbers and SSO and sewer backup numbers. There are 189 houses, 8,300 LF of sewer. Flows went from 60gpm to over 1,200gpm during a peak flow event. And we did the traditional flood testing, smoke testing, and really didn't find all that much in the way of flows. In that particular area it's basically flat—no storm sewers and roadside ditches—most of the areas didn't even have roadside ditches, so the water just basically ponds in the parkways over the service laterals.

Next slide please. What we do is after we pick the area out, we go in and it's our intention to completely rehabilitate everything in that basin, so we go into private property, we go into the homes, we run a C-snake camera down the service lateral. We do a flood test from the surface. We've just rigged up a probe for our jet truck and we just inject water over the top of the pipe and just record the fact that the pipe isn't tight. I doubt there are too many sewer services in our district that would pass that kind of a flood test, and we make a video inspection of that and we note any other illegal connections. Here we are looking for not quite only the obvious ones, like sump pumps and downspouts, but we're looking for footing tiles and any other types of issues that Ken talked about under their program as well.

We then proceed with total rehabilitation of the system. We line the mains. We do now require on a cured-in-place liner in main sewer that it pass an air test before they reinstate the service laterals. We either grout the manholes if they're precast concrete or we replace them if they're brick or block, and then we line the services and we also require that the services be air tested. I'll talk a little bit more about that later. And then we come back and we eliminate private property I/I sources later on.

Now there's been some discussion about who should pay for this kind of work and it's been my experience that if you require the homeowner to pay any portion of this, you're going to hit resistance all along the way, so we have designed our program that anything we find that needs to be repaired for an I/I perspective, elimination of I/I is paid for 100% by the district, and the logic is pretty simple. It's basically a system improvement. The benefit that you're putting onto that service line is not an improvement for the homeowner. He typically isn't the one that's having the sewer backup or the manhole overflow in his area. The system itself as a whole is improving, so that's how we justified paying for it with public funds.

For selection of our service rehabilitation process, we require a non-leaking connection at the main, minimal disruption, ability to air test, and rehabilitation from the main to transition at the building. Transition at the building in our area—that's where the 4" line under the floor changes to 6" line before it goes out to the street, generally about 5' off site, out of the building. Again, we're doing this work with the district contractor, so we grouped all the work together to get quantity of prices and then coordinated that with our excavation contractor, which I'll talk about in a bit, for putting in the outside cleanout.

Next slide please. The service lining work itself was rewarded to a local company out of Ottawa, Illinois called Performance Pipelining. We used their T-liner product, which is a T-liner at the main, so not only are you lining the main sewer, you're also lining the service lateral all the way to the building and you're putting in a T-connection at the main for strengthening and leak proofing. We've set our contracts up for a five-year renewal. It's an annual contract. Prices can adjust at the end of one year and we can renew the contract with the mutual consent of the contractor and the district for up to five years. The purpose of that is that I've been in the business too long with low-bid contractors. All they want to do is make their profit and get out. I doubt that's what they're really there to do. We wanted there to be an incentive for the contractor to satisfy and partner with us and by doing so he got the bonus of an extension of his contract.

Next slide please. So far this program—we've just gotten started with this. All the main lining has been done. The manhole rehab has been completed. We've completed fourteen services and we're going to begin removal of some of the private property work this fall. We really haven't found a lot of footing drains in this particular drainage basin, but we expect we'll find that in other areas of the district.

Now keep in mind that in this target basin and in the future target basins as we work our way through those, the district is rehabilitating everything in that basin and the district is determining which basins get prioritized, so we had an equity question that we had to face, and that would be if we had a homeowner who was experiencing a problem with his service line a few blocks away from our target basin and learned that one of the people in the target basin was getting it all paid for by the district, what would we do for that particular owner of a building who was having a problem with his building service? So we came up with—we call it BSSRAP for short, the Building Sanitary Service Repair Assistance Program—and it's developed to focus on rehabilitation of the service for the customer.

Next slide please. Before we did this, obviously what we're talking about doing here is assuming repair and replacement responsibility for the building service all the way from the building to the public sewer, so it's a huge step. I'm not aware of too many agencies in the country that are doing this, so we studied the heck out of this for a year. We sent surveys to 20,000—all of our building owners. We got 5,000 of them back, which was an excellent response. We prepared a summary of the results and the majority of the surveys favored the program. They viewed it more or less like an insurance policy that if the district were to do this, they would never be faced with the potential of a \$10,000 sewer repair. It would all be paid for by the district under this program, and then we developed estimates of what we thought our annual program costs would be.

Next slide please. We did a similar thing with this work that we did with our service lining work, and that is that we gathered all the work together based on our survey results and our prior repair permit records and estimated how much work we thought we would have

for this type of project, and the scope of the work includes installation of outside cleanouts, and very few buildings in our area have them, so by far the predominant repair we're doing is installing outside cleanouts. Also point repairs where needed where pipe is separated or crushed, and very rarely but occasionally we have to do a total service replacement where the service may be backpitched or totally beyond repair, and if we do a total service replacement, we also air test that to be sure it's tight. Again, we estimate our quantities based on our records.

Next slide please. Our contract requirements are such that the contractor is required to complete the work within six months of receiving our work order for the individual property location. Emergency repairs, however, are to be started the next day—we did have an emergency provision built into our contract. And again, another contract where we built in an annual contract but renewable for up to five years, again to provide a partnering between the district and the contractor.

Next slide please. As far as how that program itself works, we require the homeowner to submit documentation that he's having a service problem. Typically that's a copy of a rodding bill. We just won't go out and invoke this program for someone just because they want us to come out and look at their sewer for them. Upon receipt of that and verification that they have a problem, we go out, we televise the sewer service, again with our camera from inside the building, we inspect the building, we identify whatever defects there are and we determine what the needed repairs are. We apply the same criteria to the services for determining repairs as we would to a main sewer, and that is is a point repair appropriate or does it require something above and beyond that?

Again, the focus in the BSSRAP program is not I/I reduction totally. We do require any I/I sources in the building to be corrected and again, if it's something more than a sump pump disconnect or a downspout disconnect, that's totally paid for by the district, but the primary purpose of the BSSRAP program is to keep the building service in operable condition for the homeowner. We figure we'll get around to that I/I program when we do that with our I/I program itself.

The building owner—this basically applies not only to the BSSRAP program but also to the private property I/I program where we're going into a particular basin. The building owner signs two agreements—a compliance agreement and an access agreement that allows us to come onto their property to do the work, and we record that agreement at the recorder's office so that we can go onto their property in the future and go up to that outside cleanout and do whatever testing and inspection we may need to do. Our program does not pay for sewer rodding. If there are roots in the line, that's the requirement for the homeowner to pay as well as any ongoing sewer rodding they would have to do. That would be their responsibility. Again, our program is for repairs, and we complete it within six weeks and then we arrange for removal of I/I sources, again by combining that with other work and getting plumbers out to do that.

Our costs were very close to our initial estimates. When we put our costs together, we estimated that we could do provide this service to our customers for approximately \$3 per month per account. As of June of this year—after three years—we've had three years under the program and we've done 743 repairs at 631 addresses. This represents about 3% of our connected buildings, keeping in mind 3% in three years, that's 1% a year, which is what our goal is—a 100-year cycle. The total construction cost was \$1,707,233, and the feedback on this program has been phenomenal. Homeowners are

extremely positive about it. Not only does our program include the work itself, repair of the pipe, installation of the cleanout, it also includes complete restoration, including jetting the trench and siting if it's in a lawn area.

Next slide please. Prior speakers have talked about what changes have you made to your new connection ordinances. We've made several—they're listed here. We now require a cleanout at that transition. We're seeing a teardown phenomenon in our area where they're tearing down existing houses and building brand new ones. We require that they totally replace the service pipe all the way to the main sewer. We've required that all new services be air-tested. It costs about \$800. We've tested almost 500 of them so far since August of 2001. We televise and provide a video of the service, an asbuilt drawing, and basically we're applying all of the standards we've always applied to public sewers and we're now applying them to the service connections. We require a PVC-rated pipe and an access agreement for future work.

We have a couple of other quick programs I wanted to mention. They're very similar to Ken's Positive Protection Program. We call it an Overhead Sewer Program, wherein we'll basically split the cost with the homeowner to install an overhead sewer in their house, and as of this June we've converted 74 houses, and those are probably 74 of the worst houses as far as backup frequency in our district. We've taken them off our list in a high flow event at a very nominal cost—\$131,000. Our average cost is something around \$2,000, something less than \$2,000 a house. We are not replacing the service line under our program as Ken indicated in his one drawing. We're converting it to overhead sewer totally inside the building.

Next slide please. And then we adopted a program again in 1998 where if there was a blockage in the public sewer, we provided \$1,000 and now it's up to \$1,200 reimbursement to the homeowner to reimburse him for costs incurred and I've got the cost information there for you.

Next slide please. Just a summary for you—there is no quick fix to I/I. It's something you have to get into for the long haul. You have to view the system as a whole; you can't have blinders on and stop at the property line. Removal of private I/I is crucial if you're going to really make any meaningful reductions, and I think you also have to look at the way you're designing your systems today. You have to design your system today, in my opinion, to be able to test your system for leaks after you're done. Relying on smoke testing—I don't want to be relying on smoke testing ten years from now, fifteen years from now. I want to be able to go in and test the system, and when I say test the system, I mean manhole-to-manhole, plug each cleanout at the building, and air test the entire system at one time and isolate your leaks. Encourage partnership with your contractors because you need them obviously to provide you with quality work and you've got to have obviously the data and the record keeping to keep up with it.

Next slide. I just would like to acknowledge the participation of our consulting engineers, Baxter and Woodman, and in particular Derek Wold, who has assisted us throughout our entire sewer rehab effort here over the last seven years. And with that I'll also be glad to take any questions anyone may have.

JOAN HAWLEY: Thanks very much, Larry. I'm going to ask some specific ones, but for those of you who are waiting in anticipation of questions, there are a bunch of questions that are relatively the same and we'll ask all speakers. That would be funding

and education and ordinances and political/legal. Specifically, Larry, would you explain a little bit more what is an overhead sewer?

LARRY COX: An overhead sewer—we have basements in our area, almost every home has a basement. An overhead sewer merely means that instead of having a gravity-pipe connection beneath the floor to the public sewer in the street that the wastewater in the piping has to go through a pump. That's what we do in our conversion process. All new buildings in our district have to have an overhead sewer from the start, and that means that no fixtures in the lower level, in the basement, can go by gravity into the sanitary sewer. They have to be pumped through an injector pump.

JOAN HAWLEY: Who pays for the maintenance of the pumps installed in the private property?

LARRY COX: The homeowner would pay. We paid for everything else, I mean we paid for the installation, we paid for restoration, so part of our program agreement is that the homeowner agrees to pay for replacement of the pumps should that become necessary, electricity, and so forth.

JOAN HAWLEY: This is a staffing question. How many people are working on your staff and do you oversee the air test?

LARRY COX: We oversee all the air testing. One of my field people does that. Again, we're a fairly small operation compared to the other agencies. My field crew is five guys, and they handle this as well as sewer cleaning and televising of our public sewers as well as the inspection of the services in the building, and then I've got two people in the office and myself who handle the paperwork and the phone calls and so forth.

JOAN HAWLEY: How many dry-weather overflows per year and what is the minimum reporting volume?

LARRY COX: Well, in Illinois, at least my understanding is I don't think there is a minimum volume. Illinois regulations prohibit all SSOs, so I report everything, even if it's a rather small amount. As far as number of dry-weather overflows, very, very seldom do we have a dry-weather overflow. Dry-weather overflow would be due to some obstruction in the sewer, which we quickly remove. I'm going to guess we might have one or two of those a year, if that.

JOAN HAWLEY: Why are outside cleanouts a priority?

LARRY COX: Outside cleanouts are a priority for two reasons. First of all they give you access to the service line without going into the building and the homeowner can use that in the future to rod their service if we have put that in for a homeowner to enable him to maintain his sewer. We can also use that for the air testing. You've got to have a way to isolate that end of the service for air testing.

JOAN HAWLEY: If they recently replaced the lateral on their own, have you considered reimbursing the owner for the cost?

LARRY COX: No. That question has obviously come up. We debated this and no, we do not reimburse. Our program had a definite beginning date and we do not do

reimbursements, and the reason for that—there are several. First of all, we weren't able to determine if the replacement was even necessary. Secondly, we weren't able to provide our combined, low-cost contractor. Those are the two primary reasons. And thirdly, we want to determine where they're replaced, not just by the homeowner doing it on his own.

JOAN HAWLEY: If you rehab the private lateral, why not assume ownership?

LARRY COX: Well, the sticky wicket in Illinois is the locating requirements. We have a JULIE system—that's a one-call system. Under the Illinois law you're required to locate anything that you own and our claim has been, and our ordinances support this, that we don't own the service lateral. That's owned by the property owner. I envision that somebody we'll be locating services, and at that point we might consider that issue.

JOAN HAWLEY: Okay, thank you, Larry. A lot of the questions that we received actually relate to all three of you, so I'd like to take a minute to have each of you briefly talk about funding, for example what are your rates? Specifically, what have you had funded vs. city, state, loan, etc., and if you'd just be real brief. I'm just going to start out in the order that you spoke—Ken and then Raj and then Larry.

KEN ROLEY: Well, I can tell you that our rates typically, the average homeowner for a residential family of three pays about \$55 a month. That puts us in about the middle of the surrounding agencies in our area, so we're not the most expensive but we're not the cheapest either. And so that's basically what our homeowners are paying.

RAJ BHATTARAI: Our rates are probably one of the higher ones in Texas just because we're in an environmentally sensitive area—hilly country, a lot of shifts in the soil and then the different terrain, so that has always been sort of a point of contention.

JOAN HAWLEY: Do you have a specific monthly or yearly for homeowners?

RAJ BHATTARAI: Average monthly water and wastewater would be about \$43.

LARRY COX: In our district, our revenues come in by three sources. We levy a user charge based on volume, we levy a monthly service charge, and we have a small tax levy on the property tax bills. The total annual bill for a homeowner is about \$230 a year. If I did my math right, that's about \$20 a month. We have one \$2 a month increase yet to implement to get us to that 100-year funding cycle, so next year we'll probably be at \$22 a month. Now one thing you have to keep in mind with us is we have no debt, so there's no retirement cost whatsoever in our rates.

JOAN HAWLEY: Do any of you have either point of sale at home inspections or any warranty or things like that that you use for funding as well?

KEN ROLEY: We currently don't have a point of sale inspection. We've talked about that and thought about it, but we haven't implemented that kind of program yet.

RAJ BHATTARAI: We haven't done that either, but that has been sort of under consideration, but sort of on the back burner.

LARRY COX: In our district we've thought about it as well and have a number of thoughts on it. One is we want to determine where we make our inspections. We don't want it to be determined where property has sold. I don't know if your areas are like mine, but I have houses in neighborhoods that sell three and four times over a ten-year period and others that don't sell at all, so we want to be able to focus our inspections where we think the problems are, and secondly if you do a program where you're doing a comprehensive rehabilitation and you're paying for it all, you really don't need to time it to the sale of the property.

JOAN HAWLEY: One other thing too, there are some communities in California, just based on notes that I have, that the point of sale ordinances are for different properties. The next question I have is related to public education and political entities, and I'll have you each talk about what did you do to educate the public and how did you educate your politicians?

KEN ROLEY: Well, we also have a Sewer and Water Task Force that's made up of representatives from the community and we work very closely with them on all policy issues. They're a combined group made up of city council and also appointed officials and representatives from the community, from different aspects of the community, so we've used that as the primary means of educating our public. We also have neighborhood associations. We have nineteen neighborhood associations within the city of Salem and we use those associations to meet with them and explain to them our program and what we're doing.

RAJ BHATTARAI: As I said earlier, we do have a citizen advisory group, a 33-member panel chosen from throughout the city, which has basically provided advice and comments on almost all aspects of the Austin Clean Water Program to control the SSOs as required by the Administrative Order, and all of our rate change processes, they're all public forums. We go through discussions and presentations are made to the public and in addition we also have a Water/Wastewater Commission, which is a citizen advisory group to the Austin City Council. And we also educate the public through bill inserts. We have little flyers for controlling grease and other aspects of the program, and we also routinely make presentations to neighborhood groups and associations—anyone who requests it. Sometimes we just target for certain projects that are going on in the particular area if that's a particular concern to the people.

LARRY COX: In our district we approach that two ways. Before we adopted our program, as I indicated in my presentation, we sent out a questionnaire, a survey, to every building owner in our district. I don't know of a better public participation method than one where you give everybody the opportunity to give you some comments, and we got 5,000 comments back, we got 5,000 surveys filled out. We tabulated and entered in every comment that we received and put it in a 231-page report that went to the three-person board of trustees that administered our district here. In addition to that we also have an annual newsletter that we mail out to every one of our customers every summer, which describes all of our programs and what we're doing and actually that's where we included that survey I mentioned earlier, and we've done it every year for the last twenty years. We're a small agency. My board meets once a month and if the public wants to attend our meetings, obviously the public is welcome to attend all of our meetings.

JOAN HAWLEY: What were the top three legal issues that you had in implementing your private property programs?

KEN ROLEY: I don't know that we had any legal issues. Public financing on private property has never really been a serious issue for us at this date. There were more policy concerns and issues with our policy makers, and allowing them the opportunity to make those policy decisions and the staff implementing them.

RAJ BHATTARAI: For us historically the public financing on private property has been sort of a stumbling block, and it took us a while to get over that. Another problem has been the enforcement, and when we devised the new ordinance that's proposed right now, some of the citizen advisory group felt that we're going from no enforcement and really lax to extremely severe enforcement, so the schedule has been somewhat extended. We have given people more time to fix the repair as opposed to what was originally proposed, so those were the two major issues really, but now I think everybody is on board. Now the only thing that's left that we're grappling with is what do we do with people who cannot afford or do not qualify for the loan—we're still grappling with that one.

JOAN HAWLEY: Have you imposed any penalties, Raj, on the people who are late?

RAJ BHATTARAI: Yes, it is going to be. I mean as I said, this ordinance is still proposed. It has not gone into effect yet. There is going to be a penalty. It could be as hard as \$500 a day, and that raised some eyebrows when we were discussing it, but people felt that that's the only way we can get attention.

LARRY COX: As far as legal issues, I'm in agreement with Ken on this one. I don't think it was really a legal question for us. Again, we've been going on private property and inspecting sumps and downspouts for almost 30 years, so we weren't afraid of going onto private property. The bigger issue for us was having the courage, if you will, to implement a comprehensive repair program and set your rates at a level to fund it and then go do it.

JOAN HAWLEY: Which brings us up to how did you guys evaluate the cost of treatment, backups, and conveyance vs. the private property?

KEN ROLEY: Well, as I mentioned in my presentation, we don't feel that our I/I reduction program is going to be effective in terms of meeting these regulatory requirements on a short-term basis. To meet the regulatory requirements by 2010, we're not relying on the I/I reduction program. We're conveying and treating that I/I, and that was determined through our Sewer System Evaluation Study and our Master Plan to be the least cost alternative. Now that doesn't mean that we don't have an I/I reduction program and that we don't need one, because obviously if we did nothing, I/I would get worse over time, and one of the assumptions the Master Plan made was that I/I would get no worse. It would stay the same as it was in 1996, and that was another reason why we went to the effort of putting together an I/I forecasting and performance model because we need to make sure that I/I is at least not getting worse and staying the same and we're hopeful that over the long term we can make improvements and we can reduce I/I.

RAJ BHATTARAI: For us the private lateral in addition to all the I/I sources is extremely important, as I said. We estimate private laterals could contribute up to 50% of the extraneous flow, so I think this is a really good investment for us. We estimate the total cost to be \$20-30 million, in that range, which I think is really good bang for the buck. We are right now on a twelve-year cycle for our inspection and cleaning and maintenance of the sewer system and our goal is by 2009, by the time the Administrative Order ends, we want to go about a seven or eight-year cycle because we have realized that cleaning and maintaining and inspection of the system is the best way to manage the collection system, so this is an investment that's definitely worth the cost.

LARRY COX: In our district we did that type of a calculation back in the grant days with the SSES and the sewer rehabilitation where you calculate the cost of transportation and then you calculate the cost of treatment and you do whatever is cheaper, but we've sunk our investment into a new trunk sewer system. We basically doubled the capacity of our trunk sewer through the old part of town and we put in treatment capacity that will treat us up to—well, we've now got 110. We can treat up to 110mgd, so we've made that investment. Now our challenge is to maintain our system and to not only control the I/I like Ken and Raj have said, but also to effectively reduce it over time, and we're convinced that the only reductions, the only way you can reduce I/I, is to do it long term, do it the right way, and it takes money.

JOAN HAWLEY: Do any of the three utilities operate a storm water utility and do any of the storm water funds go towards the I/I rehab and sanitary sewer?

KEN ROLEY: We don't have a separate storm water utility. We're in the process of developing that and I think in the next few years we probably will. Currently our storm water program is funded out of sewer and water rates, so no, none of the storm water money would be paying for this directly. It's just coming out of sewer rates in general.

RAJ BHATTARAI: We have a separate sewer system and the storm sewers are maintained by a separate department and they have their own separate funding for that. There is a charge to the homeowners, the property owners, but we do work very closely with them because a lot of our pipes are at the bottom of the creeks and then we work very closely with the Watershed Protection Department—that's what our storm water utility is called—to stabilize the creeks and if possible to remove the lines from the creeks, so we have a very good working relationship with them, but our systems are totally separate.

LARRY COX: Our systems are also totally separate and storm sewers are not under the jurisdiction of the sanitary district. They are handled by the local municipalities, cities, villages, and county, and they charge for the maintenance of the storm sewer system on their property tax bills. A number of them are, however, considering a storm water utility, but none of that funding would come to the sanitary district.

JOAN HAWLEY: This relates to your pipe materials and more specifically are any of your laterals made out of Orangeburg materials and how many?

KEN ROLEY: Yes, we do have Orangeburg pipe, unfortunately, in Salem and one estimate that we've made, and this is a pretty rough estimate, but perhaps as many of 15% of our service laterals are Orangeburg pipe, and those are very bad and are failing

rapidly, so the homeowner does have a lot of extra maintenance if they happen to have an Orangeburg pipe in their backyard or in their front yard that they have to maintain.

RAJ BHATTARAI: Yes, unfortunately we do have Orangeburg pipe. The number used to be about 20% I believe of the private laterals, and in fact the majority of the replacement—the numbers I showed earlier, the 100,000 that needs replacement, are probably Orangeburg. Some of them have already been replaced, so unfortunately that's the fact, but these are mostly the older systems. Of course the new ones, they are not allowed. The new ones are almost exclusively all PVC pipes—much better construction.

LARRY COX: In our district we probably can count—I can count on one or two hands the number of services that have Orangeburg pipe. To my knowledge our district never allowed it to be installed. The predominant material for us is clay. Unfortunately for us it's not a function totally of age. Some of the worst leaking sewers for us, sewers and services, are sewers that were built right after the War with not very good joint materials, and that appears to be about in our area when they began bedding their pipes in stone, so you have a clay pipe with poor joint material in a French drain.

RAJ BHATTARAI: I have a little order of magnitude correction here. I mentioned 100,000 private laterals. Actually what I meant was 10,000 private laterals—that's what I had said in my presentation earlier—that might need replacement or repair.

JOAN HAWLEY: For those of you who don't have the pleasure of having Orangeburg pipe, it's an old material that I'm frankly surprised that it's even lasted, but you just don't have ground. Most people have other pipe materials. For those of you—maybe Larry more specifically—your cured-in-place pipe or your CIPP that you're lining for your laterals, what was the decision to line vs. open cut?

LARRY COX: Primarily cost. Most of the sewers in the areas we'll be working in, the public sewer is in the center of the street. A lot of the streets are concrete surface. We have a public sidewalk to get through and we've got homeowner landscaping. We had to come up with a mechanism where although we're paying the entire cost, we still had to be able to sell it to the homeowner as not being totally disruptive. So that was one of the features. The other feature is primarily cost. We can install a cleanout, an outside cleanout, and line the service to the main including a T-liner at the main for in the range of \$6-7,000 a house, including an air test. If we had to replace it, it would probably be at least 50% higher than that.

RAJ BHATTARAI: In our case I guess most of them would be repaired and replaced by PVC pipes, but if there is no sag, if the pipe is in pretty good structurally sound condition, we would allow lining, but the city would not be doing the lining. It would be the private contractor which would do the lining. The homeowner would have to work with the private company.

JOAN HAWLEY: Do all three of your have high groundwater in your systems?

KEN ROLEY: We certainly do in Salem, and we have noticed our groundwater level goes up and down fairly rapidly. For years we saw a peak or a very rapid increase in flow in a very short period of time that was mistakenly, I think, attributed to inflow sources and we now refer to this as rainfall-induced infiltration and I/I and what we're

seeing is a rapid increase in flow as the groundwater rises and starts to enter footing drains and a lot of leaks on private property in addition to our own public system.

RAJ BHATTARAI: Our terrain, as I said, is somewhat hilly and so there are pockets where the groundwater level may be approaching where the sewers are, but I would not characterize Austin as having very high groundwater level. Most of it would be inflow and some infiltration specifically during heavy rainfall, but not really groundwater infiltrations. The groundwater table doesn't rise that high except under extremely wet weather conditions.

LARRY COX: In our area, the Downers Grove area, it's pretty flat and rolling. We don't have a lot of great topography changes, and it's really not so much the high groundwater table, because we have pretty tight clay soils, but what you have is you have high groundwater tables in your pipe trenches where a storm sewer goes over a service line or a public main sewer and everything is bedded in stone, so that the storm sewer leaks and puts water pressure on my sanitary sewer system through all that gravel bedding, so it's an isolated specific over the pipe trench type of groundwater table.

JOAN HAWLEY: This would be really for Ken and for Larry. Any list of approved contractors or special rates from contractors to participate in the program or is the contract entirely between the homeowner and the contractor?

KEN ROLEY: Well, typically on our private property work the contractor is between the homeowner and the contractor, but as part of the technical service and the advisory capacity that we provide to the property owner, we know what the common cost should be and what the approximate cost should be and we advise the homeowner if we think that they're being overcharged, but we pretty much leave that up to the homeowner and we don't require them to necessarily select the lowest cost contractor if they feel more comfortable that they're getting a better job at the higher rate.

RAJ BHATTARAI: The city of Austin is going to provide free training to all licensed plumbers who are interested in the private lateral training and only licensed plumbers who have the training would be qualified to do the repairs later on. As I said, our program is not quite in effect yet, but that has been our plan.

LARRY COX: For my district, since we're paying for everything, one of the reasons we are paying for everything is economy of scale. That means it's a public contract, publicly bid, again one year, renewable up to five, so the contractor has an incentive to work with us, so it's a publicly bid contract for both the building service repair program as well as the I/I lateral lining program. The only program where the homeowner does the contracting is under our Overhead Sewer Program, where they would hire a local plumber to take care of their conversion for them.

JOAN HAWLEY: One of the questions is regarding peak reduction factors and how effective has the rehabilitation been. You guys have indirectly or directly sometimes answered that, but if you could each one start off with what was the peak reduction and how effective do you think it was. Ken?

KEN ROLEY: Well, in the one study basin I showed that we were able to get about a 20% reduction in peak flow for a five-year, 24-hour storm after we replaced 60% of the main lines and the associated private property work in that basin. I believe based on my

experience that removing I/I in the basin doesn't really follow the 80/20 rule that we might see in a lot of our other projects. I think because I/I removal is so difficult and it tends to migrate within the basin, probably the last 20% of the work that you are going to do and the most expensive work is where you're going to get the biggest reduction in the total I/I in the basin, so we're continuing to monitor that. We're not real pleased with the cost of removing I/I at this point but we think as we get more of these lines replaced in the study basins we'll see that cost go down.

RAJ BHATTARAI: We do not have any hard and fast numbers. In fact our work, our rehab work, is just beginning and we'll have studies conducted later on to compare with the pre- and then post-construction, but we certainly do hope we'll see some reduction for all the effort and the money that we're pouring in.

LARRY COX: For us we actually kind of proved the reverse of the argument with the study we did and the work we did in '94 where we lined and rehabbed everything in the right of way and didn't touch private property and we did not get an I/I reduction. Well, basically that's been replicated in our next basin, that I-H-9 basin we're working in now. We've only lined fourteen services, but we've rehabbed everything in the public right of way and we have yet to see the I/I reduction. I was very glad to hear Ken talk about the 80/20 rule and the fact that it really doesn't appear to apply to I/I. That has been my observation as well. What we seem to be dealing with is a large number of small leaks, and if you don't get them all, the water will migrate. We're shooting for 90-100% I/I reduction in our basin after we go in and do everything. Now whether we'll get it or not, I don't know, but that's our goal. We're going after everything in the basin.

RAJ BHATTARAI: I guess I should prepare to be disappointed then.

LARRY COX: It's a tough road, Raj, it's a very tough road. One of the biggest frustrations in my professional career is how little progress we've been able to make in I/I reduction. That was before we embarked on our new program. I'm very optimistic now, but it requires expenditure of a good amount of money, requires you to be focused in the basin like Ken is doing in Salem and like we're doing here and stick with it and go after all of it, and that's really part of the rationale behind why we're not relying on I/I reduction to meet regulatory requirements also.

JOAN HAWLEY: Ken, one of the questions was how large was your basin study for that?

KEN ROLEY: The basin I showed is over 20,000 linear feet of main line, so it's a fairly large sub-basin and we replaced about 60% of the total pipes in that system. And again, after replacing 60%, we only saw a 20% reduction in I/I. It would have been nice it would have been higher than that, but I think it goes back to this whole principle that you really have to go after all the leaks, and we don't expect that we're going to be getting 80-90% reduction until we replace everything.

JOAN HAWLEY: Were any of your SSO events listed strictly wet weather or were they related to grease, roots, broken lines, etc.? Ken?

KEN ROLEY: The information I provided in our presentation was wet weather overflows. We occasionally have overflows related to grease or roots or whatever. For the most part, similar to what Larry was talking about, that's one or two events a year.

The most troublesome things that we have the least control on, of course, are the wet weather overflows.

RAJ GHATTARAI: In our case the grease and the roots are probably the majority of the problem and I think after that you'd be surprised—vandalism is probably our next high cause of overflows, and most of our overflows are dry weather overflows, not as many wet weather.

LARRY COX: The overflows I reported are total overflows, but again, only one or two of those a year are dry weather. And Raj, isn't it amazing what people can get into a sanitary sewer line—size and shape? I mean it's amazing.

RAJ BHATTARAI: Yes, it is mind-boggling.

JOAN HAWLEY: The next question would probably be Larry and Ken. Did the redirection of the footing drains to the curb or storm drainage create a new set of problems like complaints, freezing, etc.?

KEN ROLEY: I don't know. In our area, freezing hasn't really been an issue. We've had a few cases where we have found that we have extensive leaks in the curb that allow the water to flow back into the ground and actually back into the trench to the service line, and we created a situation where we're just recirculating the ground water in a relatively small area and we've had to go in and fix those kinds of issues, but for the most part the Positive Protection Program was very successful in eliminating basement flooding in our area. Since we've completed that program we're just not getting any calls from property owners with basement backups any more and that's been a very successful program. The homeowners have been very happy with the results of that work.

LARRY COX: In our area it is an issue—it is a concern. I indicated earlier that our topography is fairly flat and the areas that we're working in basically don't have much of a storm drainage system, so unfortunately the only outlet that a lot of people have is our sanitary sewer, so when we do a disconnect and a re-route, they put it out to grade to their yard and when the yard gets flooded, they call us, and then they call the village on the storm sewer system, so it is a concern. We are trying to work with our local villages who have storm sewer responsibilities to try and improve the storm drainage in these areas, but it's an issue too, and the other issue too which nobody has mentioned is that education with the property owner not to reconnect his storm pit back into the sanitary sewer as soon as you leave his building.

JOAN HAWLEY: Just for everyone, there will be a copy of the transcript sent to each site and for those of you who have multiple people at a site, maybe you could make extra copies for the folks and we will be also staying off line to make sure that we've answered all the questions, and the speakers have volunteered to do this so that we make sure. So really the next question was regarding the inspection methods. Each one of you—Raj, I believe you said smoke testing. Is it systematically using a lateral camera and what do you use to determine how defective it is, that it needs to be replaced? And have you had any issue with homeowners regarding is it bad enough or defective enough to replace, etc.?

KEN ROLEY: I would say that Salem uses a variety of methods in terms of our operation and maintenance of our system and also in terms of inspecting service laterals as part of the R/R program, but primarily with the R/R program we're targeting specific basins to replace the sewer mains and laterals, and in that case we're doing a thorough TV inspection and also inspection of any sump pumps or other extraneous water connections and getting those removed. Unless the service lateral is fairly new and recently been replaced, which occasionally occurs, in most cases we're finding the laterals are in very bad condition—there are lots of holes and cracks and dislocated joints and it's pretty obvious that it's in need of replacement. If we had a particular question and got into a debate with the property owner, we always have the option of doing an air test on the lateral as specified in our ordinance and providing either proof positive that the lateral is in good shape or not based on air test.

RAJ BHATTARAI: In Austin when a certain neighborhood—when we're going to be conducting smoke testing, we notify the homeowners beforehand and then after the smoke test if we found the smoke escaping, we take photographs of that and send it to the homeowner saying there is a problem, and then we'll follow up, especially in areas where we have SSOs, we'll follow up with TV inspection and then order the homeowners to take the corrective action. That's been our protocol.

LARRY COX: For us the inspection method on our service is the same regardless of which program we use, and that basically involves going into the building and putting in a small camera in the line. We have tried some of the lateral systems from the main, but unfortunately most of our services are too long and are beyond the capability of that equipment, so we've found it more efficient to do it from inside the building with like a small C-snake. We also have a locator on that and we can locate the sewer and also get a depth indication outside the building, so that's how we examine a service line. Now the criteria we would employ would depend on the purpose of our being there. If we're there and it's an I/I target basin, the test is similar to Ken's. If that sewer looks like it won't pass an air test, it gets replaced or lined. In our case it gets lined. If the program is for the homeowner and we're trying to put the sewer in serviceable condition for the homeowner, then we would repair whatever obvious breaks and so forth there would be, applying the normal criteria that would apply to our own public sewer system. In other words we don't fix every cracked joint. We'd just be sure that there's a full pipe available to serve the house.

RAJ BHATTARAI: May I add something to that, Joan? Only one of our cameras can go from the city main through the private lateral to inspect that. The others we have to use the property line cleanout or the building cleanout, and if we find there is no property line cleanout, we go in and install that at our expense, and so we have several other cameras which can go through either the building cleanout or the property cleanout and inspect the private lateral.

JOAN HAWLEY: Raj, are there copies of your ordinance available?

RAJ BHATTARAI: Yes. Again, it is in the draft form. It's not final; it's not been approved yet. We hope to get it approval within the next month or two and yeah, I would be glad to send them to anybody who requests that, but strictly it's a draft copy.

JOAN HAWLEY: Ken or Larry, do you have copies of your ordinance that you use to impose for your programs?

KEN ROLEY: That's certainly available. I'd be happy to send that to anybody that would like a copy.

LARRY COX: Same for me—not only our ordinance, but our program requirements for the two programs and the agreements that we require the homeowners to sign. That's all available.

JOAN HAWLEY: I'd like to thank you. We're just really right at time for two hours. Each of the contact information as well as myself and Laurie Sharon, the moderators, are listed on the presentation also, so if you have any additional questions that you'd like to contact us or the speakers regarding their programs, they would be glad to do it. And please, we have distributed evaluations and survey forms. If you would please fill that out, that really helps our committee and WEF to decide if another program or items like this can be used in the future. I'd like to thank each one of you participating. If you have additional questions or things, please send them to us and we'll be happy to help you. Thank you.

OPERATOR: Ladies and gentleman, thank you for participating in today's conference. This concludes the program. You may now disconnect. Good day.

[End of Webcast]