

COUNCIL WORK MINUTES
SEPTEMBER 1, 2021

The City Council held a meeting on Wednesday, September 1, 2021, at 5:30 p.m. in the City Council Chambers, 10 North Main Street, Cedar City, Utah.

MEMBERS PRESENT: Mayor Maile Wilson Edwards; Councilmembers: Ron Adams; Terri Hartley; Craig Isom; W. Tyler Melling; Scott Phillips.

STAFF PRESENT: City Manager Paul Bittmenn; City Attorney Tyler Romeril; City Recorder Renon Savage; City Engineer Jonathan Stathis; Police Chief Darin Adams; Fire Chief Mike Phillips; Leisure Services Director Ken Nielson; Economic Development Director Danny Stewart; Public Works Director Ryan Marshall; Water Superintendent Robbie Mitchell; Police Lieutenant Jimmy Roden.

OTHERS PRESENT: Ben Batty, Ryan Talbot, Gregg Horn, Jeffrey Butters, Laura Henderson, Lorayne Russo, Richard A. Russo, Garth Green, Justin Kunkel, Tom Jett, Nancy Pearson, Mike Babcock, Betty Babcock, Teri Kenney, Rob Obrien, Brad Green, Wendy Jessen, Dan Jessen, Wendy Green, Brian Nichols, Ethan Lux.

CALL TO ORDER: Reverend Nancy Pearson of the Community Presbyterian Church gave the invocation; the pledge was led by Councilmember Hartley.

AGENDA ORDER APPROVAL: Councilmember Isom moved to approve the agenda order for both the City Council & RDA meetings, pulling items 3 & 4 from the City Council agenda; second by Councilmember Hartley; vote unanimous.

ADMINISTRATION AGENDA – MAYOR AND COUNCIL BUSINESS; STAFF

COMMENTS: ■Isom – I want to share an experience from last night, I was able to ride with Sgt. Lovell and ride with him and understand communications between dispatch and each other. I marvel at how effective and efficient and how quietly they do a magnificent job. We don't often thank our police; they are on the tougher end of the stick most of the time. I had a great experience. I know Hartley has taken the opportunity; it is a wonderful experience. I want to reassure the citizens that we are well protected and served by the Police Department. Hartley, I echo that. Melling – I got to go last week, I took 8:00 p.m. to 2:00 a.m. shift and the one thing I appreciated, there was one incident where the law would have given officers latitudes to throw the book at someone, but they took a tempered situation and not to the greatest extent allowed. I appreciate the judgment and care that goes into those decisions. It was a good experience. ■Phillips – I am wondering if we have a standard for street sign height, turning onto DL Sargent Drive, I couldn't see the street sign. There is a commercial sign there also. ■Mayor – we had Iron County Coordinating Council meeting today, the item was brought before you a few weeks ago about partnering with the Water Conservancy District to apply for the new round of ARFA money. The paperwork has been submitted and will go through the review process with the State, we will find out probably in November if that has been awarded.

PUBLIC COMMENTS: ■ Laura Henderson – a neat article in the Today paper last week, we are dealing with the general plan and elections. I will read it, by John Newberry. Building Main Street Not Wall Street. The article is attached as *Exhibit "A"*. ■ Ron Riddle – I am coming as a concerned citizen, small/large to those in my neighborhood. I live on Cove Drive, it used to not be a through street. As it became a through street also came increased traffic and the ability to drive faster. I have 4 families that live around me that have young kids, learning to ride a bike, one wandered into the street and almost got hit. A few approached me and said isn't the speed limit 25 mph. If anyone drives that I am shocked. A year ago, my wife rolled through the stop sign at 5:15 a.m. she received a ticket. I haven't seen anyone being pulled over on Cove Drive in a long time. I know the police are busy and we don't have enough officers. It is all over Cedar City and around the schools, but they want the people slowed down. Hartley – we have a few speed signs, Chief can we put one there? Yes. Ron – we had the best speed bump, and it was taken out. Mayor – we will get a speed trailer there. ■ Garth Green – 9/11 is on a Saturday and it is the 20th anniversary and the 50th anniversary of Wendy and I's wedding I am hosting a Freedom Festival at the City Park. I got an email to some of you to venture to set on the dunking booth. There will be free food, music, inflatables, patriotic program at noon and then the party continues and everyone is welcome.

PUBLIC HEARING TO CONSIDER AN ORDINANCE REPEALING CEDAR CITY ORDINANCE NO. 0623-21-1 ANNEXING 40.02 ACRES OF PROPERTY IN THE VICINITY OF 2300 WEST 3000 NORTH. TYLER ROMERIL: Tyler – this item concerns the discussion we had the past few weeks on the Coronado annexation that occurred. We found some deficiencies in public notices; this is cleaning that up and formally appealing that up. I understand that Dallas on behalf of his clients have restarted that process.

Phillips – do they go to the State and Planning Commission? Tyler – they will start at the beginning.

Mayor Edwards opened the public hearing. There were no comments. The hearing closed.

PUBLIC HEARING TO CONSIDER ENTERING A DEVELOPMENT AGREEMENT WITH CHOICE BUILDERS LLC ON 60 ACRES OF PROPERTY LOCATED IN THE VICINITY OF 2700 S., 2800 S., AND 2900 S. TIPPLE ROAD. CHOICE BUILDERS/TYLER ROMERIL: Tyler – Mr. Watson on behalf of this client Roger Thomas brought the zone change through, it was approved contingent on the development agreement. The agreement has been looked at by Mr. Thomas and his attorney. This would be recorded with the County and run with the land. Any development is built at the R-2-1 standard, max 3.6 units per acre with max 175 units. It also gives vesting rights in the R-2-1 ordinance as they are now.

Isom – as I mentioned to the Planning commission, these are trail blazing agreements. This will help us lock things in so if property changes hands there is guidance in density.

Phillips – there is a stipulation, #4 about some of the open space and amenities on the preliminary plat. As I recall they presented extensive preliminary plat, so we got a sense of what it looked like. We only see boxes. Are we comfortable we will be getting what we anticipate as a council based on preliminary plans, or do we need to be more specific? Tyler – that is up to the Council, they can become complex. In this situation it was that the density and open space. I am comfortable that this agreement binds them; it gives leeway on where it is placed.

Mayor Edwards opened the public hearing. There were no comments. The hearing closed.

PUBLIC HEARING TO CONSIDER GRANTING A DRAINAGE EASEMENT ON CITY PROPERTY LOCATED AT 400 EAST 900 NORTH. PLATT & PLATT/TYLER ROMERIL: This item has been pulled.

CONSIDER GRANTING A PROPOSED VARIANCE FROM THE CITY'S ENGINEERING STANDARDS REGARDING THE LENGTH OF A CUL-DE-SAC IN THE LOCATION OF 400 EAST 900 NORTH. PLATT & PLATT/TYLER ROMERIL: This item has been pulled.

CONSIDER PROPOSALS FOR THE DESIGN OF THE CEDAR CITY PICKLEBALL COURTS COMPLEX. LISA BENSON: Jonathan – this is a project funded by RAP Tax. RFP was put out for consultants, three were received, CivilScience, PEPG Consulting and Sunrise Engineering. Based on review by staff it is recommended awarding the bid to CivilScience of St. George who is the low bidder at \$38,792. In the proposal it was said to be completed in 30 days, none said they could do that, CivilScience proposed 60 days.

Hartley – I am not aware of CivilScience, have they worked with us before? Jonathan – I have not worked with them with the city, but UDOT has used them. They are working on the Nichols Canyon Road signal. Phillips – are we confident they have the ability to design the pickleball and a recreational project.

Ken Nielsen – to give more info, Cody, the engineer with Civil has been with Sunrise for a long time and is now with CivilScience. He did the courts in Washington and Little Valley and he has experience.

Phillips – are we comfortable we will be ready with drawings to move forward? Ken – the next process is where they itemize everything so we can move forward. Rocky Mountain Power has already been contacted about relocating the power. Phillips – any land prep we can do. Yes. Hartley – is the design fee included in the RAP Tax fund? Ken – yes.

CONSIDER REVISIONS TO THE CITY ENGINEERING STANDARDS FOR WATERLINE MATERIALS AND A ROAD CROSS-SECTION WITH PLANTER STRIPS. JONATHAN STATHIS: Jonathan – several weeks ago I brought revisions to Engineering Standards, most were approved, two items were tabled, one was regarding whether to allow PVC C-900 pipe, the other was to allow planter strips in the roadway cross

sections. The water line materials, I invited Uni-Bell PVC Pipe Association and Ductile Iron Pipe Research Association, I thought it would be good to have information from industry experts. Both will give presentations and you can ask questions to them.

Ethan Lux Uni-Bell PVC Pipe Association. See presentation attached as *Exhibit "B"*.
Phillips – how long have they had it? Ethan - Gilbert about 15 years. Phillips – can you tell us about Prescott, AZ? Ethan – they are trusting of their contractors and are not following proper installation and not removing rocks and they are over installing joint which taking it out causes pressure on the entire pipeline. Phillips – it isn't the product, but the installation. Melling – one concern, PVC if fails the repair costs are higher than other materials because it can't be patched. Ethan – that is a factor that is expensive, but typically it isn't the case, it is a small crack, it is installation and management and also detecting leaks early. Phillips – do we have the ability to do these inspections? Jonathan – that is the critical factor, having an inspector on site. The bedding is very critical, the rocks need to be removed, sand in and have compaction around the pipe, yes, we can make sure the inspections are done. Ethan – we can be there to make sure it is done correctly. Hartley – would that require additional personnel, or does your department have the ability? Jonathan – it would be a stretch, right now we also use the Water Department to help with the inspections. We may need an inspector dedicated to that. I don't know for sure, but it is a possibility, it will take more inspection time. Hartley – what is the process now, can they lay ductile iron without inspections, or is it easier?

Robbie Mitchell – my biggest concern is the installation. Jonathan doesn't have time to inspect what we have now, we are hit and miss. Ductile takes more abuse. We had a few incidents, and it is $\frac{3}{4}$ minus and the track hoe punched holes in the ductile. With the Water Department we will have requirements that have to be met. When you show up, they do what you want, when you drive off, they don't do what you want them to do. If this is not bedded in sand sooner or later, it will wear a hole in the pipe. Mayor – have you had tracer wires? Robbie – we will require them every 10 feet to tape it to the pipe. A lot of time now the wires are 18 inches off the pipe. If we allow, we want that required and inspected and monitored. Hartley – what about storage? Robbie – it will have to be stored inside; ductile I store outside. I haven't worked with it personally; I hear if it splits you have to cut it out and use a ductile iron fitting on it anyway. We would have to have something in the building to store PVC, it can't be in the sunlight.

Chris Uchman – failure characteristics to a hard freeze? Ethan – as it gets colder it can be more brittle. Some utilities don't bury below the frost line and don't have problems. You can reduce the frost line. Typically, they are buried 3-4 feet or deeper, so it is not a concern.

Gregg Horn, Ductile Iron Pipe Research Association, we represent for US and Canada. See presentation attached as *Exhibit "C"*. Most work we do is on corrosion control. We have test sites all over the country, one in Spanish Fork, Utah. The reason people like ductile iron is the strength. We are designing to 900 psi, that is the Class 350.

Phillips – one of the biggest factors is ductile iron is great, with all technology is any research being done to lessen corrosion? Greg – yes, we started in 1928, in 1950's we started buying property throughout the United States for research. We will look at corrosion by putting

pipes in the ground and checking it over the years. We had one analyzed statistically from 3 companies, that is what corrosion control method is based on for corrosive and not corrosive soils. Phillips – from our discussions, if we were to adopt, is this another method that would be allowed, not taking ductile iron away. Also, in some high-pressure areas PVC would not be allowed. Melling – what was that pressure? Jonathan – 150 or 200 psi. Robbie – we dropped it to 150 psi. Hartley – what size was the pipe? Jonathan it was 10 or 12 inches.

Rob O'Brien – I don't have a horse in the race, my background is mechanical engineering. A question is their case studies that show total cost of ownership, PVC versus ductile iron, from hydrostatic shock, freezing, etc. I am sure there is some data showing total cost.

Ethan Lux – there is multiple studies on total costs of ownership, utilities have produced them as well as National Standards, we like the Sustainable Solutions Corporations report they produced from manufacturing, transportation, installation and operation & maintenance. I would email that to Jonathan for you to have. Melling – we want to see that. Paul – does each industry have one that compares similar data points? Ethan – yes. Melling – that is the crux of this, freezing in Texas threw cost factors out, but over several decades there is a cost difference.

Gregg Horn – I will address the Sustainable Solutions report we have done lca's on our product and are in the process of doing a 3rd one. It is from cradle to gate and gate to grave. The operations phase, because of the energy savings in pumping, they said you would have a benefit if you made PVC out of air. The problem I have with Sustainable, they asserted that the cement motor lining deteriorated over time saying you had to replace your iron pipe every 30 or 50 years, I am not sure which. They cited in large part a doctoral dissertation from Allison St. Claire from her work at Virginia Tech it had data from Washington Suburban Sanitation Commission and Western Virginia Water Authority and the lca indicated a deterioration of the cement motor lining. I read the dissertation and it didn't have like that in there. I contacted John O'Dowd the asset manager with the Western Virginia Water Authority at the time and Felicia James who was working with WSSC and she was the one that worked with Dr. St. Claire, and I contacted Dr. St. Claire and I got email responses from all of them, none of them provided information on the deterioration of cement lining. The operation phase makes the difference. There are all kind of studies from all kinds of places. When you do an analysis, the energy savings over 100 years, iron pipe wins hands down. I talked about the flow test in Charleston, and that pipe was 97 years old.

Phillips – the installation of both products, from the contractor/developer point of view, which is easier and why and why would a developer want to use your product? Gregg – developers will do what costs the least, installation is on your specifications.

Ethan – similar lines, the contractor will use PVC because it is light weight and easy to install. I have a question on the distribution system, for pipes 12 inches and smaller, is it from an elevated tank? Jonathan – it depends, some pump straight from wells through pressure reducing valves. Paul – on the south end of town there are developments that will require pump stations from the tank. Ethan – there is little to no need from hydraulic need from an elevated tank.

Tom Jett – I have used PVC and ductile iron, they assemble about the same, ductile is heavier. They are both being put in trenches by tractors, it is too hard for individuals to jump in and out of a ditch. Councilman Phillips hit it on the head, look at the costs to the taxpayer, we should not subsidize the developer or contractor in their doings. If we pass something that says you have your own engineer on site to watch it put in, I don't have a problem, but if you are asking the taxpayer to do that, I have a problem, it is easier to go with a more expensive product. I understand the cost, it is not good, but as I get older, I put my taxpayer hat on.

Ryan Talbot, Iron County Home Builders Association – most of you know our position. Official statement is as follows: On behalf of the Iron County Home Builders Association, we would like to state that we are in support of allowing PVC or HDPE to be used on projects within Cedar City. We would like more flexibility from the City when projects could be done with PVC or HDPE. Ductile Iron is heavy and more expensive. Working with Ductile Iron requires more time for install as each piece must be craned in. this adds additional costs for labor and equipment. We ask that the City Council allow for those other options when the situation allows for it as we move forward.

Garth Green – I have been 30 years in pipe outfitting industry, did we invite HDPE people? Jonathan – no. is there a reason? Jonathan – chlorine, I discussed this with Washington County, they had several failures and are moving away from it. If the council wants me to look into it further, I can. Garth – I have not been in the AWA for 15 years, but it should be a choice. Jonathan – WL Plastics, we have used it in the irrigation pipes at the Golf Course. Based on my research it is not an application I feel like recommending for culinary water.

Brad Green – I have been around HDPE, PVC, and ductile for many years. I invited an engineer from WL Plastics here tonight, as a supplier I supply them all. HDPE is a premium product, I though it interesting that ductile iron lines with HDPE, if the chlorine is a concern it goes in or out the door. The point considering the size of pipe, I grew up around pipe, as you get bigger the pressure tolerance gets lower. Some instances higher pressure you may want it to dip higher and lower in higher pressure. Anything over 200 psi ductile has shown to be better. I know our transportation lines are over that. They use ductile fittings between PVC and other things. Ductile falls on cement it breaks, PVC bounces, it takes a hard fall or rock to make an impact. They are using tractor for installation, lighter weight it is less with ductile iron.

Gregg Horn – we don't line with HDPE, we do it with low density on the outside of the pipe.

Chris Uchman – I worked in the class A general contractor designing for Coca Cola and Pepsico, I am coming forth with ideas, one thing when I moved to Utah we went into a deep freeze, -25 degrees, they happen and are not considered with the regular models. We are looking where we have current models to design for drainage system and also for freezing, currently we are at 36 inches. Deep freeze we get -25 and that is something to consider, other areas that do that are 4-8 feet in the ground.

Ethan Lux – PVC is the material of choice in Anchorage, Alaska, they have pipes frozen and did not break when it completely solidified.

Brad Green – in our 7 branches, we sell 95% to municipalities is PVC, 5% ductile. Cities in Utah that buy pipe are buying PVC. We don't sell a lot in Cedar City, they use ductile. Melling – along those lines with our neighbors, Enoch, Parowan, do they prohibit PVC? Brad – if they do, I am not aware of it. We have sold it extensively up to 18 inches, above that they don't buy PVC. There was one job in Orem they went above that.

Brian Nichols – I was part of the group with the Home Builders that met with Jonathan to study this out. I think I could state accurately that the notion of more options was the highest priority of that group. I am friends with engineers, contractors, material suppliers everyone in that element of the industry and no one warned us about promoting other options. I wear different hats; I build and maintain water systems. I have a system in the city beyond the meters and its 12-13 years old and I think we did PVC and didn't have city inspections, quality controlled by self-interest and zero problems. Melling – what pressure? Brian – 100 lbs., in this area it is high for you but is reduced in the vault. Melling – do you have redundancy of the reducer in case? Brian – I don't believe so. Melling – self-interest, you run it yourselves. On quality control side, Cedar City has fairly comprehensive standards, closely watched over, any construction you do if not done properly will have issues. They all have a bedding that has to be met, the measures are already in place.

Jonathan – do you want a presentation from WL Plastics? Melling – yes.

Robbie Mitchell – for WL Plastics if chlorine is a factor on that pipe, we have an area that does not get chlorine, but in the winter, we bleed into those systems. 80% of our system has chlorine in the winter. Jonathan has talked with cities, and they have had problems 8-10 years down the road. I was pushing HDPE we use it on our springs we don't chlorinate in the mountains. Jonathan – I want to thank Gregg and Ethan for coming.

The planter strips, there was discussion about concerns with damage to city infrastructure from planting trees and we have seen that where sidewalk and curb and gutter has been lifted. I had discussions with Wade Orme, former City employee, but knowledgeable with trees. Recommendations he gave me would be to use a columnar tree, that type of tree does not have a large canopy, that would only go out wide enough to cover the planter street. Limit the canopy to the width of the planter strip. When the canopy goes over the street it limits the Street Department to use sweeper or chip seal. If the canopy is limited to the planter strip it takes care of that problem and it doesn't limit pedestrians. The other thing is to install root barriers to inhibit the roots under the sidewalk or curb. The root barrier would prevent uplift of the sidewalk or curb. Also consider tree spacing, if the canopy is 5 feet the trees would have to be at least that far apart and no closer than 10 feet from water or sewer laterals. Last would be to have 12" minimum topsoil to encourage roots to grow deeper. That was a good compromise to allow the planter strips and protect the infrastructure.

Phillips – the root barrier is a good idea, I am in favor of planter strips, it is only an option. I know Wade is an arborist. I have concern if it doesn't grow wider than the strip it does not

give a very good canopy. This will be in new areas with no overhead power lines. I think we can look at other varieties, but overall, it is moving in the right direction for a developer. Melling – I agree, it comes back to options and not to have it unless it is a PUD I struggle with, but I also want to protect the taxpayer. There are trees that would be good, poplars have a more invasive roots. It could be maximum height of 20-30 feet. I would think we already have guidelines on encroaching in the rights of ways. About a year ago we had an option to do something that would have been esthetically nice, but this wasn't an option.

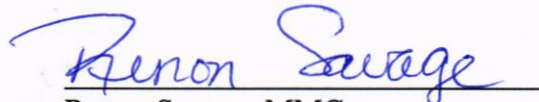
CONSIDER AN ORDINANCE REPEALING A PORTION OF CITY ORDINANCE

1209-20-1. TYLER ROMERIL: Tyler – in December last year the City Council amended the PUD ordinance, within the adoption of those amendments there was a therefore statement that said PUD's are vested in the standards of the last phase developed. Over the last 8 months Council had standards that went back 10 years, and you didn't like it. This strikes the 10 years, and it would go under the current vesting ordinance, over the one that is in place when they go to Planning Commission and pay the fees.

CONSIDER AN ORDINANCE CLARIFYING VESTING RIGHTS OF RESIDENTIAL DEVELOPMENT OVERLAYS (RDO'S) IN CITY MASTER PLANS.

TYLER ROMERIL: Tyler – we had a situation a few months ago where there was an RDO approved, and it was in the best interest of the City to amend the master plan and the developer of the RDO designed on the old master plan. This clarifies that you don't vest on a master plan.

ADJOURN: Councilmember Isom moved to adjourn and move into the RDA meeting at 7:12 p.m.; second by Councilmember Phillips; vote unanimous.


Renon Savage, MMC
City Recorder

WEDNESDAY, AUGUST 25, 2021 19

business**Critical nature of
community leaders****BUILDING MAIN STREET, NOT WALL STREET**

Chuck Comeau once said, "A downtown is the center of a community, the pulse, ... When it dies, your town dies. I want my kids to experience something different from Wal-Mart and strip malls." It is fall and many communities have recently held elections or have them coming up. While it is easy to believe our votes have little impact on the National level and in local elections, nothing could be further from the truth. Our local vote not only impacts various issues in your local community, but it can also determine the long-term vitality and vibrance of your community for years to come.

Candidates elected today have a huge impact on the direction and future of your downtown, and therefore your community. The questions you ask of them are critical. Questions such as, do they understand the power of tourism to the community? Do they understand how the importance of being business friendly is to draw new and younger entrepreneurs to your community? Do they understand that wishing for new high-paying jobs to just show up in your community is usually a fool's errand? Do they understand the real importance of having a city led hyper-local movement? Do they even understand what a hyper-local movement is?

The answers to these and other vital questions are critical to your community and most importantly, your downtown. Tourism is one thing communities can control to an extent. The events they host

along with the atmosphere they provide are critical to luring outside visitors in to spend their money in your community.

Being business friendly is critical to a community's growth. Communities making it difficult for start-ups or new businesses are simply left behind in today's world. Those entrepreneurs will simply migrate to the next town that happens to be more business friendly, and open their business there. City officials must create a one-stop business system that assists potential startups and simplifies the entire process. Sending a message to potential startups that your community is open and ready to assist new businesses will be worth its weight in gold.



JOHN A. NEWBY
COLUMNIST

Understanding the nature of higher paying jobs that accompany new businesses moving to town is what separates the true candidates from those blowing smoke. Companies relocating or start-ups offering those high-paying jobs are few and far between. Communities must face the reality that courting those companies is, at best, high stakes poker where most lose. Communities understanding the slim odds of winning those few bids and altering course will have the upper hand. They have the upper hand because they make revitalizing and transforming their community and downtown the top priority. Companies don't relocate to cities lacking community

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IRON COUNTY TODAY

LEADERS

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vibrancy, and heart and soul. It is hard enough to retain workers as it is, they seek quality of life. It is critical your community make vibrancy, and heart and soul their priority in order to be relevant.

Having an understanding of what hyper-local means is critical. Hyper-local efforts must be led by the city. They must promote, encourage and above all, set the example. When cities purchase goods outside their community, they send a message to their residents hyper-local isn't that important. That is the nail in the coffin of communities moving forward. With city's budgets being challenged more than ever, every penny kept within the boundaries of the local community is crucial. Those dollars will recirculate over and over again providing additional jobs, sales tax and progress within the city. Cities simply must get this right. Smart candidates must understand the only way to begin solving these woes is to keep as many dollars local as possible and create a vibrant community.

Small and mid-sized cities are in the fight for their economic lives. Many aren't aware of the magnitude of the struggle or the size of the mountain they must climb to find success or respite from the economic storm. These aren't the days where a slow meandering approach is prudent. These are the days where the slow and meandering are left as a carcass on the economic road. You need leaders that understand tourism and what hyper-local really means. Find leaders that are business friendly. A vote for a candidate with those attributes is a vote for building Main Street, not Wall Street.

John A. Newby, author of the "Building Main Street, Not Wall Street" column and Facebook group dedicated to helping communities and media companies work together allowing both to not just survive, but thrive in a world where truly-local is lost to Amazon, Wall Street chains and others. His email is: john@Truly-Local.com.

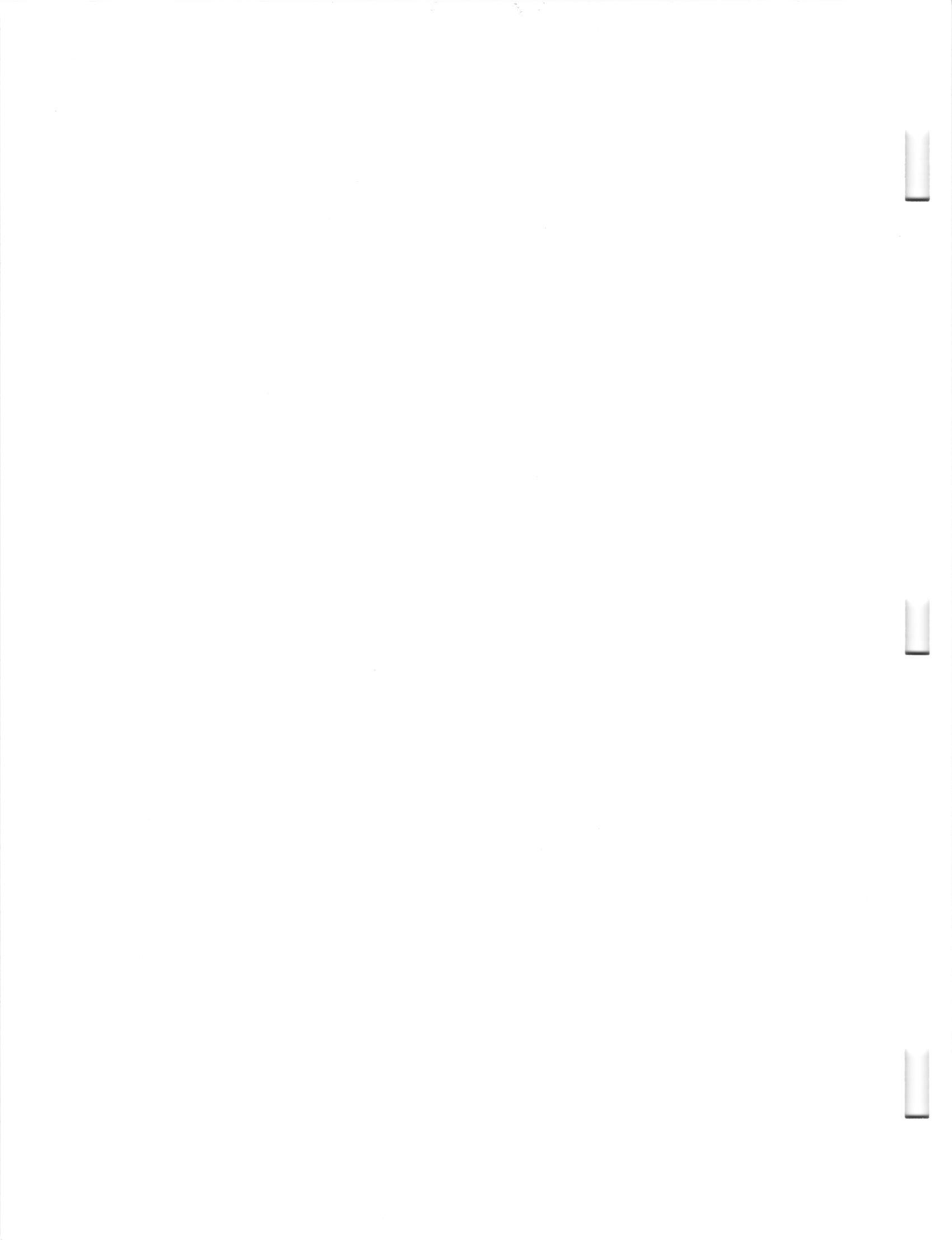


EXHIBIT "B"

CITY COUNCIL – SEPTEMBER 1, 2021



PVC WATER PIPE OVERVIEW

for



PRESENTED BY:
Ethan Lux
Regional Engineer

09/01/21



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1



Uni-Bell PVC Pipe Association



Our Mission

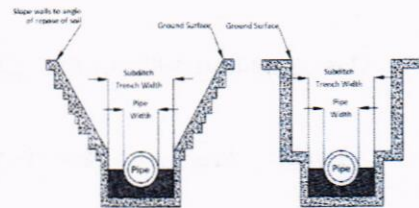
Design

Installation

Maintenance


Technical publications

Educational outreach




$$\% \frac{\Delta Y}{D} = \frac{[(D_L W_P) + W_L] K_x (100)}{0.149 P S + 0.061 E'}$$

2



Uni-Bell PVC Pipe Association



50+ Years of experience!

1952: PVC water pipe first available in North America.


1960's: National Science Foundation (NSF) certifies PVC pipe for potable water. First ASTM standards published regarding PVC (Schedule Pipe)

1970's: Standards developed by the American Water Works Association (AWWA) PVC pipe available up to 21" & Uni-Bell PVC Pipe Association is founded


1990's: AWWA standards expanded to include larger sizes of PVC PVC pipe available up to 48"

2016: C900/C905 standards combined and expanded to formally include 54" and 60" sizes

3



PVC Estimates



Over 1 million miles of PVC pipe in the US

40 million successful service connections

28% of installed water pipe is PVC

Over 40,000 water utilities use PVC

Average pressures of water pipe systems are 90 psi

4

PVC Characteristics

Physical properties

- Chemically inert
- Light weight and easy to install
- Smooth inner wall and large inner diameter allow for excellent hydraulics
- Homogeneous pipe wall
- Internal and external pressure capacity, also resistant to dynamic ground movement

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PVC Characteristics

Hydraulics

Flow Characteristics of PVC Pipe
[Neale & Price, 1964]

- Determined Manning $n = 0.009$ and Hazen-Williams $C = 155$
- Based on testing at Alden Hydraulic Laboratory
- Used 8" & 12" PVC bell and spigot pipe with 20 ft. joints

Pipe Material	C Factor
PVC	150
HDPE	150
Ductile Iron (Mortar Lined)	140 (New)
Steel (Mortar Lined)	140 (New)
Concrete	140 (New)

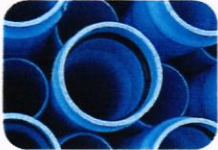







Hydraulic Characteristics of PVC Pipe (A Report of Field Measurements)
[Bishop & Jeppson, 1975]

- Determined PVC pipe friction factors of installed 8" & 10" pipe
- Confirmed Manning $n = 0.009$ and Hazen-Williams $C = 150$

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PVC Characteristics

Deflection Limits

			
PVC – 7.5%	Fiberglass – 3% to 5% (depends of lifespan)	Polypropylene – 5%	HDPE – 3.3% to 7.5% (varies by DR)
			
Ductile Iron – 2% to 5% (depends on lining/coating)	Steel – 2% to 5% (depends on lining/coating)	Vitrified Clay – Less than 1%	Concrete (PCCP/RCCP) – Less than 1%

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Manufacturer hydrostatic testing

AWWA C900 Pressure Test Requirements

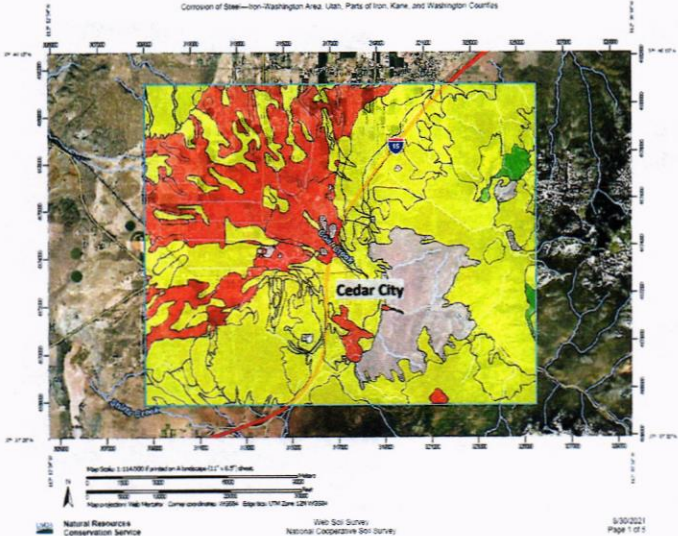
DR	Pressure Class (psi)	Each Piece Hydrostatic Pressure Test(psi)	1000 Hr. Sustained Pressure Test (psi)	Burst Pressure Test (psi)
25	165	330	350	535
21	200	400	420	630
18	235	470	500	755
14	305	610	650	985

Lot testing

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Corrosion

USDA Soil Survey



Corrosion of Steel—Non-Zachryton Area, Utah, Parts of Iron, Kane, and Washington Counties

23% of soil is highly corrosive

68.5% of soil is moderately corrosive

8.5% of soil has low levels of corrosion

PVC is chemically inert, so it does not corrode

Map Scale: 1:24,000 (Printed on A Landscape 11" x 17" Sheet)

North Arrow

Scale: 0 1000 2000 3000 4000 Feet

Map Data: National Resources Conservation Service, 2010; National Cooperative Soil Survey, 2010

9/30/2021 Page 1 of 2

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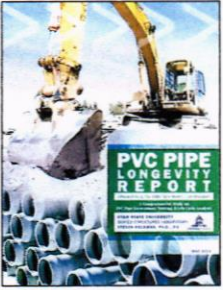
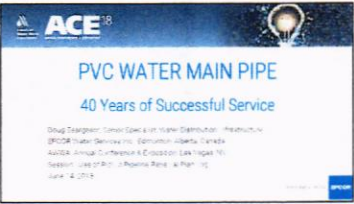
Longevity

PVC Pipe has a 100+ year life based on numerous studies

25 – 50-year-old PVC pipe was tested to current pipe standards

All testing shows PVC pipe meets or exceeds standard for new pipe

No change in physical or dimensional properties

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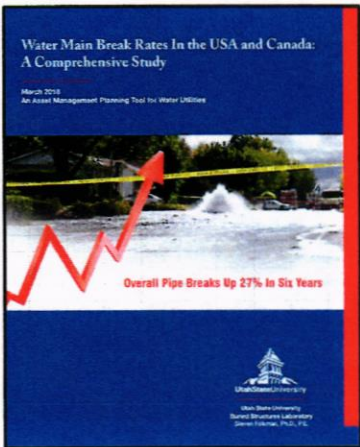
Longevity

Utah State University surveyed 281 utilities for water main break rates

A total of 170,569 miles of pipe was reported by the utilities. This is the largest water main break survey in North America

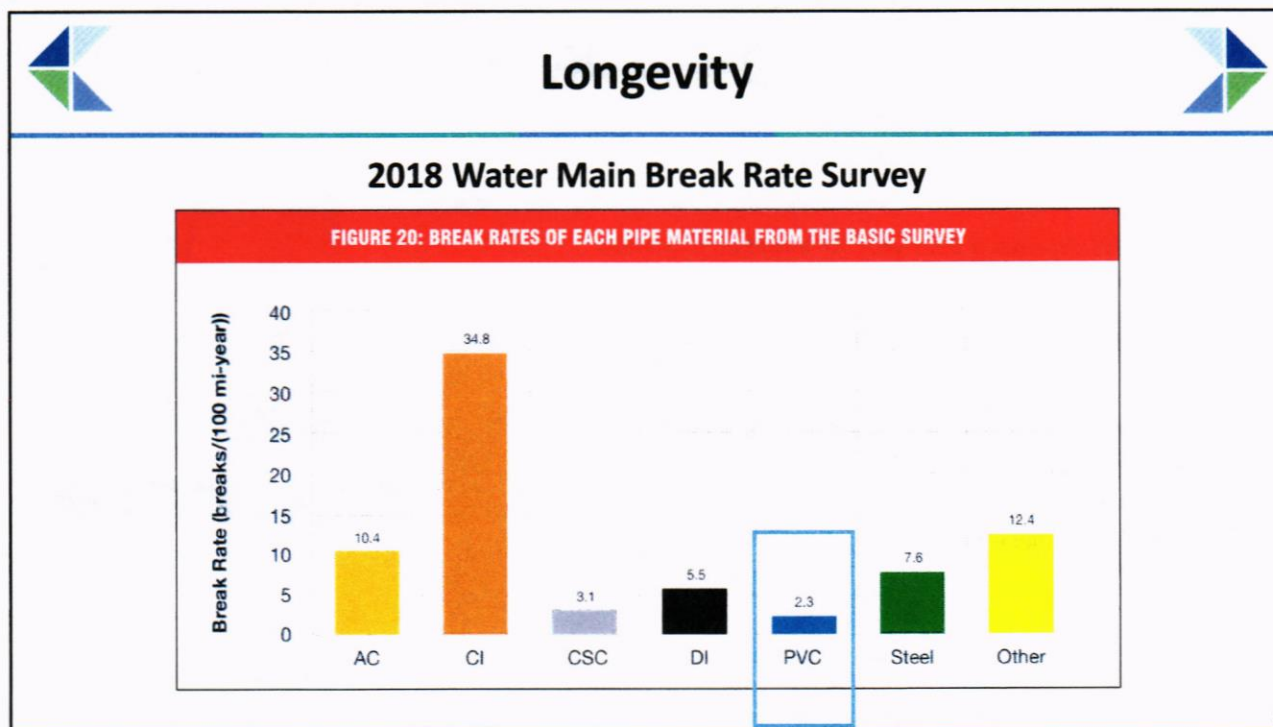
PVC pipe has the lowest break rate

The average among utilities was over 600 miles of pipe




3. S. Folkman, "Water Main Break Rates In The USA and Canada: A Comprehensive Study", 2018


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Reference Utilities




Colorado Springs Utility, CO

- 90% of new installations are PVC
- Less than 3 breaks/100 miles of PVC pipe
- Expanded usage to 24"
- High rock and medium-high corrosive soils
- Average pressures of 180 psi in distribution mains




Colorado Springs Utilities
It's how we're all connected

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Reference Cities



Denver Water, CO

- Over 1,000 miles of PVC pipe
- Expanded usage to 20"
- High rock and medium-high corrosive soils
- Average pressures of 150 psi in distribution mains



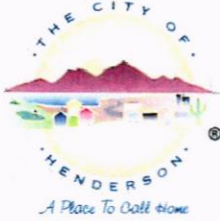
**DENVER
WATER**

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Reference Cities

City of Henderson, NV

- Over 600 miles of PVC pipe
- Uses up to 12" for distribution mains
- Uses up to 48" for transmission mains
- High rock and medium-high corrosive soils




The logo for the City of Henderson, NV, features a circular emblem with a sun rising over mountains and a cityscape. The text "THE CITY OF HENDERSON" is written around the circle, and the tagline "A Place To Call Home" is at the bottom.

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Reference Cities

City of Gilbert, AZ

- Over 900 miles of PVC pipe
- Uses up to 12"
- Medium-high corrosive soils



The logo for the City of Gilbert, AZ, consists of a stylized 'G' made of overlapping orange, yellow, and blue shapes, with the word "gilbert" in lowercase white letters below it.

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Reference Cities

City of St. George, UT

Over 500 miles of PVC pipe

Uses up to 24"

High rock and medium-high corrosive soils

The logo for St. George, UT, featuring a stylized yellow sun with rays.

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Reference Cities

Cedar City, UT


10 miles of pipe installed in new developments last year alone

Installed up to 8"


High rock and medium-high corrosive soils

The logo for Cedar City, UT, featuring a blue square with a yellow sun and three flags, with the text "Cedar City Festival City USA" below it.

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Reference Cities



Small list of Utah water utilities

Salt Lake City	Layton
Granger-Hunter Improvement District, West Valley City	Lehi
West Jordan	Herriman City
Ogden	Millcreek
South Jordan	

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Questions?

Ethan Lux
elux@uni-bell.org
972-243-3902 x 1025



@PVCPipeAssoc






@PVCPipeAssoc






PVC Pipe Association

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 <h2 style="margin: 0;">Notable regional projects</h2> 	
<h3 style="margin: 0;">Baker City, OR – Transmission Main, 2019</h3>	
<p>24 in. DR25, 15,000 ft, 14 ft lengths</p> <hr/> <p>Replaced degraded cement transmission line</p> <hr/> <p>40 ft wide easement and winding alignment</p> <hr/> <p>Used shorter lengths to accommodate many changes in direction</p>	

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 <h2 style="margin: 0;">Notable regional projects</h2> 	
<h3 style="margin: 0;">Baker City, OR – Transmission Main, 2019</h3>	
<p>Used native backfill with a crusher box</p> <hr/> <p>Shorter lengths allowed for less fittings</p> <hr/> <p>Excavator was used to assemble the joints</p>	

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Notable regional projects

Oakland, CA – Distribution Main, 2016

1000' of 6" C909 PVCO which replaced 6" AC pipe

20 degree slope and tight alignment

¼ mile from Hayward Fault line



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Notable regional projects

Oakland, CA – Distribution Main, 2016

Used compacted native backfill : $E' = 400 \sim 1000$ psi


Flex-tite fittings gave the joints 5 degrees of deflection

PVCO was selected over other materials due to seismic concern



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CITY COUNCIL – SEPTEMBER 1, 2021



dipra
Ductile Iron Pipe
Research Association

**Presentation to
Cedar City, Utah**

Thursday, September 2,
2021

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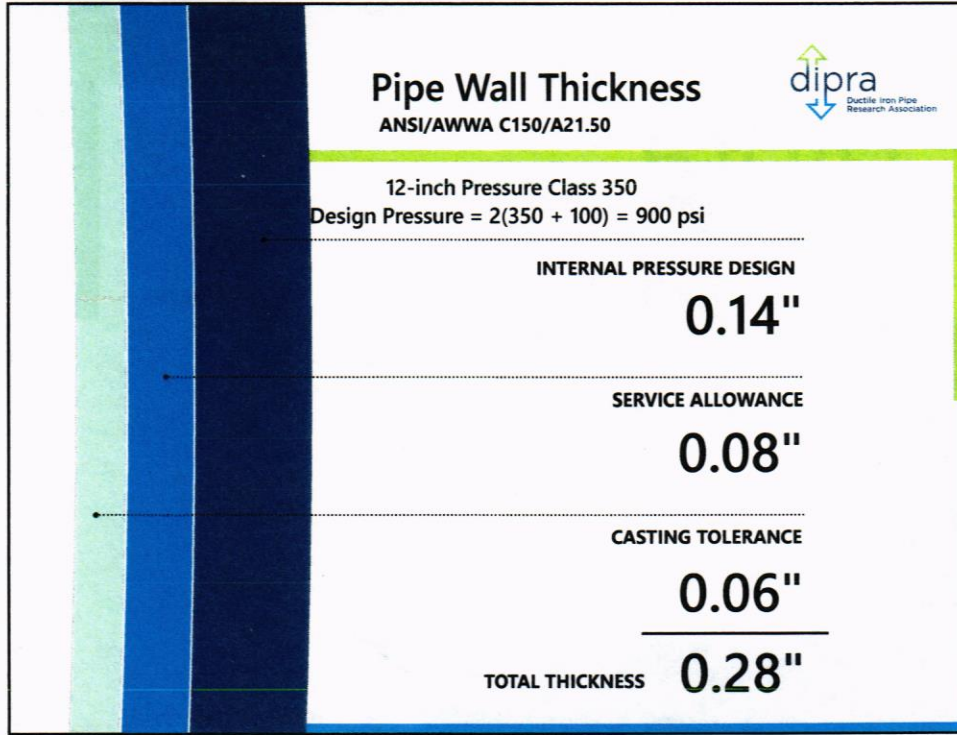
Major Functions of DIPRA

- Standards
- Publications
- Research
- Engineering Services

Thursday, September 2, 2021

2

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3

Advantages of Ductile Iron Pipe

- Higher pressure capacity
- 9 times the tensile strength
- 8 times the crushing strength
- Longer life cycle
- No over-belling
- Safer to tap
 - *No restrictions on tapping (spacing, location)*

Thursday, September 2, 2021

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Advantages of Ductile Iron Pipe



- Minimum average recycled content of 90% for iron
- 100% Recycleable
- Energy Savings in Pumping
- Resilience under extreme conditions

Thursday, September 2, 2021

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Advantages of Ductile Iron Pipe



Energy Savings

- Larger inside diameter and smooth cement-mortar lining translates into lower pumping costs
- Lower energy requirements translate into lower greenhouse gas emissions
- DIPRA recommendations for Hazen-Williams C based on results of field flow tests.

Thursday, September 2, 2021

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Cement Mortar Lining



Flow Tests	Pipe Size (in)	Length (ft)	Age of Pipe (yrs)	Hazen-Williams C-Factor
Baltimore, MD	12	909	18	136
Birmingham, AL	6	473	17	133
Catskills, NY	16	30,825	25	136
Charleston, SC	8	300	97	140
Chicago, IL	36	7,200	12	151
Concord, NH	12	500	36	140
Greenville, SC	30	50,700	36	146

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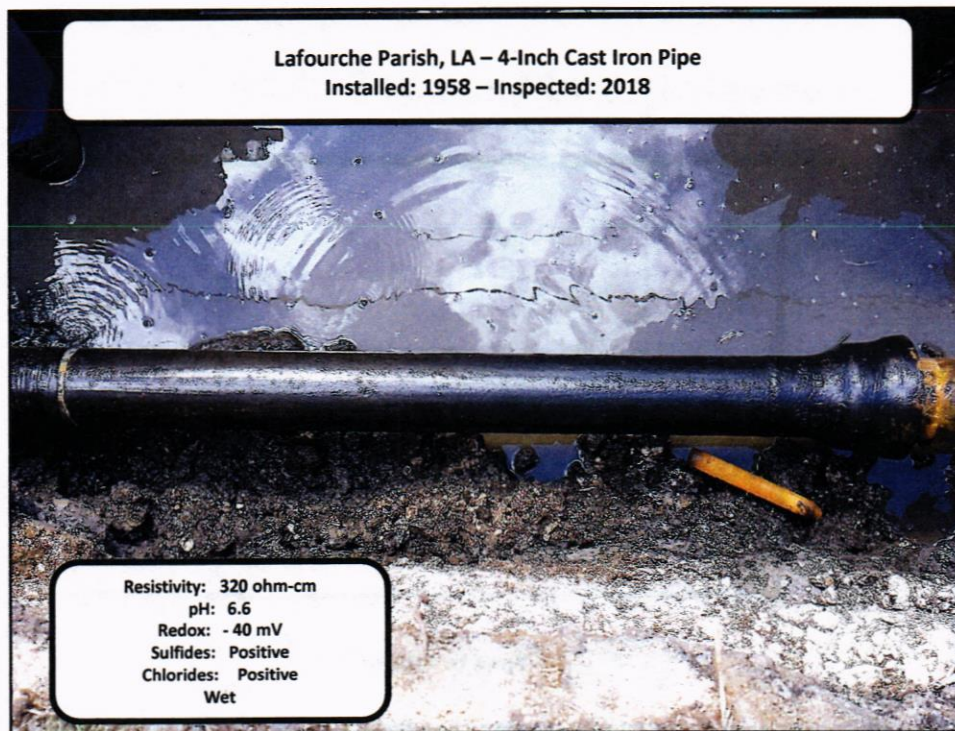
Thursday, September 2, 2021

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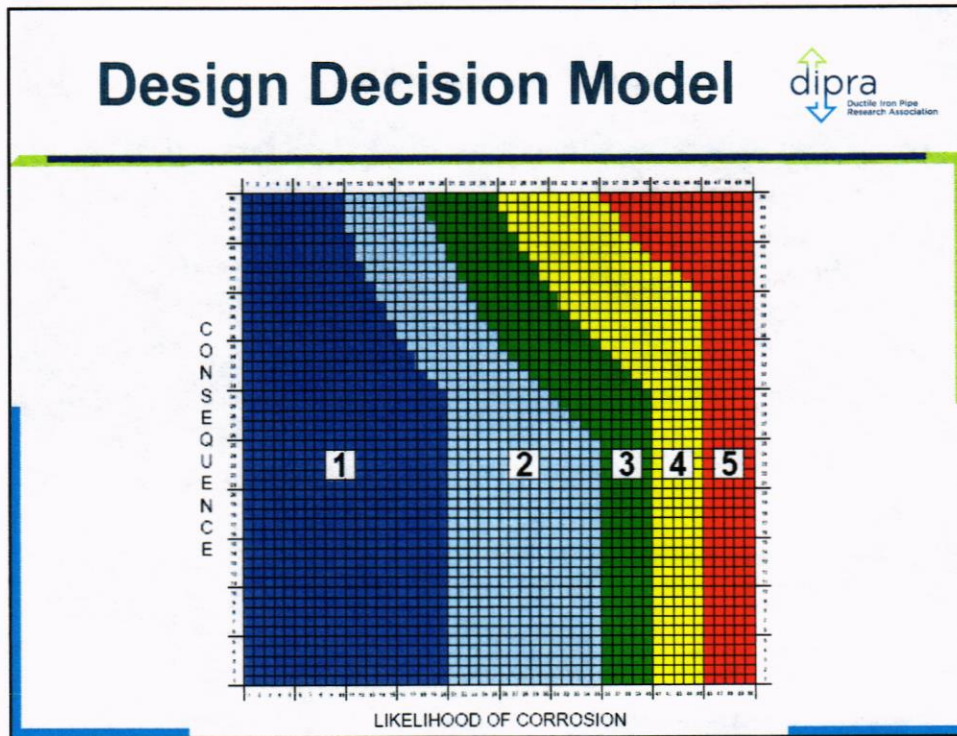
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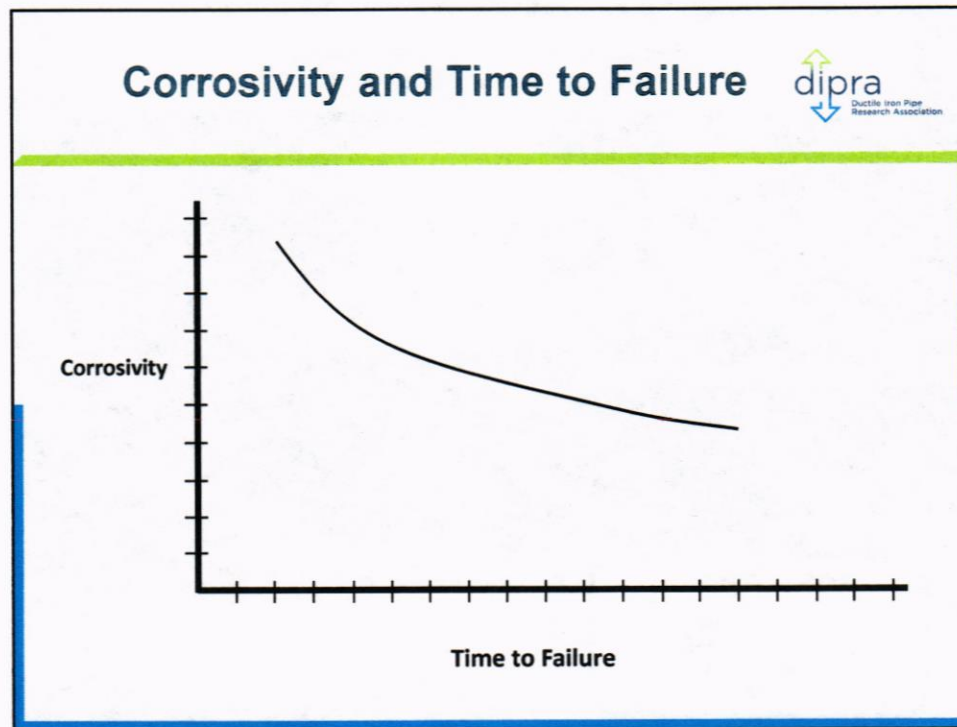
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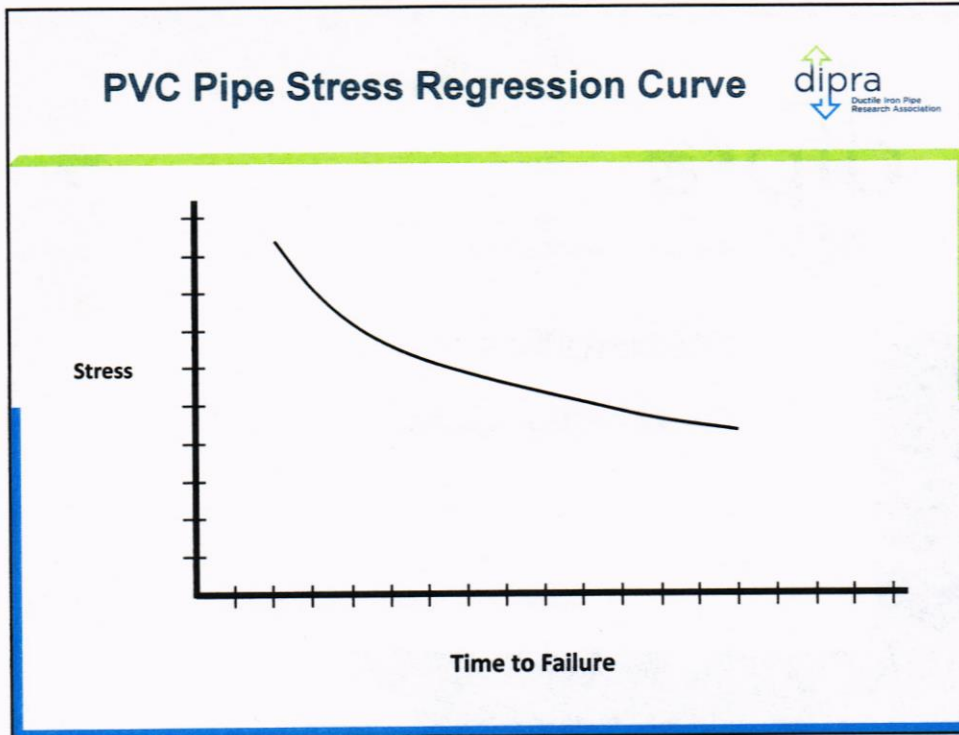
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DIPRA




- Final Comments

Thursday, September 2, 2021

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dipra
Ductile Iron Pipe
Research Association

**Presentation to
Cedar City, Utah**

Thursday, September 2,
2021

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