Attachment No. 2 – Final Change Order

E-MAILED 3/19/24 3.08pm

City of Laredo Utilities Department

Change Order No. 1
Date: 3/8/2024

Project: **Jefferson St. WTP Chlorine Feed Improvement**

Contractor: J.S. Haren Company
1175 Hwy 11 North
Athens, TN 37303

You are hereby requested to comply with the following changes from the contract plans and specifications.
This document shall become an amendment to the contract and all provisions of the contract shall apply thereto.

CHANGE ORDER REQUEST NO. 1

ITEM No.	ITEM DESCRIPTION	DAYS ADDED / (SUBTRACTED)	INCREASE	DECREASE	COST
1	Super.	20	$ 4,725.00		$ 4,725.00
2	OTL		$ 900.00		$ 900.00
3	Monthly Expenses		$ 281.25		$ 281.25
4	4" ARV/Degassing Valve		$ 2,150.00		$ 2,150.00
5	4" CPVC Tee, Sch 80		$ 72.00		$ 72.00
6	4" CPVC Misc Material for connection		$ 220.00		$ 220.00
7	4" CPVC Vented Ball Valves		$ 2,938.00		$ 2,938.00
8	3" CPVC 45, Sch 80		$ 3,100.00		$ 3,100.00
9	4" CPVC 45, Sch 80		$ 732.00		$ 732.00
10	3" CPVC 90, Sch 80, Long Sweeps		$ 792.00		$ 792.00
11	4" CPVC 90, Sch 80, Long Sweeps		$ 628.00		$ 628.00
12	Glue and Primer		$ 156.00		$ 156.00
13	Freight		$ 318.00		$ 318.00
14	Labor Tax and Installation		$ 2,450.40		$ 2,450.40
15	Overhead and Profit		$ 2,919.40		$ 2,919.40
16	Bond		$ 671.46		$ 671.46
				TOTAL	23,053.51

Noted Additional Working Days to be approved on this Change Order:	20
Inclement Weather Days Claimed	0

Original Contract:	$ 794,000.00	Original Contract Time:	150	Working Days
Total Increase:	$ 23,053.51	Additional Contract Time:	20	Working Days
Total Decrease:	$0.00			
Current contract amount :	**$ 817,053.51**	Current Contract Time	**170**	**Working Days**

Justification:

1. Item 1 - *(Superintendent):* Superintendent
2. Item 2 - *(OTL):* Out of Town Living
3. Item 3 - *(Monthly Expenses):* Monthly Expenses
4. Item 4 - *(4" ARV/Degrassing Valve):* 4" ARV/Degassing Valve
5. Item 5 - *(4" CPVC Tee, Sch 80):* 4" CPVC Tee, Schedule 80
6. Item 6 - *(4" CPVC Misc Material for connection):* 4" CPVC Misc Material for connection
7. Item 7 - *(4" CPVC Vented Ball Valves):* 4" CPVC Vented Ball Valves
8. Item 8 - *(3" CPVC 45, Sch 80):* 3" CPVC 45, Schedule 80
9. Item 9 - *(4" CPVC 45, Sch 80):* 4" CPVC 45, Schedule 80
10. Item 10 - *(3" CPVC 90, Sch 80, Long Sweeps):* 3" CPVC 90, Schedule 80, Long Sweeps
11. Item 11 - *(4" CPVC 90, Sch 80, Long Sweeps):* 4" CPVC 90, Sch 80, Long Sweeps
12. Item 12 - *(Glue & Primer):* Glue and Primer
13. Item 13 - *(Freight):* Freight
14. Item 14 - *(Labor Tax and Installation):* 40% Labor Tax and Installation
15. Item 15 - *(Overhead and Profit):* 15% Overhead and Profit
16. Item 16 - *(Bond):* 3% Bond

Note: See attached letter proposals submitted by the Contractor and City direction for the changes requested herein this change order.

Recommended by: Date: 3/11/24

James Hoelscher, P.E.
Ardurra Group, Inc.

Accepted by: Date: 3/18/24

Contractor:
J.S. Haren Company

Approved by: Date:

Arturo Garcia, Jr., P.E.
Director of Utilities Department

Approved by: Date:

Joseph Neeb
City Manager

Approved by: Date:

Jose A. Valdez, Jr.
City Secretary

Approved by: Date:

Doanh "Zone" T. Nguyen
City Attorney

C.O. #1/23435

J.S. Haren Company

Jefferson St. WTP Chlorine Feed Improvement

Laredo, TX

Add Long Sweeps/Soft 90s

Add ARV with Degassing Valves w/ Ball Valves

			Material		Labor			Non Taxed	
Description	Qty	Units	Unit	Total	Unit	Total	TOTAL	Total	Unit
Super.	1.50	Wks	$ 350.00	$ 525.00	$ 2,500.00	$ 3,750.00	$ 4,725.00	$ 450.00	$ 300.00
OTL	1.50	Wks	$ 600.00	$ 900.00	$ -	$ -	$ 900.00	$ -	$ -
Monthly Expenses	0.38	Mo	$ 750.00	$ 281.25	$ -	$ -	$ 281.25	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
4" ARV/Degassing Valve	1.00	EA	$ 1,850.00	$ 1,850.00	$ 300.00	$ 300.00	$ 2,150.00	$ -	$ -
4" CPVC Tee, Sch 80	1.00	EA	$ 52.00	$ 52.00	$ 20.00	$ 20.00	$ 72.00	$ -	$ -
4" CPVC Misc Material for connection	1.00	Lots	$ 120.00	$ 120.00	$ 100.00	$ 100.00	$ 220.00	$ -	$ -
4" CPVC Vented Ball Valves	2.00	EA	$ 1,356.00	$ 2,712.00	$ 113.00	$ 226.00	$ 2,938.00	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
3" CPVC 45, Sch 80	62.00	EA	$ 30.00	$ 1,860.00	$ 20.00	$ 1,240.00	$ 3,100.00	$ -	$ -
4" CPVC 45, Sch 80	12.00	EA	$ 41.00	$ 492.00	$ 20.00	$ 240.00	$ 732.00	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
3" CPVC 90, Sch 80, Long Sweeps	6.00	EA	$ 107.00	$ 642.00	$ 25.00	$ 150.00	$ 792.00	$ -	$ -
4" CPVC 90, Sch 80, Long Sweeps	4.00	EA	$ 132.00	$ 528.00	$ 25.00	$ 100.00	$ 628.00	$ -	$ -
Glue & Primer	2.00	EA	$ 78.00	$ 156.00	$ -	$ -	$ 156.00	$ -	$ -
Freight	1.00	LS	$ 318.00	$ 318.00	$ -	$ -	$ 318.00	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
			$ -	$ -	$ -	$ -	$ -	$ -	$ -
				$ 10,436.25		$ 6,126.00	$ 17,012.25	$ 450.00	

Add 20 Calendar Days

0 % Sales Tax	$ -
40 % Labor Tax and Ins.	$ 2,450.40
	$ 19,462.65
15 % O and P	$ 2,919.40
	$ 22,382.05
3 % Bond	$ 671.46
Figured Total:	$ 23,053.51

Documentation for Change Order No. 1

1. 3" and 4" 90 Long Sweeps Inquiry
2. CPVC Fittings 3 Inch 90 Long Sweeps Technical Information
3. CPVC Fittings 4 Inch 90 Long Sweeps Technical Information
4. Air Release & Degassing Valve Data Sheet

Ronald W. Miller II

From: John Haren <john.h@jsharen.com>
Sent: Thursday, January 25, 2024 2:34 PM
To: Ronald W. Miller II
Cc: James Hoelscher; Ignacio Hinojosa; Mitchell K.
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Follow Up Flag: Follow up
Flag Status: Flagged

Ron,

The credit is in the price. We have to package up separately and send back including restock fees. 20 days is for ARV and extra long sweeps and pouring flowable fill.

John H
J.S. Haren Company
423-745-5000

From: Ronald W. Miller II <rmiller@ardurra.com>
Sent: Thursday, January 25, 2024 2:53 PM
To: John Haren <john.h@jsharen.com>
Cc: James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: RE: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

John,

We had a couple of questions regarding the Changer Order No. 1:

- Is credit back going to be included for the 90 elbow fittings that are being replaced with the requested sweep 90s and 45s?
- We need further clarification for the 20 calendar days. Is it just to install the ARV; or is this to account for a delayed start?

Please let me know if you would like to discuss.

Thank you,

ARDURRA

Ron W. Miller II
Graduate Engineer
O: 956-462-5511 | **M:** 956-304-0225
6909 Springfield Avenue, Suite 300, Laredo, TX, 78041
rmiller@ardurra.com | www.ardurra.com

From: John Haren <john.h@jsharen.com>
Sent: Tuesday, January 23, 2024 3:23 PM

To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: edtaboada@ci.laredo.tx.us; ramartinez@ci.laredo.tx.us; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us; dasalinas@ci.laredo.tx.us; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

Please see attached COR#1 for one (1) ARV/Degassing assembly and adding long sweeps/ soft 90s.

ARV is 4-5 weeks out.

Thanks,

John H
J.S. Haren Company
423-745-5000

From: John Haren <john.h@jsharen.com>
Sent: Tuesday, January 23, 2024 9:18 AM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: edtaboada@ci.laredo.tx.us <edtaboada@ci.laredo.tx.us>; ramartinez@ci.laredo.tx.us <ramartinez@ci.laredo.tx.us>; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us <jtoledo@ci.laredo.tx.us>; dasalinas@ci.laredo.tx.us <dasalinas@ci.laredo.tx.us>; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

Please advise no 3" ARV/Degassing valves are not needed. You stated one (1) ARV/Degassing valve and pointed to two (2) locations on the drawing. Are you stating the highest point of these two locations?

Please confirm the ARV/Degassing valve model number CARD400VT-PV is the request model to price?

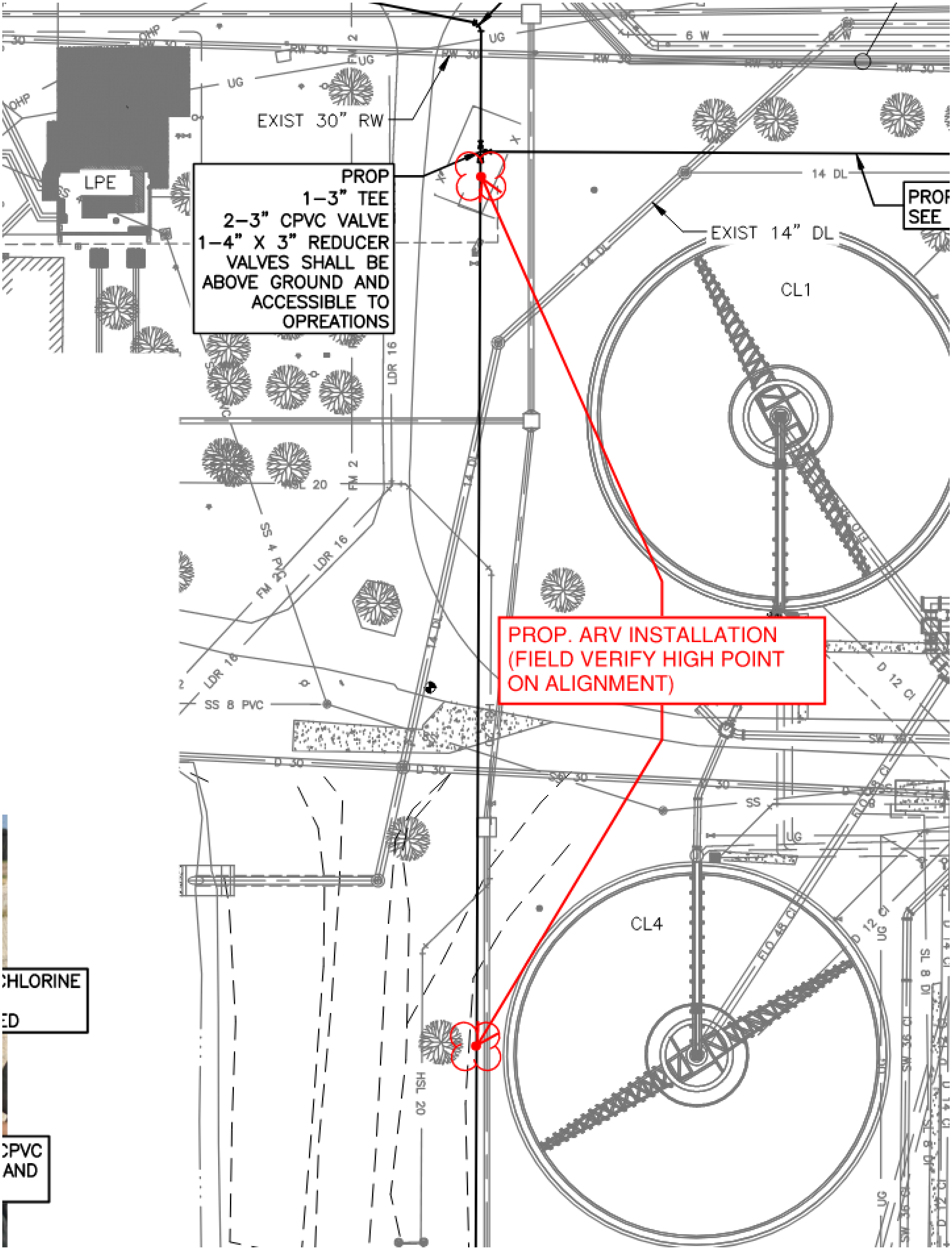
Thanks,

John H
J.S. Haren Company
423-745-5000

From: Ronald W. Miller II <rmiller@ardurra.com>
Sent: Monday, January 22, 2024 5:19 PM
To: John Haren <john.h@jsharen.com>
Cc: edtaboada@ci.laredo.tx.us <edtaboada@ci.laredo.tx.us>; ramartinez@ci.laredo.tx.us <ramartinez@ci.laredo.tx.us>; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us <jtoledo@ci.laredo.tx.us>; dasalinas@ci.laredo.tx.us <dasalinas@ci.laredo.tx.us>; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: RE: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

John,

Please utilize one (1) – 4” Combination ARV/Degassing valve. See attached snip below for proposed location.


EXIST 30" RW
PROP
1–3" TEE
2–3" CPVC VALVE
1–4" X 3" REDUCER
VALVES SHALL BE
ABOVE GROUND AND
ACCESSIBLE TO
OPREATIONS
LPE
EXIST 14" DL
PROP
SEE
CL1
PROP. ARV INSTALLATION
(FIELD VERIFY HIGH POINT
ON ALIGNMENT)
CL4
CHLORINE
ED
CPVC
AND

Thank you,

Ron W. Miller II
Graduate Engineer
O: 956-462-5511 | **M:** 956-304-0225
6909 Springfield Avenue, Suite 300, Laredo, TX, 78041
rmiller@ardurra.com | www.ardurra.com

From: John Haren <john.h@jsharen.com>
Sent: Thursday, January 18, 2024 1:13 PM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: edtaboada@ci.laredo.tx.us; ramartinez@ci.laredo.tx.us; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us; dasalinas@ci.laredo.tx.us; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

Please advise where ARV will be located.

Please advise if City wants ARV or a combination ARV/Degassing?

John H
J.S. Haren Company
423-745-5000

From: John Haren <john.h@jsharen.com>
Sent: Friday, January 12, 2024 2:39 PM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: edtaboada@ci.laredo.tx.us <edtaboada@ci.laredo.tx.us>; ramartinez@ci.laredo.tx.us <ramartinez@ci.laredo.tx.us>; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us <jtoledo@ci.laredo.tx.us>; dasalinas@ci.laredo.tx.us <dasalinas@ci.laredo.tx.us>; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

Mitch advised 10 yards at the two (2) locations for flowable fill.

Please see attached data sheets for ARV and ARV/Degassing.

Thanks,

John H
J.S. Haren Company
423-745-5000

From: John Haren <john.h@jsharen.com>
Sent: Tuesday, January 9, 2024 11:21 AM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: edtaboada@ci.laredo.tx.us <edtaboada@ci.laredo.tx.us>; ramartinez@ci.laredo.tx.us <ramartinez@ci.laredo.tx.us>; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us <jtoledo@ci.laredo.tx.us>; dasalinas@ci.laredo.tx.us <dasalinas@ci.laredo.tx.us>; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

We will proceed with 45's. The long sweeps are double the cost.

Reviewed the spec and it states flowable fill per the plans. Instead of doing a lump sum I priced up a per yard cost for any flowable fill installed. This includes all material, labor, and tools to complete. See below:

$340 per Yard. We have identified two locations for flowable backfill. One at an electrical duct bank and one at a slab near the photo B injection riser.

John H
J.S. Haren Company
423-745-5000

From: Ronald W. Miller II <rmiller@ardurra.com>
Sent: Monday, January 8, 2024 5:15 PM
To: John Haren <john.h@jsharen.com>
Cc: edtaboada@ci.laredo.tx.us <edtaboada@ci.laredo.tx.us>; ramartinez@ci.laredo.tx.us <ramartinez@ci.laredo.tx.us>; Rolando San Miguel, Jr. <rsanmigue2@ci.laredo.tx.us>; jtoledo@ci.laredo.tx.us <jtoledo@ci.laredo.tx.us>; dasalinas@ci.laredo.tx.us <dasalinas@ci.laredo.tx.us>; James Hoelscher <jhoelscher@ardurra.com>; Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: RE: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

John,

We would accept either the soft 90s or the two 45s, as both would reduce back pressure.

Regarding the flowable fill, it was not mentioned in the plans but briefly mentioned in Specification 102: Excavation and Backfill for Utilities. It should be utilized as needed.

Thank you,

ARDURRA

Ron W. Miller II
Graduate Engineer
O: 956-462-5511 | **M:** 956-304-0225
6909 Springfield Avenue, Suite 300, Laredo, TX, 78041
rmiller@ardurra.com | www.ardurra.com

From: John Haren <john.h@jsharen.com>
Sent: Monday, January 8, 2024 11:17 AM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Re: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

Please advise if we can use two (2) 45-degree fittings.

Also I can not find in the specs and drawings using flowable fill. Please advise.

John H
J.S. Haren Company
423-745-5000

From: John Haren
Sent: Friday, January 5, 2024 2:26 PM
To: Ronald W. Miller II <rmiller@ardurra.com>
Cc: Ignacio Hinojosa <ihinojosa@ardurra.com>; Mitchell K. <mitchell.k@jsharen.com>
Subject: Jefferson St. WTP Chlorine Feed Improvements - 90 Long Sweeps

Ron,

See attached Technical Data for the 3" and 4" long sweeps or we can do the two 45 degrees like Mitch mentioned.

Thanks,

John H
J.S. Haren Company
423-745-5000

Spears® Technical Information

05-Jan-24 10:58:06 AM

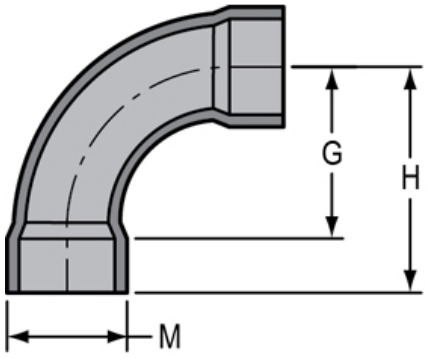
Part No: 806-030LSCF **Fabricated Fittings** **Elbow**

Desc: 3 CPVC LG SWP 90 EL SOC SCH80 FAB

MSRP: 310.24 **Part Code:** 097

Weight(lbs): 2.463 **Weight(kg):** 1.117 **Weight(gm):** 1117

Size: 3" **Color:** GRAY **Material:** CPVC



Schedule	SCH 80
Angle	90 Degree
Connection	Long Sweep
Type	Standard

G = 7 **H** = 9 **M** = 4- 1/8

Fabricated Dimension References:

G = (LAYING LENGTH) intersection of center lines to bottom of socket/thread; 90° elbows, tees, crosses; ± 1/4 & larger ± 1/2 inch.

H = Intersection of center lines to face of fitting; 90° elbows, tees, crosses; ± 1/4 inch.; wyes ± 1/2 inch; 14" & larger inch.

J = Intersection of center lines to bottom of socket/thread; 45° elbows; ± 1/4 inch; 14" & larger ± 1/2 inch.

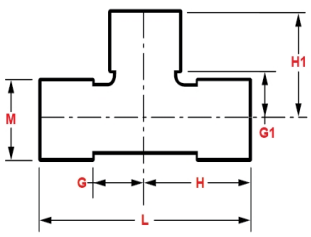
L = Overall length of fittings; ± 1/2 inch; wyes ± 1 inch; 14" & larger ± 1 inch.

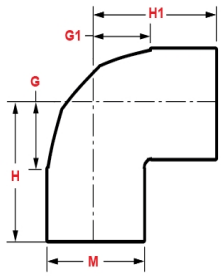
M = Outside diameter of socket/thread hub; ± 1/4 inch.

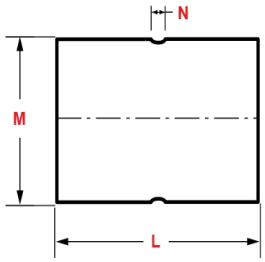
N = Socket bottom to socket bottom; couplings; ± 1/2 inch.

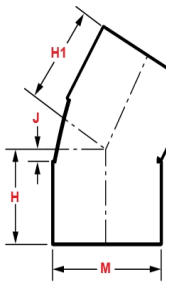
W = Height of cap; ± 1/4 inch.

Typical Fabricated Dimension References









Spears® Technical Information

05-Jan-24 11:02:54 AM

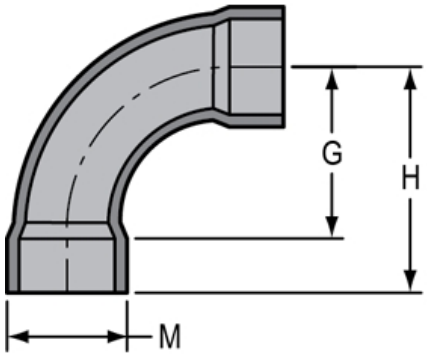
Part No: 806-040LSCF **Fabricated Fittings** **Elbow**

Desc: 4 CPVC LONG SWEP 90 EL SOC S80FAB

MSRP: 383.76 **Part Code:** 097

Weight(lbs): 4.855 **Weight(kg):** 2.202 **Weight(gm):** 2202

Size: 4" **Color:** GRAY **Material:** CPVC



Schedule	SCH 80
Angle	90 Degree
Connection	Long Sweep
Type	Standard

G = 9 **H** = 11- 1/4 **M** = 5- 3/16

Fabricated Dimension References:

G = (LAYING LENGTH) intersection of center lines to bottom of socket/thread; 90° elbows, tees, crosses; ± 1/4 & larger ± 1/2 inch.

H = Intersection of center lines to face of fitting; 90° elbows, tees, crosses; ± 1/4 inch.; wyes ± 1/2 inch; 14" & larger inch.

J = Intersection of center lines to bottom of socket/thread; 45° elbows; ± 1/4 inch; 14" & larger ± 1/2 inch.

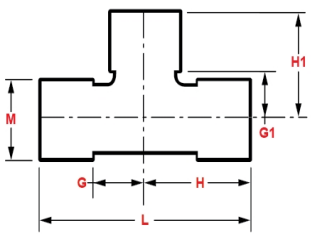
L = Overall length of fittings; ± 1/2 inch; wyes ± 1 inch; 14" & larger ± 1 inch.

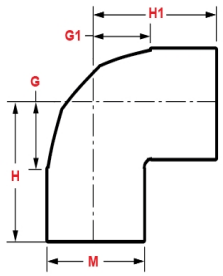
M = Outside diameter of socket/thread hub; ± 1/4 inch.

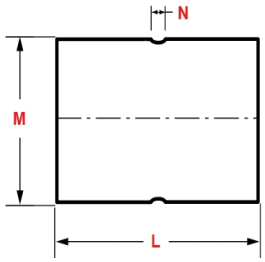
N = Socket bottom to socket bottom; couplings; ± 1/2 inch.

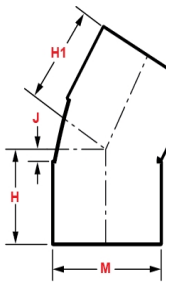
W = Height of cap; ± 1/4 inch.

Typical Fabricated Dimension References









COMBINATION AIR RELEASE / DEGASSING VALVE

SERIES CARD PROVIDES THREE DIFFERENT VENTING FUNCTIONS

US PATENT #10683946

FEATURES/BENEFITS:

- **Combination of features within one valve enclosure:** Each valve consists of three functional valves...
  1. Air Release Valve, which releases air during system start up.
  2. Degassing Valve, which provides continuous degassing.
  3. Vacuum Relief Valve, which prevents pipeline vacuum in case of leaks or siphon.
- **Cost Efficient:** When three types of venting valves are needed, this valve will serve the function of all three.
- **Safety:** Allows safe expulsion of unwanted air in piping system.
- **Dependability:** The self-guided, high buoyancy float, in combination with the elastomeric sealed poppet assures leak tight sealing with minimal emission of process fluid.
- **Superior Design:** Simplicity of design assures reliability. The poppet seals more reliably than a ball type seal, which deforms under load.
- **Minimum Closing Pressure:** The high buoyancy float causes the valve to close tight at 0 PSI after expelling all air. Liquid will not escape. If air enters the system the valve will expel that air without allowing liquid to escape, even if the system is still under operating pressure.
- **Corrosion Resistant:** Top quality thermoplastics and elastomers resist chemical attack, and protect system purity. There are NO metal parts in the valve.

DESCRIPTION:

The CARD valve series is available in 1”, 2”, and 4” series (CARD100, CARD200, and CARD400 respectively). The valves are available in Geon PVC or Corzan CPVC plastic, and with Viton or EPDM seal materials. The valves are Normally Open (NO) when there is no pressure or liquid in the piping system. Process connections are NPT or socket. Vent side connection is NPT. For other material or connection requirements, please consult factory.

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HOW IT WORKS:

Series CARD provides three functions. First, when a pipeline is being filled with liquid, the valve allows the air to escape through its large orifice at the same rate as the liquid is filling the pipes. This is the AIR RELEASE VALVE function. The valves are designed to be used at the industry standard pipe filling rate of approximately 1 ft. /sec (reference American Water Works Association AWWA manual M51). When the pipeline is filled, liquid will enter the valve and the high buoyancy float will rise causing the elastomeric sealed poppet to rise and shut off the large valve orifice. The high buoyancy float causes the poppet to have a large sealing force holding the large orifice tightly closed, regardless of system pressure, as long as it is higher than atmospheric pressure.

If air enters the pipeline through leaks or other means, air will enter the valve, the valve float will drop and open a small orifice that will allow the air to escape. Note that the large orifice will remain closed as long as the pressure in the pipeline remains above atmospheric. When the air has escaped, liquid will enter the valve causing the float to rise and shut the small orifice tight. This is the DEGASSING VALVE function. This mode is made possible by a combination of a lever and engineered force balanced float that allows the small degassing orifice to open even though the piping system is still under pressure. The large orifice remains closed as long as the pipeline pressure is above atmospheric.

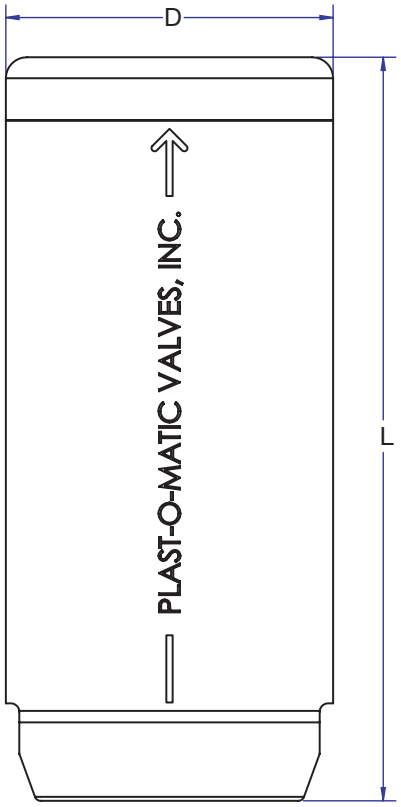
If there is a break in the pipeline causing sudden loss of liquid, vacuum could form in the pipeline which could cause pipe collapse or unwanted siphon. In this event the body of the CARD valve will empty of liquid, the float will drop allowing the large orifice to open, which in turn allows atmospheric air into the pipeline, preventing vacuum from forming. This is the VACUUM RELIEF VALVE mode.

Important: Please note that because Series CARD is a normally-open valve, it should not be used in applications requiring a normally-closed vacuum breaker.

Note that the high buoyancy float will operate in fluids with a minimum specific gravity of 0.9. The float is guided within the valve body by low friction ribs that prevent it from jamming within the valve.

Installation Notes

There are many different locations within a pipeline where air valves are needed. The American Water Works Association (AWWA) manual M51 is an excellent reference source. In general, Series CARD should be installed at the highest possible point in a piping system or vessel, and it **must** be oriented upright, with the outlet vent on top. In most cases, residual liquid and/or vapor in the valve may be expelled from the outlet port just prior to valve shut-off. Therefore, it is recommended to pipe the outlet port to a safe area for hazardous liquids, or use a standpipe for non-hazardous liquids. There is an NPT thread on top of the valve in case that fluid needs to be contained or safely routed away.



MODEL	PIPE SIZE	D IN.	D MM.	L IN.	L MM.	MAX. FLOW IN LINE SCFM
CARD100VT-PV	1"	3.63	92.2	8.62	218.9	5
CARD200VT-PV	2"	4.87	123.7	11.06	280.9	19
CARD400VT-PV	4"	7.87	199.9	17.00	431.8	100

- Standard connections are threaded. For socket connection, change “T” to “S” for example CARD100VS-PV.
- Part numbers shown are PVC bodies with Viton seals. For Corzan CPVC body, use suffix “-CP” for example CARD100VT-CP. For EPDM seals change “V” to “EP” for example CARD100EPT-PV.

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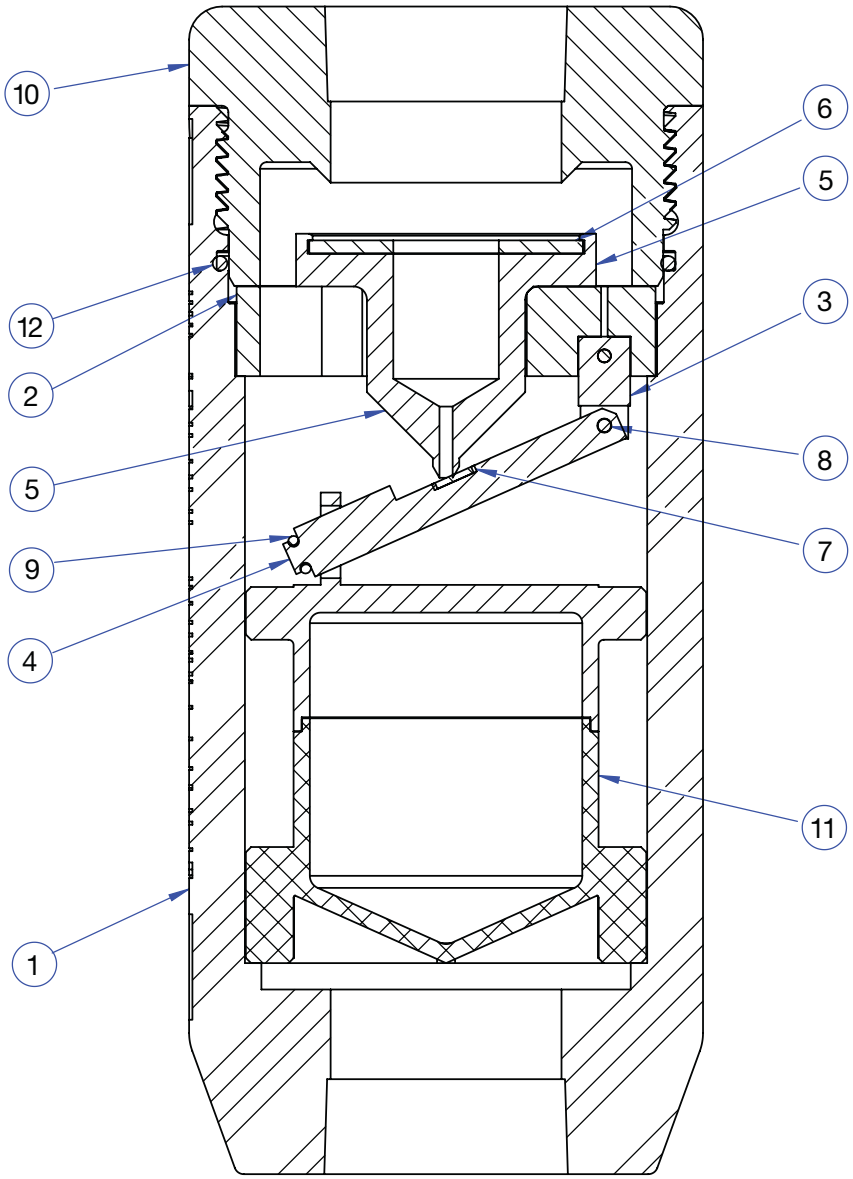
PARTS DRAWING



TEM NO.	DESCRIPTION	QTY.
1	THREADED BODY	1
2	MAIN SEAT HOLDER	1
3	PIN	1
4	LEVER	1
5	POPPET	1
6	LARGE SEAT DISK	1
7	SMALL SEAT DISK	1
8	HINGE PIN	2
9	O-RING	1
10	CAP	1
11	FLOAT ASSY	1
12	0-RING	1

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SERIES CARD SIZING CHART FOR PIPELINE FILLING

These charts show the maximum fill rate for various pipe sizes, with a fill rate not exceeding a velocity of 1 ft/sec.

CARD100

The CARD100 will flow up to 5 SCFM air.

SCHD 80 PIPE SIZE	MAX. FILL RATE GPM	SCFM AIR FLOW RATE
1"	2.1	0.3
1.5"	5.3	0.7
2"	9.0	1.2
2.5"	12.8	1.7
3"	20.1	2.7
4"	35.1	4.7

CARD200

The CARD200 will flow up to 19 SCFM air.

SCHD 80 PIPE SIZE	FILL RATE GPM	SCFM AIR FLOW RATE
2"	9.0	1.2
2.5"	12.8	1.7
3"	20.1	2.7
4"	35.1	4.7
5"	55.6	7.4
6"	79.8	10.7
8"	140.1	18.7

CARD400

The CARD400 will flow up to 100 SCFM air

SCHD 80 PIPE SIZE	FILL RATE GPM	SCFM AIR FLOW RATE
4"	35.1	4.7
5"	55.6	7.4
6"	79.8	10.7
8"	140.1	18.7
10"	220.5	29.5
12"	312.2	41.7
14"	376.9	50.4
16"	494.5	66.1
18"	627.6	83.9

AIR CAPACITY TABLE FOR DEGASSING (AIR RELEASE FUNCTION PER AWWA) SERIES CARD

INLET PRESSURE PSIG	CARD100	CARD200	CARD400
10	0.4	0.6	1.6
15	1.2	1.8	4.7
20	1.4	2.1	5.5
25	1.6	2.4	6.3
30	1.8	2.8	7.1
35	2.0	3.1	7.9
40	2.2	3.4	8.7
45	2.4	3.7	9.4
50	2.6	4.0	10.2
55	2.8	4.3	11.0
60	3.0	4.6	11.8
65	3.2	4.9	12.6
70	3.4	5.2	13.4
75	3.6	5.5	14.2
80	3.8	5.8	15.0
85	4.0	6.1	15.8
90	4.2	6.5	16.6
95	4.4	6.8	17.4
100	4.6	7.1	18.2
110	5.0	7.7	19.7
120	5.4	8.3	21.3
130	5.8	8.9	22.9
140	6.2	9.5	24.5
150	6.6	10.2	26.1

Instructions: The table above shows the air flow rate in SCFM through the CARD valve. This is air released while the pipeline is operating under normal flowing conditions, pressurized.
Select your inlet pressure for the valve. Go to the column for your valve (e.g. CARD200). The flow in SCFM is given at the appropriate pressure for your valve. For example; with a CARD200 valve operating at 50 PSIG, the valve can vent up to 4.0 SCFM.

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