



**Kenvirons, Inc.**

452 Versailles Road • Frankfort, KY 40601 • Phone: (502) 695-4357 • Fax: (502) 695-4363

*Civil & Environmental Engineering and Laboratory Services*

March 21, 2017

Dr. Talina R. Mathews, Executive Director  
Kentucky Public Service Commission  
211 Sower Blvd.  
P.O. Box 615  
Frankfort, Kentucky 40602-0615

**RECEIVED**

**MAR 21 2017**

**PUBLIC SERVICE  
COMMISSION**

RE: Blackhawk Road Water Line Extension  
Whitley County Water District  
Williamsburg, KY

Dear Dr. Mathews:

Case No. 2017-00142

Attached you will find the plans and hydraulic calculations for the above referenced proposed water line extension. As you will see the proposed line size is 2-inch for a distance of approximately 475 feet, which exceeds the Commission's limit of 200 feet. Therefore, we are requesting a variance per 807 KAR 51066 Water Section 10(2)(a) minimum pipe size.

1. Whitley County Water District is proposing to use the 2-inch distribution line instead of a larger line for the following reasons:
  - A. The District does not envision there ever being more than three (3) users on the line and the operating pressure is more than adequate to serve their peak demand.
  - B. There initially may only be one user on the line and the smaller line will provide fresher water.
  - C. The cost is being minimized as 2-inch line is slightly cheaper than 3-inch.

Plans and specifications are also being submitted this date to the Kentucky Division of Water for approval. Should you have any questions please call or e-mail me at [KTaylor@Kenvirons.com](mailto:KTaylor@Kenvirons.com).

Sincerely,

Kenneth D. Taylor, P.E.  
Vice President

Attachments

C: WCWD

# WHITLEY COUNTY WATER DISTRICT

19 S HWY 25W  
WILLIAMSBURG, KY 40769  
606-549-3600  
606-549-5795 (FAX)

February 23, 2017

Water Infrastructure Branch  
KY Division of Water  
300 Sower Blvd  
Frankfort, KY 40601

RE: Whitley County Water District  
Blackhawk Road and Clyde Strunk Road Water Line Extensions  
Whitley County, Kentucky

Dear Sirs:

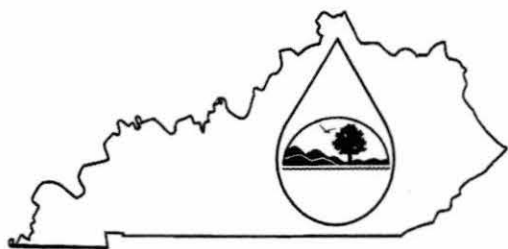
Attached for your review and approval are two sets of plans, Construction Application for Drinking Water Distribution, and a CD containing plans, specifications, and hydraulics for the above referenced project. The documents were prepared by Kenvirons, Inc. and have been reviewed by the Water District. The Water District concurs with their content, will own and operate the facilities once constructed and has the water available to service the project.

If you should have any questions or need additional information, please contact our engineer, Ken Taylor, PE, with Kenvirons, Inc. at 502-695-4357.

Sincerely,

A handwritten signature in black ink, appearing to read "Albert Mahan", written in a cursive style.

Albert Mahan  
Field Superintendent



**Commonwealth of Kentucky**  
Energy and Environment Cabinet  
**Division of Water**

**Construction Application  
For Drinking Water Distribution**

See the instructions for more information about selected portions of this application.

Questions on completing this application? Contact the Water Infrastructure Branch at 502/564-3410, by e-mail at [WIBEngineering@kv.gov](mailto:WIBEngineering@kv.gov) or visit our website at <http://water.kv.gov> for more information.

## I. Construction Project Information

Project Name: Blackhawk Road and Clyde Strunk Road Water Line Extensions

Project County: Whitley Estimated Project Cost: \$ \$20,000

Project Latitude/Longitude (DMS): 36° 47' 58" 84° 07' 33" (Blackhawk Road)

Is this a federally funded project: NO

☐ DWSRF

☐ SPAP

☐ Other: \_\_\_\_\_

If yes, has an Environmental Information Document been reviewed and approved? n/a

If the project has been submitted to the State Clearinghouse for review, provide the SAI number: n/a

Identify all other funding sources: local

Does the project contain any of the following:

☐ Booster Pump Stations

☐ Water Storage Tanks

☒ Waterlines

Waterline Material	Waterline Size	Linear Feet
pvc	3"	900
pvc	2"	475

Provide a DETAILED description of work to be performed for this project. Attach additional sheets as necessary:

These extensions will make water service available to two residences on Blackhawk Road and three on Clyde Strunk Road which currently do not have access to public water.

Identify how the sanitary wastewater produced as a result of this project will be handled:

☐ Sanitary Sewer

WWTP: \_\_\_\_\_

☒ Septic Tank

☐ Other: \_\_\_\_\_

## II. Utility Information

Utility Name: Whitley County Water District PWSID: KY1180468

Street Address: 19 S. Highway 25W County: Whitley

City, State, Zip: Williamsburg, KY 40769

Phone #: 606-549-3600 Fax #: 606-549-5795 Email: sandysmith.wc wd@yahoo.com

If another utility will serve any portion of the proposed project, provide the name and PWSID No.

Utility Name: \_\_\_\_\_ PWSID No. \_\_\_\_\_

If the utility serving the project purchases water from another utility, provide the name and PWSID No. and purchase contract amount.

Utility Name: Williamsburg PWSID No. KY1180471 Purchase Contract Amount: 5.5 MGMo

Utility Name: Jellico, TN PWSID No. TN0000330 Purchase Contract Amount: 2.7 MGMo

Utility Name: Corbin City Utilities PWSID No. KY1180085 Purchase Contract Amount: 4.5 MGMo

Is the system currently under any type of waterline or sewer sanctions? No

☐ If yes, submit an exception request and attach supporting documentation to justify its approval.

## III. Design Considerations

### A. Plans and Specifications

Plans and specifications shall comply with **401 KAR 8:100** and "**Recommended Standards for Water Works**" 2007 Edition (Ten States' Standards). All plans must contain a P.E. seal, signature and date of signature with at least one set having an original seal and signature. Provide detailed plans (**no larger than 24" X 36"**) which must comply with **401 KAR 8:100**. See the instructions for additional details.

### B. Design Engineer

Name: Ken Taylor, PE Firm: Kenvirons, Inc.

Street Address: 452 Versailles Road

City, State, Zip: Frankfort, KY 40601

Phone #: 502-695-4357 Fax #: 502-695-4363 Email: ktaylor@kenvirons.com

### Design Capacities

Identify the number of new connections and the projected average daily demand: 0 new services

Identify the number of existing residents, and their projected water demand, that may be served as a result of this project:  
0 new services

Identify the number of connections in the service area: approximately 4,020

#### Other Information to be Submitted with the Project

- ☒ 1. Provide a copy of the U.S.G.S. 7 ½ minute topographic map or a detailed vicinity map with the location(s) of the proposed project.
- ☐ 2. If the project includes a new or upgraded pump station(s), provide the pump sizing calculations and the proposed pump's characteristics curve along with the efficiency, horsepower and NPSHR data. Also, identify each pump station's locations coordinates (DMS).
- ☐ 3. If the project proposes the addition of storage tanks, provide engineering calculations which demonstrates a complete fill and drain cycle every 72 hours. Also, identify each storage tank's location coordinates (DMS).
- ☒ 4. Provide engineering calculations or an electronic model demonstrating the availability of 30 psig in the waterline under peak demand conditions.
- ☒ 5. Provide engineering calculations or an electronic model that demonstrates if the proposed waterlines are capable of a 2.5 ft/sec flow velocity and show associated residual system pressures.
- ☒ 6. Provide a signed letter of acceptance from the utility, which states that the utility has reviewed and approved the plans and specifications and agrees to serve the proposed project upon completion. If another utility will own, operate and maintain any portion of this project provide an acceptance letter from that utility as well.
- ☐ 7. If the utility is a purchaser and the project demand is over 10,000 gallons per day or the utility has exceeded 85% of its purchase contract, provide a valid acceptance letter from the seller.
- ☐ 8. If the project will provide water service to existing residences, provide the names and addresses of all existing residences to be served by the project, if known.
- ☒ 9. If the project is funded by a State Revolving Fund Loan (SRF) provide a completed SRF Plans and Specifications Checklist along with 1 complete printed copy of the project specifications.

#### IV. Environmental Benefits

Identify the environmental benefit(s) of the project by checking all that apply.

- ☐ Construction of new waterlines serving existing residences previously without public water.
- ☒ Modifies/upgrades existing waterlines:
  - ☒ Inadequately sized waterlines.
  - ☒ Leaks, breaks, restrictive flow.
  - ☐ Replaces lead, copper or asbestos cement waterlines.
  - ☐ Other: \_\_\_\_\_
- ☐ Provides fire protection.
- ☐ Replaces tanks/pumps due to age/condition.
- ☐ Installation of high efficiency/energy saving pumps.
- ☐ Other. Provide a brief description in the space below. \_\_\_\_\_

## V. Fees

Check or money order must be made payable to "Kentucky State Treasurer" for the total amount. Fees do not apply to projects FUNDED by a municipality, water district, or other publicly owned utility.

Project Category: N/A Total Amount: \$ N/A



**LOCATION MAPS, PLAN SHEETS  
AND CONSTRUCTION DETAILS**

**Blackhawk Road and Clyde Strunk  
Road Water Line Extensions  
Whitley County, Kentucky**

**Whitley County Water District  
19 South US 25 W  
Williamsburg, Kentucky 40769**

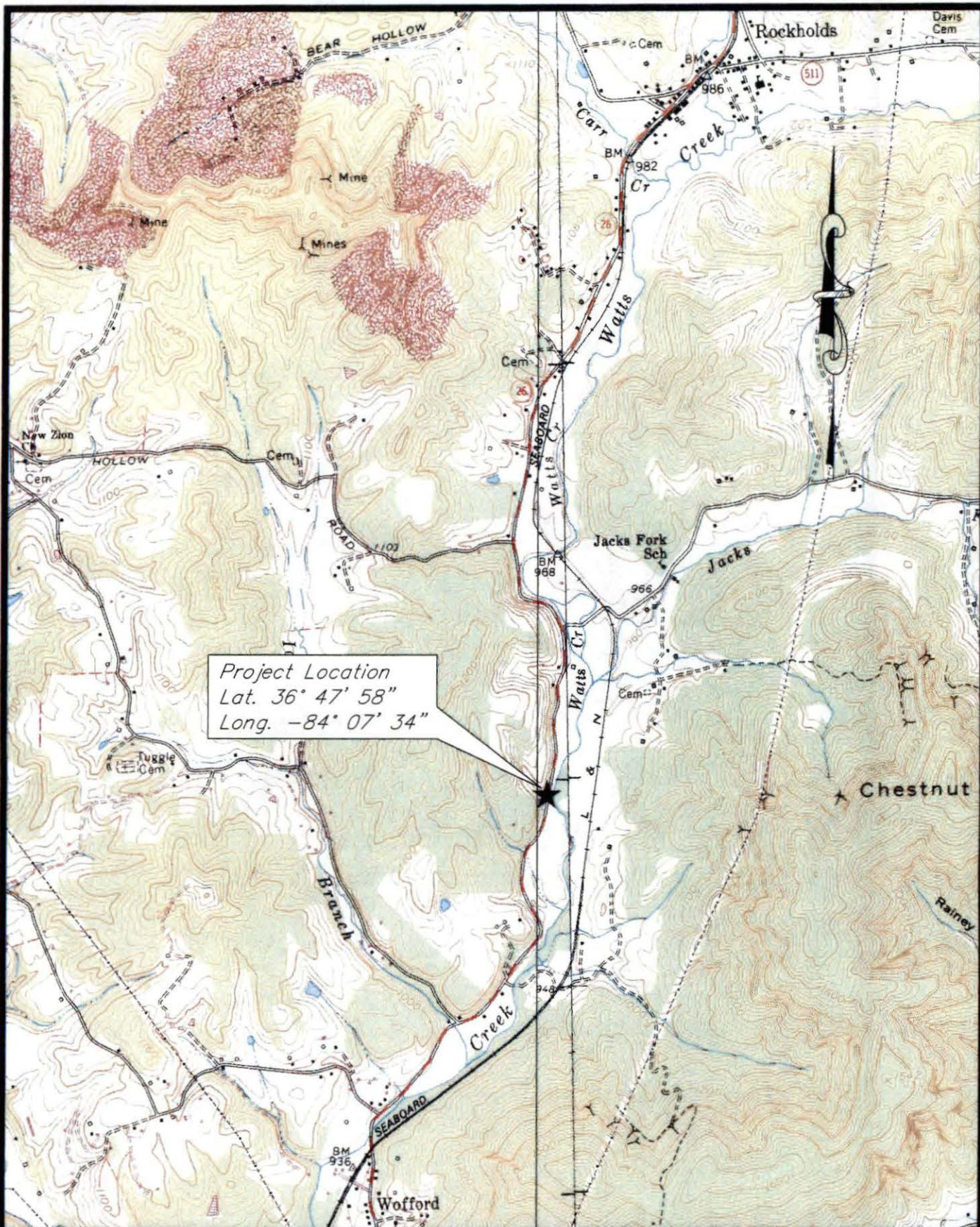
**Project No. 2017024**

**February 2017**

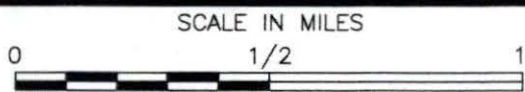




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**WOFFORD & ROCKHOLDS, KY.  
U.S.G.S. QUADRANGLES**



SCALE: 1"=2,000'

**WHITLEY COUNTY WATER DISTRICT  
BLACKHAWK ROAD W.L. EXTENSIONS  
WHITLEY COUNTY, KENTUCKY**

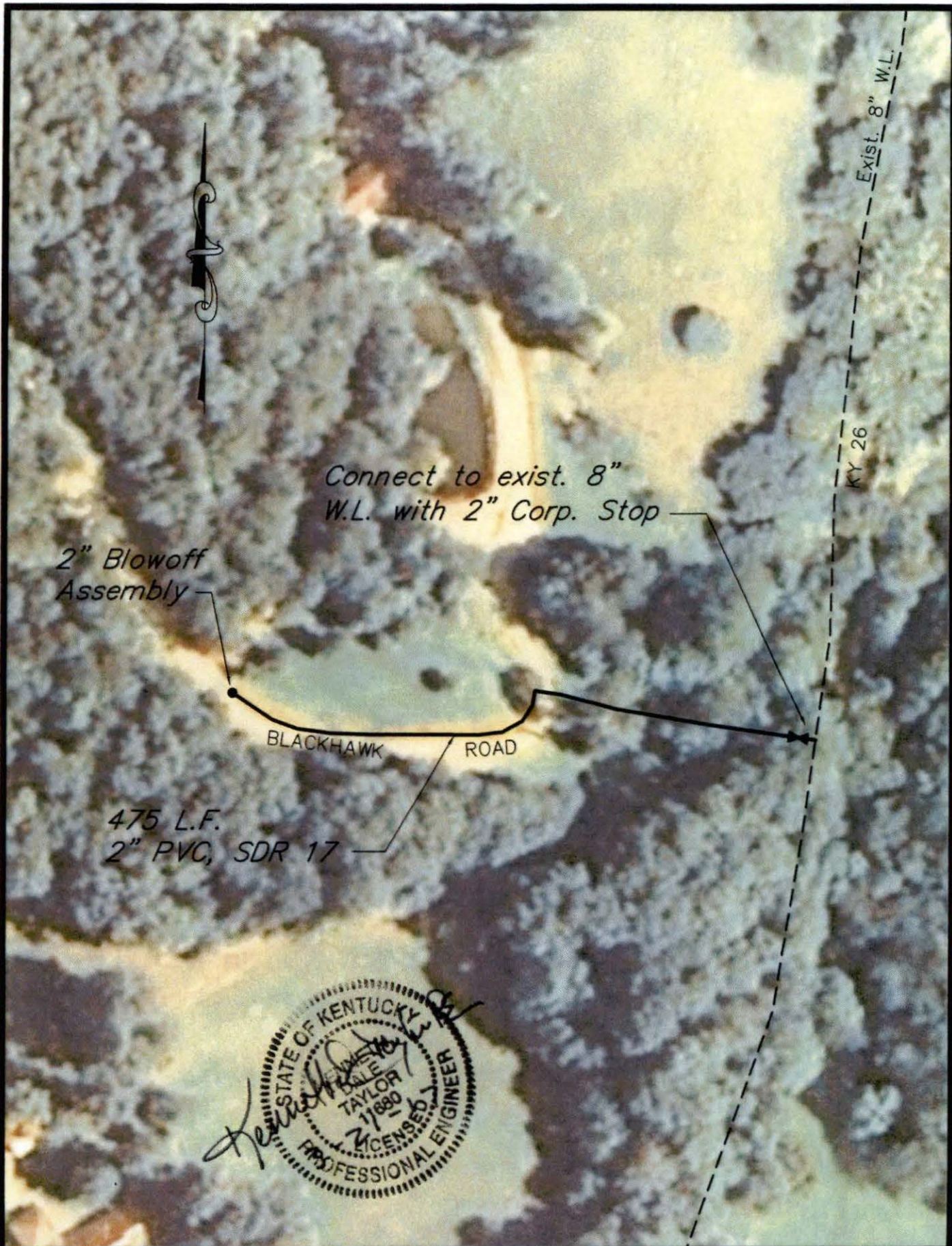


**KENVIRONS, INC.**

452 VERSAILLES ROAD, FRANKFORT, KENTUCKY  
(502) 695-4357



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KENVIRONS, INC.

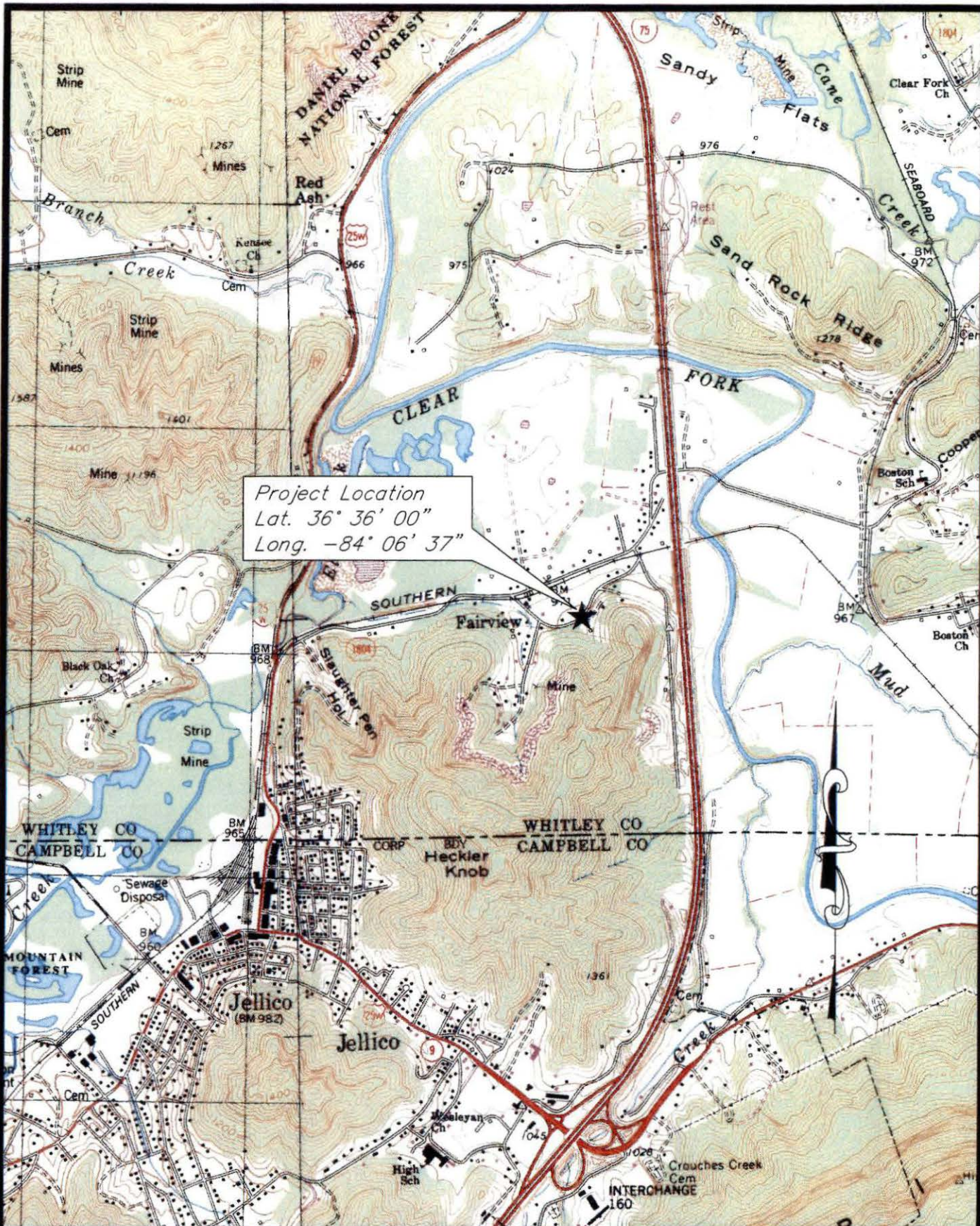
452 VERSAILLES ROAD, FRANKFORT, KENTUCKY

(502) 695-4357

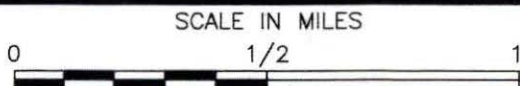
WHITLEY COUNTY WATER DISTRICT  
BLACKHAWK ROAD W.L. EXTENSION  
WHITLEY COUNTY, KENTUCKY  
SCALE: 1"=100'



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**JELICO WEST & JELICO EAST  
U.S.G.S. QUADRANGLES**



SCALE: 1"=2,000'

**WHITLEY COUNTY WATER DISTRICT  
FAIRVIEW W.L. EXTENSIONS  
WHITLEY COUNTY, KENTUCKY**



KENVIRONS, INC.

452 VERSAILLES ROAD, FRANKFORT, KENTUCKY

(502) 695-4357



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*Kenneth Dale Taylor*  
KENTUCKY  
KENNETH DALE TAYLOR  
11090  
PROFESSIONAL ENGINEER  
3-21

WHITLEY COUNTY WATER DISTRICT  
FAIRVIEW WATERLINE EXTENSIONS  
WHITLEY COUNTY, KENTUCKY

DRAWN BY: JKP  
CHECKED BY: KDT  
DATE: Feb. 2017  
SCALE: 1"=100'  
REV:

KENVIRONS, INC.  
FRANKFORT, KENTUCKY

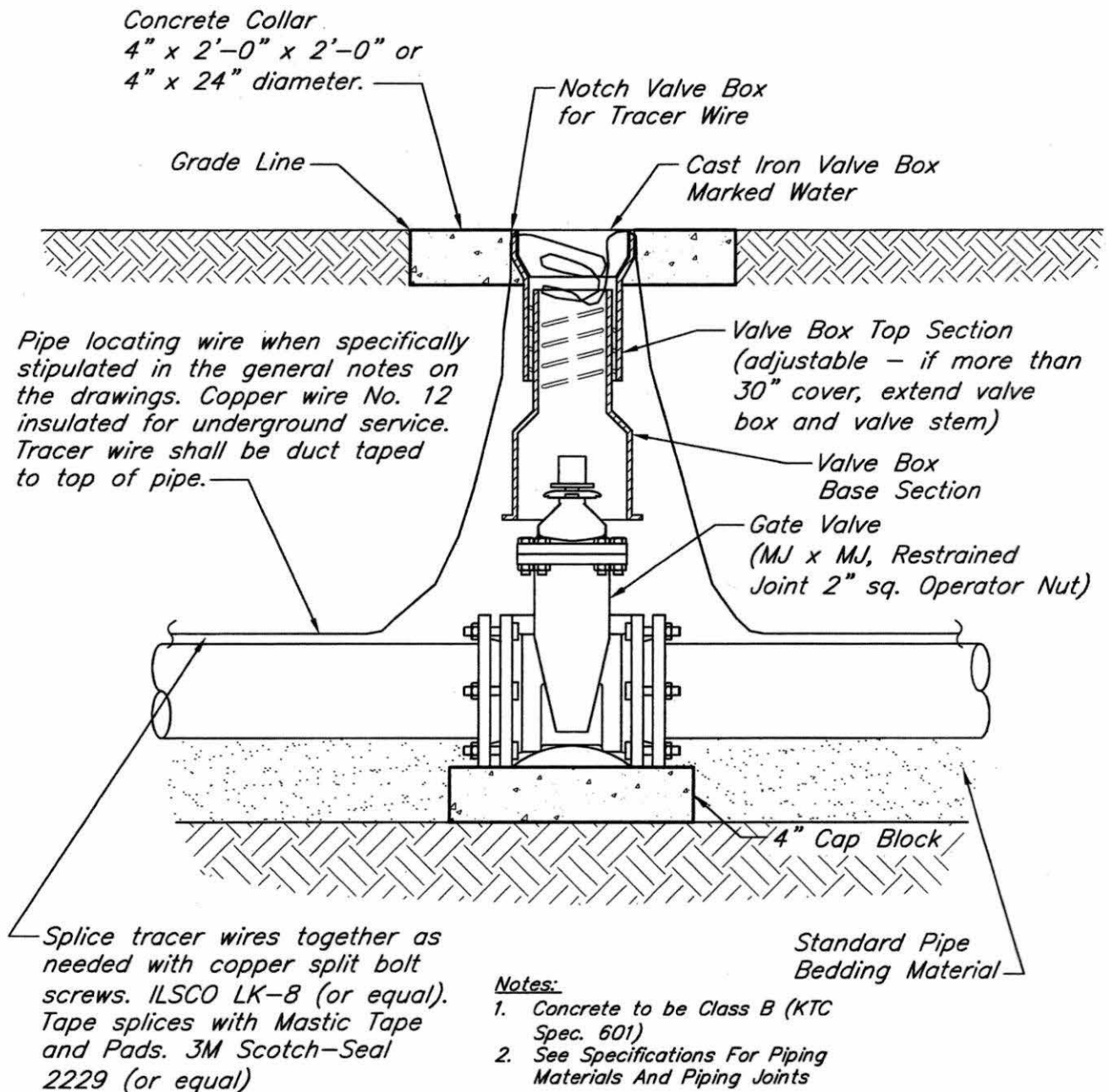


PROJECT NO.  
2015010

SHEET NO.  
1 of 1

FAIRVIEW WATERLINE EXTENSION

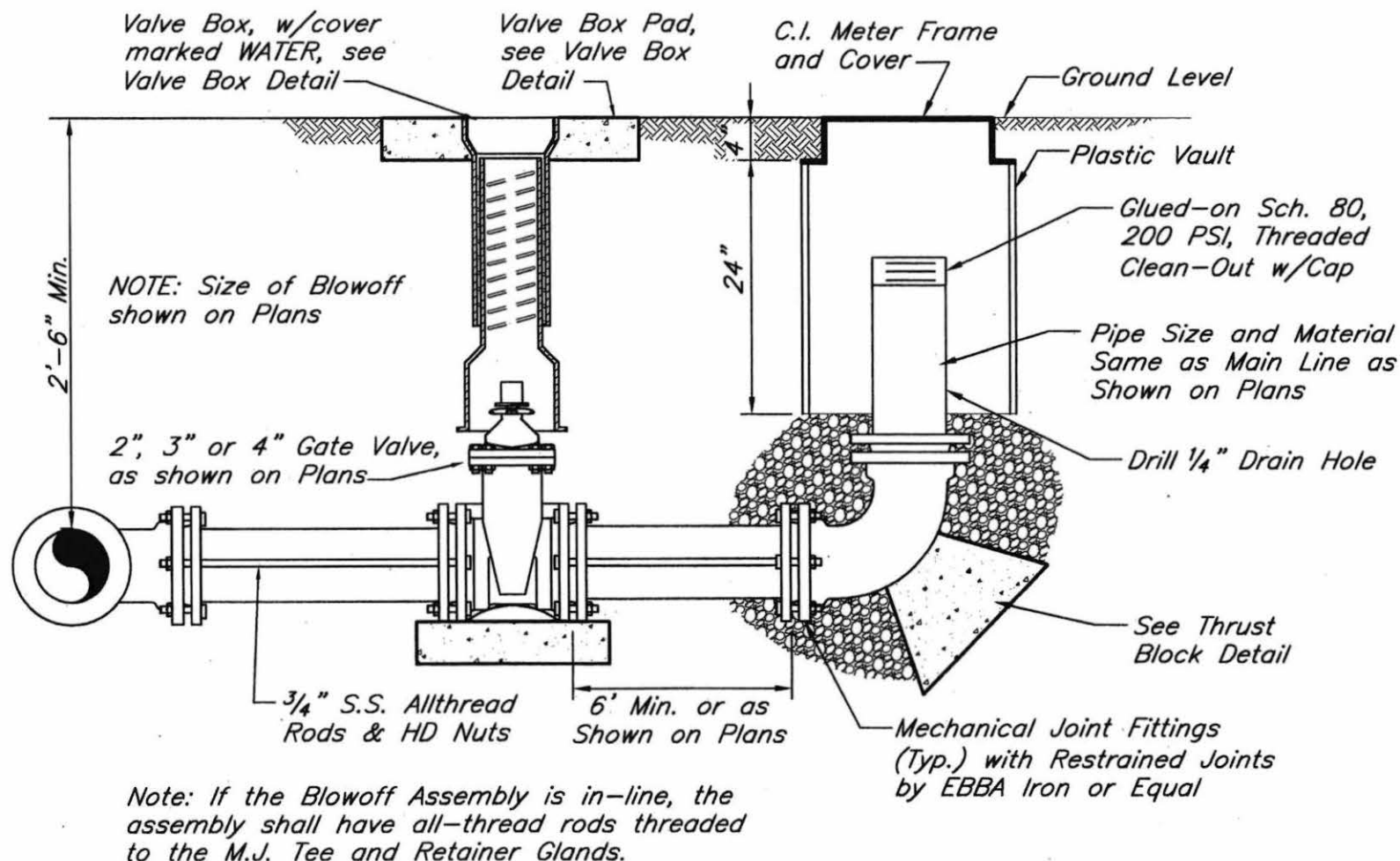




## **VALVE BOX INSTALLATION**

July 2015

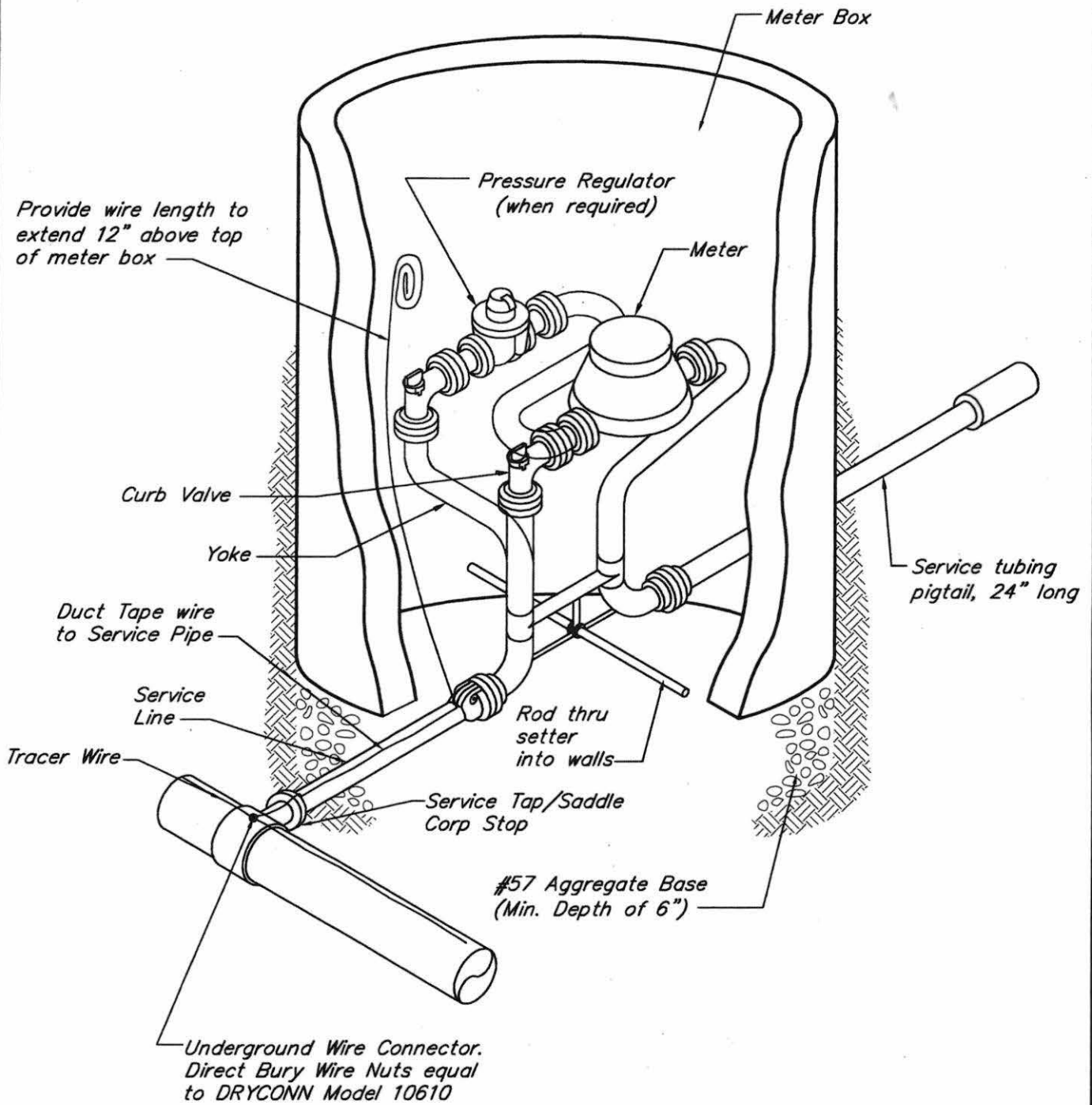
Scale: 1"=1'-0"



## **BLOWOFF ASSEMBLY DETAIL**

Feb. 2015

Scale: 3/4" = 1'-0"



#### NOTES

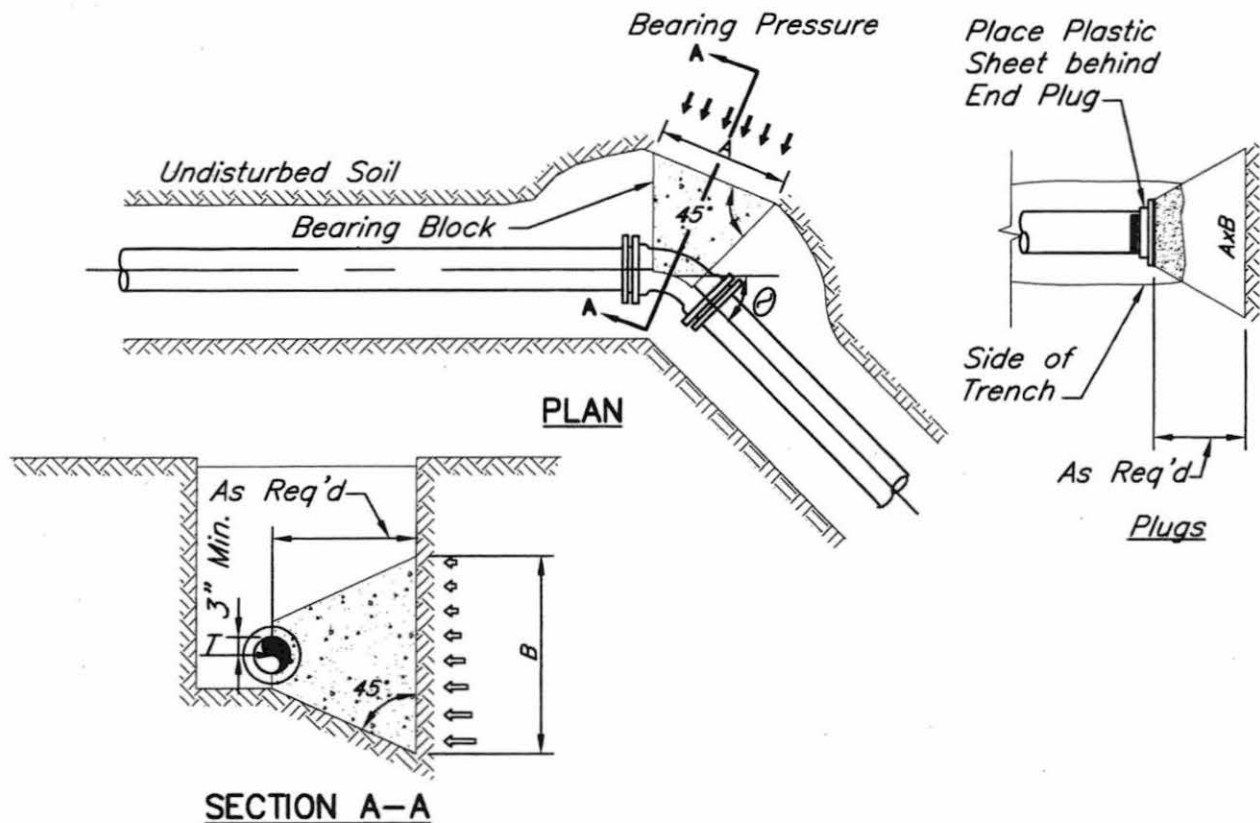
1. This drawing typical for meters 1" and smaller (w/std. press reg.)
2. Meter setting shall be placed inside property line as directed by the Engineer.
3. Tracer Wire not required on Meter Settings less than 10 feet from water main.
4. Service tubing pigtail to be incidental to Meter Setting.

## METER SETTING

Mar., 2011

N.T.S.





**NOTES:**

1. Thrust restraint table is based on pipeline pressure of 200 psi and earthbearing capacity of 1500 psf. During construction, the specific soil type may be evaluated and concrete thrust block size revised at the discretion of the Engineer.
2. On large diameter pipes where space limitations or construction difficulties render concrete thrust blocks not feasible or impractical, a joint restraint system may be used. This restrained joint system must be approved by the Engineer.
3. Concrete shall be 3000 psi minimum conforming to KTC Specifications 601.
4. Accessibility to fittings and bolts must be maintained.
5. Wrap fittings in plastic prior to placing concrete.

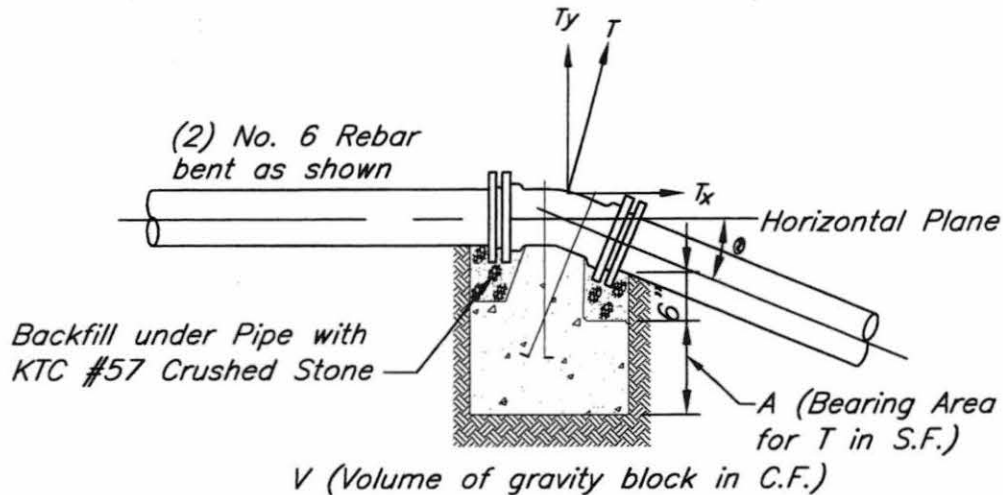
**HORIZONTAL THRUST BLOCK SCHEDULE**

PIPE SIZE (INCHES)	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		TEE, DEAD END	
	A	B	A	B	A	B	A	B	A	B
3 & 4	3'-3"	1'-8"	2'-4"	1'-2"	1'-8"	1'-0"	1'-0"	1'-0"	2'-8"	1'-4"
6	4'-8"	2'-4"	3'-5"	1'-8"	2'-6"	1'-3"	1'-6"	1'-0"	3'-10"	2'-0"
8	6'-0"	3'-0"	4'-5"	2'-3"	3'-2"	1'-7"	2'-3"	1'-2"	5'-0"	2'-6"
10	7'-6"	3'-9"	5'-5"	2'-9"	3'-10"	2'-0"	2'-9"	1'-5"	6'-3"	3'-2"
12	8'-10"	4'-5"	6'-6"	3'-3"	4'-8"	2'-4"	3'-4"	1'-8"	7'-5"	3'-9"
14	10'-3"	5'-2"	7'-6"	3'-9"	5'-4"	2'-8"	3'-10"	2'-0"	8'-8"	4'-4"
16	11'-8"	5'-10"	8'-7"	4'-4"	6'-1"	3'-0"	4'-4"	2'-2"	9'-9"	4'-11"
18	13'-0"	6'-6"	9'-7"	4'-9"	6'-10"	3'-5"	4'-10"	2'-5"	11'-0"	5'-6"
20	14'-5"	7'-3"	10'-7"	5'-4"	7'-7"	3'-9"	5'-4"	2'-8"	12'-2"	6'-1"
24	17'-3"	8'-8"	12'-8"	6'-4"	9'-0"	4'-6"	6'-5"	3'-3"	14'-6"	7'-3"

**HORIZONTAL THRUST BLOCK**

July, 2015

Scale: 3/8" = 1'-0"



### GRAVITY THRUST BLOCK

#### NOTES:

1. Thrust restraint table is based on pipeline pressure of 200 psi and earth bearing capacity of 1500psf. During construction, the specific soil type may be evaluated and concrete thrust block size revised at the discretion of the Engineer.
2. On large diameter pipes where space limitations or construction difficulties render concrete thrust blocks not feasible or impractical, a joint restraint system may be used. This restrained joint system must be approved by the Engineer.
3. Concrete shall be 3000 psi minimum conforming to KTC Specifications 601.
4. Accessibility to fittings and bolts must be maintained.
5. Wrap fittings in plastic prior to placing concrete.

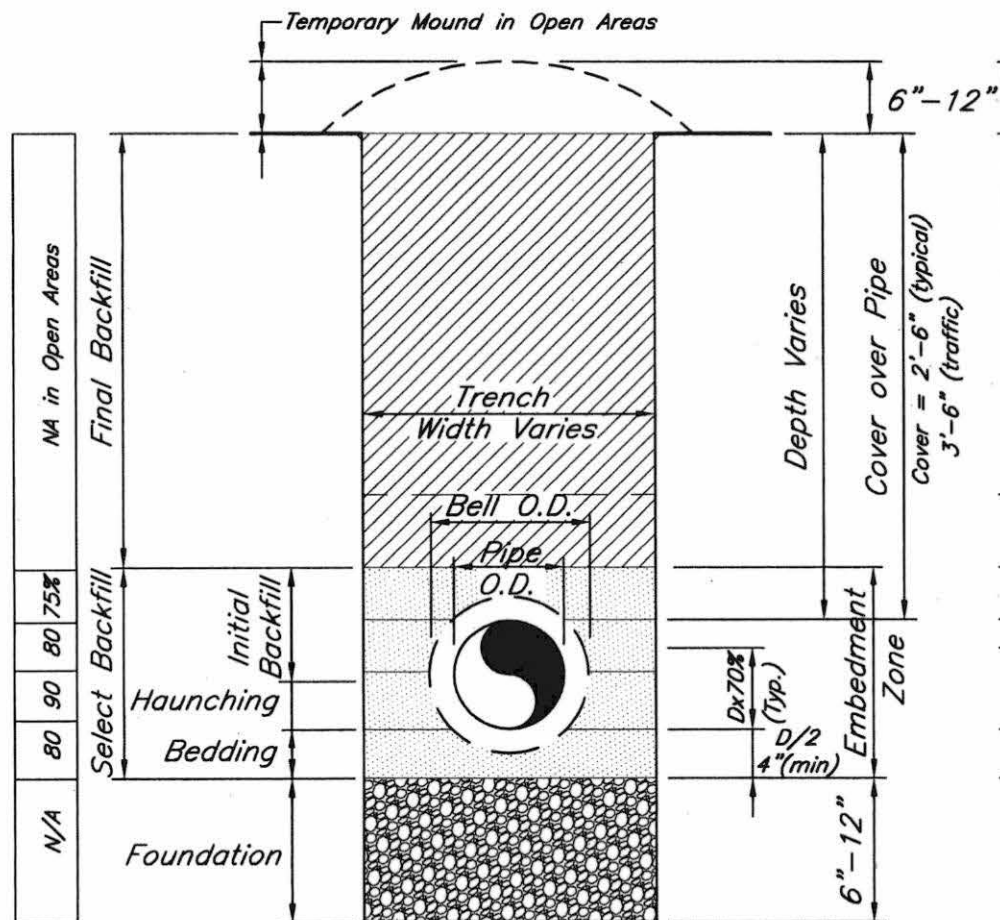
#### VERTICAL THRUST BLOCK SCHEDULE

PIPE SIZE (INCHES)	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND	
	V	A	V	A	V	A	V	A
3 & 4	29	2	20	1	11	1	6	1
6	64	5	46	2	25	1	13	1
8	114	8	81	4	43	1	23	1
10	174	12	123	5	66	2	35	1
12	248	17	176	8	95	2	50	1
14	337	23	238	10	128	3	67	1
16	439	29	311	13	167	4	88	1
18	555	37	393	16	211	5	111	1
20	685	46	484	20	260	6	137	2
24	985	66	696	29	374	8	197	2

### VERTICAL THRUST BLOCK

July, 2015

Scale: 1/2" = 1'-0"



Typically, open areas are final graded, dressed and seeded following two soaking rains...excluding KYTC road ROW's

Unless otherwise specified, material excavated from trench may be used for final backfill provided it is relatively free of large rock (>8"), or mixed with sufficient dirt to minimize voids and settlement, and free of other unsuitable materials... as approved by the Engineer

The Engineer may require selective placement of an extra buffer layer for extremely rocky backfill to prevent migration

Select backfill, lightly compacted (bucket shaping) using suitable on-site material, or dumped sand.

Sand or very select material, hand tamped

Haunching to be carefully placed - Sand or sandy/clay soil. No. 9's may be required if weak foundation is encountered

Bedding to be sand or approved equivalent, (except No. 57's may be required if weak foundation encountered) hand placed and smoothed to uniform grade for support of pipe

In soft, wet, muddy or otherwise yielding foundation conditions, undercutting and replacement with No. 2 Stone and/or Class II channel lining, or equivalent, will be required. Objective is to provide a trench bottom free of large stones, clods, frozen material, etc. which is unyielding.

**NOTES:** No rocks larger than 1-1/2" allowed in embedment zone.

Typical desired densities in open areas are depicted above in the boxes to the left of the figure. In other laying situations, more stringent selection, placement and compaction will be required.

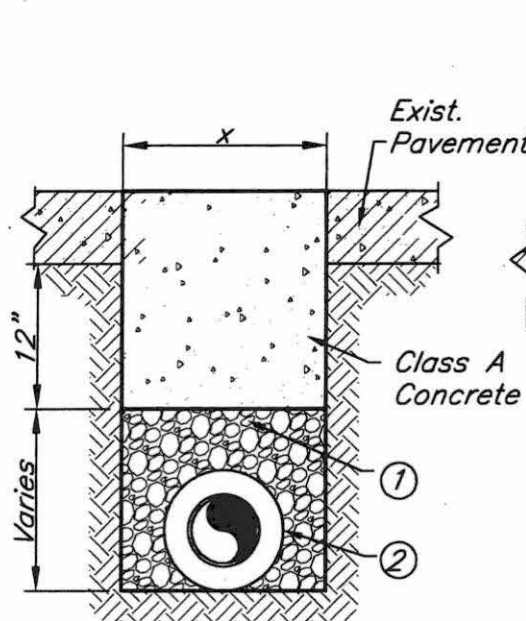
Trench width should be no wider than necessary for adequate work room and to assure safe working conditions. Nominal outside diameter (O.D.) pipe plus 6" on each side is typically considered minimal.

## TRENCH BACKFILL OPEN AREAS - PLASTIC PIPE

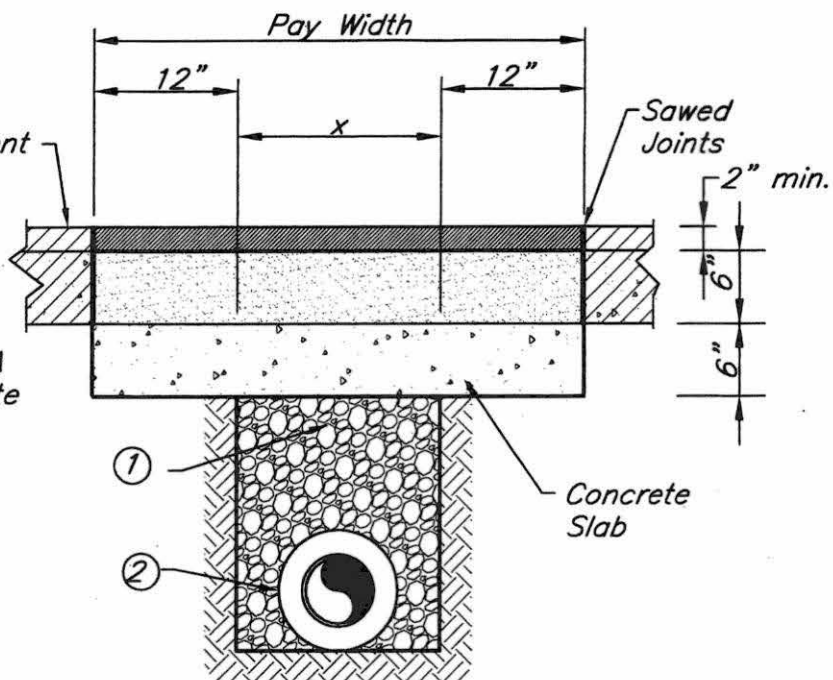
Oct. 2016

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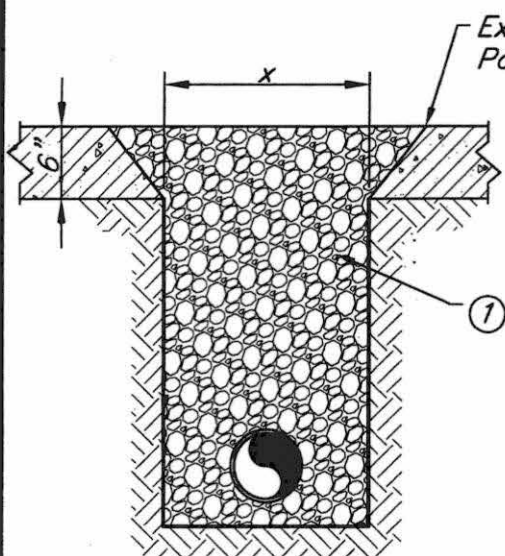




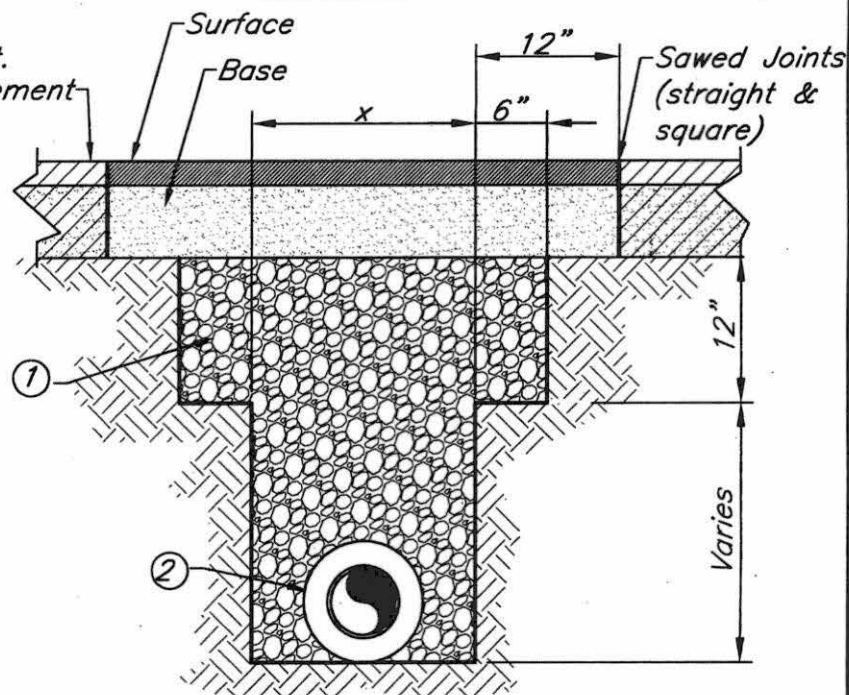
**CONCRETE PAVEMENT**



**HEAVY DUTY BITUMINOUS SURFACE**



**CRUSHED STONE SURFACE**



**LIGHT DUTY BITUMINOUS**

**NOTES:**

1. The max. allowable distance for dimension "X" shall be calculated as follows:  $X = 24" + \text{Pipe Dia.}$
2. Concrete slab under Bituminous surface to extend 12-inches on each side to trench
3. Replace Concrete or Bit. Pavement with new pavement same thickness as existing pavement.
4. Casing Pipe is not required under private driveways.

① Mechanically tamped #57 crushed stone aggregate in layers not to exceed 6".

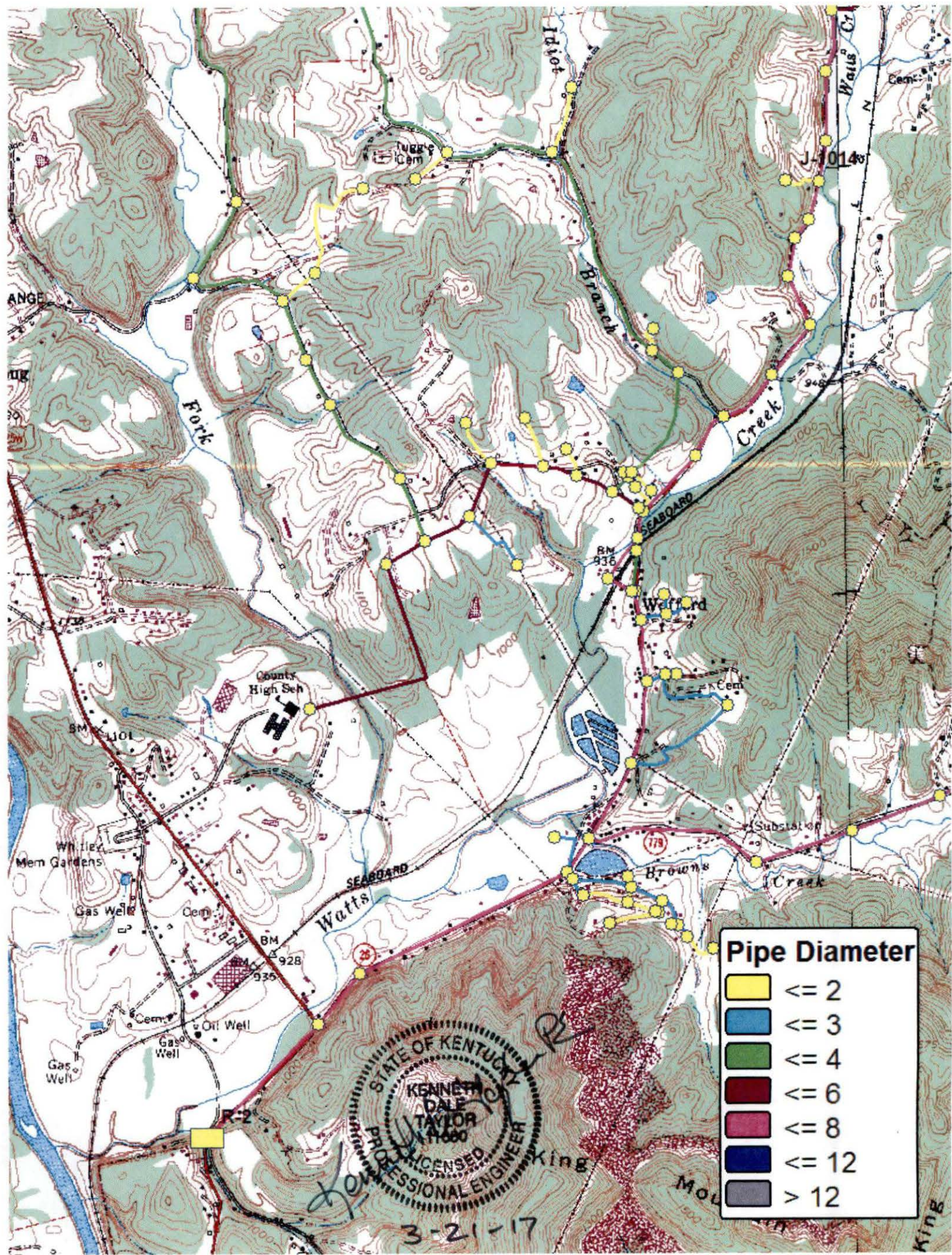
② Casing pipe to be 4" in diameter greater than the greatest dimension of the carrier pipe.

**PAVEMENT REPLACEMENT**

Mar., 2011

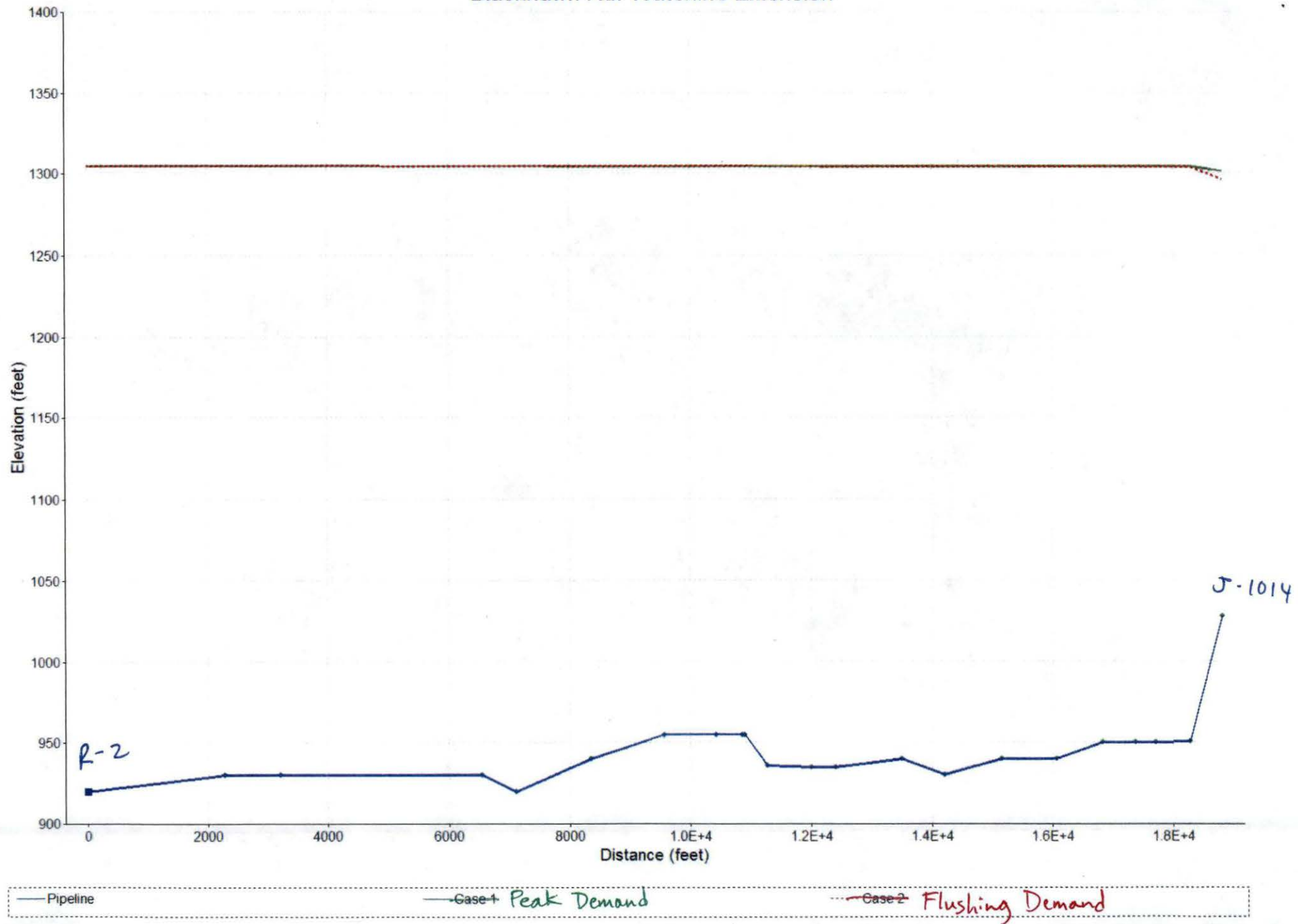
Scale:  $\frac{3}{4}" = 1'-0"$







# Blackhawk Rd. Waterline Extension





CHANGES FOR NEXT SIMULATION (Change Number = 1)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.24340E-05

## PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1 #2		FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-10	J-4	J-5	47.72	0.03	0.00	0.30	0.06	0.06
P-1093	J-1013	J-1014	15.00	3.04	0.00	1.53	5.70	5.70
P-15	J-5	J-10	44.79	0.06	0.00	0.29	0.05	0.05
P-16	J-10	J-11	42.74	0.06	0.00	0.27	0.05	0.05
P-17	J-11	J-12	43.62	0.04	0.00	0.28	0.05	0.05
P-59	J-12	J-661	42.19	0.02	0.00	0.27	0.05	0.05
P-60	J-13	J-14	19.29	0.01	0.00	0.12	0.01	0.01
P-61	J-14	J-15	19.29	0.01	0.00	0.12	0.01	0.01
P-64	J-15	J-16	19.29	0.01	0.00	0.12	0.01	0.01
P-65	J-16	J-17	19.29	0.01	0.00	0.12	0.01	0.01
P-66	J-17	J-18	19.29	0.01	0.00	0.12	0.01	0.01
P-67	J-18	J-60	19.29	0.01	0.00	0.12	0.01	0.01
P-68	J-60	J-63	19.29	0.00	0.00	0.12	0.01	0.01
P-69	J-63	J-1013	19.29	0.01	0.00	0.12	0.01	0.01
P-7	R-2	J-2	51.49	0.15	0.00	0.33	0.07	0.07
P-701	J-661	J-665	42.19	0.00	0.00	0.27	0.05	0.05
P-702	J-663	J-13	40.89	0.02	0.00	0.26	0.04	0.04
P-703	J-662	J-663	40.89	0.03	0.00	0.26	0.04	0.04
P-705	J-665	J-662	41.15	0.02	0.00	0.26	0.04	0.04
P-8	J-2	J-1	51.49	0.06	0.00	0.33	0.07	0.07
P-9	J-1	J-4	51.49	0.22	0.00	0.33	0.07	0.07

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

P-1010	P-1025	P-1030	P-1031	P-1032
P-1081	P-1084	P-3	P-47	P-869
P-874	P-898	P-923	P-989	

## PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMENTAL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Pump-1	251.64	159.60	395.43	235.8	75.00	0.	0.0	0.0	**	**	192.8
Pump-4	227.93	210.66	418.94	208.3	75.00	0.	0.0	0.0	**	**	243.8

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

## NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	1304.79	930.00	374.79	162.41

## Blackhawk Rd. - Peak Demand

J-10	0.00	1304.48	940.00	364.48	157.94
J-1013	0.00	1304.23	950.50	353.73	153.28
J-1014	15.00	1301.19	1027.90	273.29	118.43
J-11	0.00	1304.42	955.00	349.42	151.42
J-12	0.00	1304.38	955.00	349.38	151.40
J-13	0.00	1304.29	935.00	369.29	160.03
J-14	0.00	1304.28	940.00	364.28	157.86
J-15	0.00	1304.27	930.00	374.27	162.19
J-16	0.00	1304.26	940.00	364.26	157.85
J-17	0.00	1304.25	940.00	364.25	157.84
J-18	0.00	1304.25	950.00	354.25	153.51
J-2	0.00	1304.85	930.00	374.85	162.44
J-4	0.00	1304.57	930.00	374.57	162.31
J-5	0.00	1304.54	920.00	384.54	166.63
J-60	0.00	1304.24	950.00	354.24	153.50
J-63	0.00	1304.24	950.00	354.24	153.50
J-661	0.00	1304.36	955.00	349.36	151.39
J-662	0.26	1304.34	936.00	368.34	159.61
J-663	0.00	1304.31	935.00	369.31	160.03
J-665	0.26	1304.36	955.00	349.36	151.39
R-2	----	1305.00	920.00	385.00	166.83

## MAXIMUM AND MINIMUM VALUES

## PRESSURES

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-975	225.12	T-3	9.53
J-973	222.96	R-6	13.87
J-974	208.24	J-430	16.99
J-57	204.20	T-1	17.77
J-288	202.93	J-432	26.48

## REGULATING VALVE REPORT

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PRV-1	120.00	ACTIVATED	189.20	120.00	3.12
RV-2	PRV-1	100.00	ACTIVATED	202.93	100.00	3.25
RV-3	PRV-1	86.00	ACTIVATED	143.87	86.00	4.16
RV-4	PRV-1	100.00	ACTIVATED	171.27	100.00	53.43
RV-5	PRV-1	85.00	ACTIVATED	118.04	85.00	9.76

## SUMMARY OF INFLOWS AND OUTFLOWS

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
 (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	94.25	
R-2	51.49	
R-3	115.99	
R-5	244.84	
R-6	10.07	
R-7	277.91	
R-8	72.89	
T-1	-160.10	
T-2	-126.67	
T-3	-89.53	
T-4	48.04	

NET SYSTEM INFLOW = 915.48

Whitley County Water District

NET SYSTEM OUTFLOW = -376.30  
NET SYSTEM DEMAND = 539.17



CHANGES FOR NEXT SIMULATION (Change Number = 2)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.21188E-05

## PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1 #2		FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-10	J-4	J-5	57.72	0.05	0.00	0.37	0.08	0.08
P-1093	J-1013	J-1014	25.00	7.82	0.00	2.55	14.69	14.69
P-15	J-5	J-10	54.79	0.09	0.00	0.35	0.07	0.07
P-16	J-10	J-11	52.31	0.08	0.00	0.33	0.07	0.07
P-17	J-11	J-12	53.62	0.06	0.00	0.34	0.07	0.07
P-59	J-12	J-661	52.19	0.03	0.00	0.33	0.07	0.07
P-60	J-13	J-14	29.29	0.03	0.00	0.19	0.02	0.02
P-61	J-14	J-15	29.29	0.02	0.00	0.19	0.02	0.02
P-64	J-15	J-16	29.29	0.02	0.00	0.19	0.02	0.02
P-65	J-16	J-17	29.29	0.02	0.00	0.19	0.02	0.02
P-66	J-17	J-18	29.29	0.02	0.00	0.19	0.02	0.02
P-67	J-18	J-60	29.29	0.01	0.00	0.19	0.02	0.02
P-68	J-60	J-63	29.29	0.01	0.00	0.19	0.02	0.02
P-69	J-63	J-1013	29.29	0.01	0.00	0.19	0.02	0.02
P-7	R-2	J-2	61.49	0.21	0.00	0.39	0.09	0.09
P-701	J-661	J-665	52.19	0.00	0.00	0.33	0.07	0.07
P-702	J-663	J-13	50.89	0.03	0.00	0.32	0.06	0.06
P-703	J-662	J-663	50.89	0.05	0.00	0.32	0.06	0.06
P-705	J-665	J-662	51.15	0.02	0.00	0.33	0.06	0.06
P-8	J-2	J-1	61.49	0.08	0.00	0.39	0.09	0.09
P-9	J-1	J-4	61.49	0.30	0.00	0.39	0.09	0.09

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

P-1010	P-1025	P-1030	P-1031	P-1032
P-1081	P-1084	P-3	P-47	P-869
P-874	P-898	P-923	P-989	

## PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Pump-1	251.64	159.60	395.43	235.8	75.00	0.	0.0	0.0	**	**	192.8
Pump-4	227.93	210.66	418.94	208.3	75.00	0.	0.0	0.0	**	**	243.8

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

FOLLOWING ADDITIONAL PIPES ARE CLOSED :

## NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	1304.71	930.00	374.71	162.37



Blackhawk Rd. - Flushing Demand

J-10	0.00	1304.27	940.00	364.27	157.85
J-1013	0.00	1303.86	950.50	353.36	153.12
J-1014	25.00	1296.04	1027.90	268.14	116.19
J-11	0.00	1304.19	955.00	349.19	151.31
J-12	0.00	1304.12	955.00	349.12	151.29
J-13	0.00	1304.00	935.00	369.00	159.90
J-14	0.00	1303.97	940.00	363.97	157.72
J-15	0.00	1303.95	930.00	373.95	162.05
J-16	0.00	1303.93	940.00	363.93	157.70
J-17	0.00	1303.91	940.00	363.91	157.70
J-18	0.00	1303.89	950.00	353.89	153.35
J-2	0.00	1304.79	930.00	374.79	162.41
J-4	0.00	1304.40	930.00	374.40	162.24
J-5	0.00	1304.36	920.00	384.36	166.56
J-60	0.00	1303.88	950.00	353.88	153.35
J-63	0.00	1303.87	950.00	353.87	153.35
J-661	0.00	1304.10	955.00	349.10	151.27
J-662	0.26	1304.07	936.00	368.07	159.50
J-663	0.00	1304.02	935.00	369.02	159.91
J-665	0.26	1304.09	955.00	349.09	151.27
R-2	----	1305.00	920.00	385.00	166.83

MAXIMUM AND MINIMUM VALUES

PRESSURES

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R-7	277.91	
R-8	72.89	
T-1	-160.11	
T-2	-126.67	
T-3	-89.53	
T-4	48.05	

NET SYSTEM INFLOW = 925.48

Whitley County Water District

Blackhawk Rd. - Flushing Demand

NET SYSTEM OUTFLOW = -376.31  
NET SYSTEM DEMAND = 549.17

\*\*\*\*\* HYDRAULIC ANALYSIS COMPLETED \*\*\*\*\*