March 8, 2010

Ms. Sandra Squire  
Executive Secretary  
Public Service Commission of West Virginia  
Post Office Box 812  
Charleston, West Virginia  25323

RE: CASE NO. 10-0057-WS-PC-CN

Dear Ms. Squire:

Enclosed herein for filing in the above-referenced proceeding please find one (1) copy of the Responses of Mingo County Redevelopment Authority and Town of Matewan To Commission Staff's First Set of Interrogatories, Data Request or Requests For Information.

As evidenced by the Certificate of Service attached thereto, the original of the Responses has been served upon Staff Attorney Ronald E. Robertson, Jr., via hand delivery.

Sincerely,

Robert R. Rodecker  
WV State Bar No. 3145

enclosure

cc: Ronald E. Robertson, Jr., Esquire  
Ron Flora, Esquire (Town of Matewan)  
Michael Whitt, MCRA  
Rick Roberts, P.E.  
Michael D. Griffith, CPA  

Jt App for HS and KCH Extensions  
Response To Staff 1st Set
BEFORE THE
PUBLIC SERVICE COMMISSION
OF WEST VIRGINIA
CHARLESTON

CASE NO. 10-0057-WS-PC-CN
MINGO COUNTY REDEVELOPMENT AUTHORITY
and TOWN OF MATEWAN

RESPONSES OF
MINGO COUNTY REDEVELOPMENT AUTHORITY
AND TOWN OF MATEWAN TO COMMISSION STAFF’S
FIRST SET OF INTERROGATORIES, DATA REQUEST OR
REQUESTS FOR INFORMATION

Now come Mingo County Redevelopment Authority and Town of Matewan and
in response to the Commission Staff’s First Set of Interrogatories, Data Request or
Requests For Information submit the attached responses.

Respectfully submitted,

MINGO COUNTY REDEVELOPMENT AUTHORITY

By Counsel

Robert R. Rodecker [WV Bar No. 31451]
BB&T Square - Suite 1230
300 Summers Street
Post Office Box 3713
Charleston, West Virginia 25337
Telephone: (304)343-1654
TOWN OF MATEWAN

By Counsel

Ronald J. Flora (WV State Bar No. 1227)
1115 Smith Street
Milton, West Virginia  25541
Telephone: (304)743-5354
REQUEST NO. 1:

The Rule 42's filed with the application indicates that the operation and maintenance expenses for the water and sewer operations of the Town will increase by approximately $4,000 and $6,000 respectively, due to the projects. Provide a breakdown of the expenses and the backup calculations.

RESPONSE NO. 1:

See Attachment No. 1 attached hereto.

PREPARED BY: Rick Roberts, P.E.
E.L. Robinson Engineering

DATE: March 8, 2010

PERSONS TO TESTIFY: Rick Roberts, P.E.
Michael D. Griffith, CPA
REQUEST NO. 2:

Why does the water Rule 42 show more customers at going level?

RESPONSE NO. 2:

This Rule 42 is a continuation of both an expected municipal going level rate filing and a certificate filing for the Thacker Water project. The additional customers at going level relate to proposed new Thacker area project related customers.

PREPARED BY: Michael D. Griffith, CPA

DATE: March 8, 2010

PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 3:

The Notice of Filing indicates that there will be no project-related increases in water and sewer rates. However, the Rule 42 clearly contemplates a going level rate increase. Please clarify whether or not a rate increase is anticipated.

RESPONSE NO. 3:

The Town has before it proposed water and sewer rate ordinances. Our firm has prepared rates to be considered for passage by the Town. The issue is pending before the Town.

PREPARED BY: Michael D. Griffith, CPA
DATE: March 8, 2010
PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 4:

Please explain why Statement A of both the water and sewer Rule 42 states “Does not include surcharges for past due Accounts Receivables”.

RESPONSE NO. 4:

The Surcharge presented is a proposed resolution to decades of problems with non-payment by many of the former Red Jacket PSD customers. In lieu of forgiving the old balances of these customers, which was opposed by WDA, PSC Staff, etc., we proposed this position that does not reward the non-payers by writing off their balance, instead getting their current bill and this surcharge as some measure to recover the old balances. We however will not rely on any revenues from this provision. Twenty (20) years of past reliance on revenues from non-payers contributed to the Red Jacket/Matewan issues. We will not agree to any reliance on any payment by these customers.

PREPARED BY: Michael D. Griffith, CPA
DATE: March 8, 2010
PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 5:

Please explain why the Per Books Revenue on both the water and sewer Rule 42 differs from that as reported in the respective Annual Reports.

RESPONSE NO. 5:

We prepared the Rule 42 in advance of completing PSC Reports. After making adjustments accounting adjustments the numbers may differ somewhat. Given that this project is 100% grant funded, provides service to a new school complex and opens up potential new customers to the Town, we chose not to revise the Rule 42 exhibits.

PREPARED BY: Michael D. Griffith, CPA
DATE: March 8, 2010
PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 6:

Please explain why the sewer Rule 42 only considers a principal payment of $50,000 for the USDA debt obligation while the actual principal and interest payment is $68,943.

RESPONSE NO. 6:

We established this amount as an amount for debt service and reserves with the hope that the USDA might restructure the debts and arrearages and perhaps write down/off some debt to get to this level overall for debt service and reserves. This was simply an estimated amount for that proposal. If the USDA requires full payment, the debt service and reserves would cause additional rate increases. Also, there is a possibility that that USDA may seek additional funding for the arrearages which further would increase rates. It is likely that the full amount of debt service and some negotiated amount for the arrearage will ultimately be required. Those amounts are not known at this point.

PREPARED BY: Michael D. Griffith, CPA
DATE: March 8, 2010
PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 7:

Why does the sewer Rule 42 also not consider a debt reserve payment for the USDA bond obligation?

RESPONSE NO. 7:

See Response to No. 6

PREPARED BY: Michael D. Griffith, CPA
DATE: March 8, 2010
PERSON TO TESTIFY: Michael D. Griffith, CPA
REQUEST NO. 8:

Provide a copy of the Final Engineering Report with hydraulics and stamped by the Engineer.

RESPONSE NO. 8:

See Attachment No. 2 submitted herewith.

PREPARED BY: Rick Roberts, P.E.
E. L. Robinson Engineering

DATE: March 8, 2010

PERSON TO TESTIFY: Rick Roberts, P.E.
REQUEST NO. 9:

The Bid Document for Project 2 indicates that a 16,000 gallon water storage tank is to be constructed. The Preliminary Engineering Report included with the initial filing does not mention the tank. Provide an explanation of this discrepancy. If the 16,000 gallon tank is required, the Final Engineering Report needs to address it and include the applicable hydraulics addressing how the tank will be filled and the water distributed. The construction drawings also do not show the 16,000 gallon storage tank.

RESPONSE NO. 9:

The Mingo Central High School Water and Sewer Project includes a 16,000 gallons transfer tank to supply water to Booster Station No. 2. The Design Report, submitted as Attachment No. 2 in Response No. 8 above, includes additional information on the design of the tank.

Also, submitted herewith as Attachment No. 3 are revised Plans and Specifications.
REQUEST NO. 10:

With respect to any Permits that may be required, provide Staff with copies of all Permits that are necessary and have been obtained. The actual permit from the State of West Virginia, Office of Environmental Health Services and the revised NPDES from the Department of Environmental Protection must be provided. The applications, which were not provided in the initial filing, for the remaining permits, including the SHPO will suffice.

RESPONSE NO. 10:

A Permit Summary/Status for the Mingo Central High School portion of the proposed project is attached hereto as Attachment No. 4A.

Attached as Attachment No. 4B is a Permit Summary/Status relating to the King Coal Highway portion of the proposed project.

PREPARED BY: Rick Roberts, P.E.
E. L. Robinson Engineering

DATE: March 8, 2010

PERSON TO TESTIFY: Rick Roberts, P.E.
REQUEST NO. 11:
Affidavit of publication for the Notice of Filing.

RESPONSE NO. 11:
Said publication did occur on January 29, 2010. This office has not received the Affidavit of Publication From the Williamson Daily News but will file it with the Commission immediately upon receipt.

PREPARED BY: Robert R. Rodecker
TITLE: Counsel for Mingo County Redevelopment Authority
DATE: March 8, 2010
PERSON TO TESTIFY: Not Applicable
ATTACHMENT NO. 1
KING COAL HIGHWAY/MINGO CENTRAL HIGH SCHOOL
WATER AND SEWER EXTENSION PROJECT

PROJECTED SEWER O & M EXPENSE

MISCELLANEOUS TREATMENT/DISPOSAL EXPENSE

Sludge Processing Costs:

Given: Estimated Average Daily Flow from Project – 0.023 MGD
Estimated Influent Suspended Solids – 200 mg/l
Estimated Effluent Suspended Solids – 20 mg/l
Polymer Requirement, lbs/1000 lbs dry sludge = 3.0
Polymer cost per pound, $3.00

Sludge Production:

0.023 MGD x 8.34 lbs./gal. x 180 mg/l = 34.5 lbs/day
or 1,035 lbs/mo.

Dewatering and Disposal Costs:

Polymer Requirement (#/mo.) = 1.04 x 3.0 = 3.12, Say 3 #/mo.
Polymer Cost/Year = $3.00 x 3 x 12 = $108/year

Monthly lime usage is estimated at 0.2 tons per ton of dry solids produced or about 1.2 tons per year at a cost of $150/ton or, $180/year.

Annual weight of sludge for disposal, at 15% dry solids and including 1.2 tons of lime will be 43 tons per year.

Landfill cost @ $45/ton = 43 x $45 = $1,935/year

Assume 9 dump truck loads per year to landfill, approximately 140 mile round trip and $0.60 per mile expense.

Hauling Expense: 140 miles x 9 trips/year x $0.60/mile
= $756/year

Total Annual Sludge Dewatering and Disposal Costs
= $108 + $180 + $1,935 + $756
= $2,979 Say $3,000/year
**Grit & Screening Disposal Costs:**

Based on published data, approximately 10 cu. ft. of grit and screening will be wasted per million gallons of waste water processed. At the plant initial flow rate of 0.023 MGD, the annual waste water volume is 8.4 MG. Thus, the total estimated volume of screening and grit to be disposed would be 84 cu. ft. at an estimated density of 50 pcf for a total mass to be disposed of 2.1 tons.

Disposal costs are estimated at $45.00/ton for an annual cost estimate of $100/year.

Total miscellaneous treatment/disposal expense is:

<table>
<thead>
<tr>
<th>Sludge Processing</th>
<th>$ 3,000</th>
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</thead>
<tbody>
<tr>
<td>Grit &amp; Screening Disposal</td>
<td>100</td>
</tr>
</tbody>
</table>

$3,100/year

**PUMP STATION ELECTRICITY:**

The proposed project does not include any new pump stations. Flows from the project will be pumped by the Town’s existing pump stations. For the purpose of this report, it is estimated that pump station electrical expense will increase by approximately $2,900 per year as a result of this project.

Pump Station Electricity = $2,900/year

**SEWER O & M SUMMARY:**

<table>
<thead>
<tr>
<th>Expense</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Misc. Treatment/Disposal Expense</td>
<td>3,100.00</td>
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<tr>
<td>Pump Station Electrical Expense</td>
<td>2,900.00</td>
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<tr>
<td>Total Annual O&amp;M Expense</td>
<td>$ 6,000.00</td>
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</tbody>
</table>
**PROJECTED WATER O&M EXPENSE**

**PLANT CHEMICALS:**

It is estimated that the treatment plant will initially produce an additional 5,475,000 gallons of water per year to meet the demand of the system. At a cost of $0.15 per thousand gallons, the plant chemical cost will be:

Plant Chemical Cost = $0.15/ MGal. x 5,475 MGal. 
= $821.25/year say $820/year

**TREATMENT PLANT ELECTRICITY:**

It has been estimated that approximately 5,475,000 additional gallons of water per year will be produced to serve the new system. At a cost of $0.15 per thousand gallons, the plant electrical cost will be:

Plant Electrical Cost = $0.15/ MGal. x 5,475 MGal. 
= $821.25/year say $820/year

**BOOSTER STATION ELECTRICITY:**

Two new booster stations will be constructed to pump all of the water used by the King Coal Highway/Mingo Central High School Water System. Assuming an average daily usage of 15,000 gallons, the booster stations will pump an average of 450,000 gallons of water per month (15,000 gal./day x 30 days/mo.). The booster stations will have a rated capacity of 200 gallons per minute and the motors are expected to be 25 and 40 hp. The additional electricity expense for these booster stations is calculated as follows:

At 200 gpm, the pump will run: 
450,000 gal./mo./200 gpm/60 min./hr.=37.5 hr./mo. 
@ 65 hp, that’s 37.5 x 65 = 2,438 hp-hours/mo.

Converting to kilowatt hours: 
2,438 hp-hours/mo. x 0.7457 = 1,818 kwh/mo. 
@ $0.10 kwh/mo.: 1,818 x 0.10 = $181.80/mo. 
Or $181.80/mo. x 12 = $2,181.60/year, say $2,180/year
STORAGE TANK ELECTRICITY:

The project includes the construction of one water storage tank. An electrical service will be provided at the locations to power the telemetry system (minimal usage). The Town currently has several such electrical services at its various tanks, and the monthly electricity cost averages approximately $15.00 per month per service. At $15.00 per month per service the annual cost will be:

Storage Tank Electricity Cost = 1 site x $15.00/mo./site x 12 mo./yr.
= $180/year

WATER O&M SUMMARY:

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<th>Cost</th>
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<td>Treatment Plant Electricity</td>
<td>820.00</td>
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<td>Booster Station Electricity</td>
<td>2,180.00</td>
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<tr>
<td>Storage Tank Electricity</td>
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<tr>
<td>Total Annual O&amp;M Expense</td>
<td>$4,000.00</td>
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ATTACHMENT NO. 2

RESPONSE NO. 8
MINGO COUNTY REDEVELOPMENT AUTHORITY
AND TOWN OF MATEWAN TO COMMISSION STAFF’S
FIRST SET OF INTERROGATORIES, DATA REQUEST OR
REQUESTS FOR INFORMATION
DESIGN REPORT

KING COAL HIGHWAY/MINGO CENTRAL HIGH SCHOOL WATER AND SEWER SYSTEM EXTENSION PROJECT

February, 2010

Prepared for:
MINGO COUNTY REDEVELOPMENT AUTHORITY

Prepared by:

E.L. ROBINSON
the Challenge. the Choice.

5088 Washington Street, West Charleston, West Virginia 25313
Office: 304/776-7473

Charles R. Roberts, Jr., P.E.
Project Manual

For

Mingo Central High School
Water and Sewer Extension Project

Contracts 1 and 2
Mingo Central High School Water and Sewer Extension Project

Mingo County Redevelopment Authority
P.O. Box 298
Williamson, WV 25661
304.235.0042

November, 2009

E.L. Robinson Engineering Co.
5088 Washington Street, West
Charleston, WV 25313
304.776.7473
ATTACHMENT NO. 3

RESPONSE NO. 9
MINGO COUNTY REDEVELOPMENT AUTHORITY
AND TOWN OF MATEWAN TO COMMISSION STAFF'S
FIRST SET OF INTERROGATORIES, DATA REQUEST OR
REQUESTS FOR INFORMATION
MINGO COUNTY REDEVELOPMENT AUTHORITY

CONSTRUCTION DRAWINGS FOR

MINGO CENTRAL HIGH SCHOOL
WATER AND SEWER EXTENSION PROJECT

MINGO COUNTY, WEST VIRGINIA

BOARD OF DIRECTORS
MIKE WITT, EXECUTIVE DIRECTOR
TERRY SAMMONS, CHAIRMAN
ANDY DILLON, VICE CHAIRMAN
JAMES SNAPP, SECRETARY/TREASURER
STEVE KONNAR, MEMBER
PAUL PINSON, MEMBER

INDEX OF SHEETS

TITLE SHEET
NOTE SHEET LEGEND
PLAN SHEET LAYOUT INDEX
SITE PLANS
DETAIL SHEETS

PLANS PREPARED BY:
E.L. ROBINSON

STATE OF WEST VIRGINIA
PROFESSIONAL ENGINEER

CHARTERED 1949
NEW YORK, MICHIGAN, OHIO
MEMBER A.S.C.E.
ATTACHMENT NO. 4A
## MINGO CENTRAL HIGH SCHOOL

### PERMIT SUMMARY/STATUS

<table>
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<tr>
<th>Permit Agency</th>
<th>Date Submitted</th>
<th>Date Received</th>
<th>Permit No.</th>
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<td>WV Health Department</td>
<td>March 1, 2010</td>
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<tr>
<td>WV Division of Highways</td>
<td>January 14, 2010</td>
<td></td>
<td></td>
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<td>WV DEP (Stormwater)</td>
<td>January 14, 2010</td>
<td>March 2, 2010</td>
<td>WVR104816</td>
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<td>WV Culture &amp; History</td>
<td>February 1, 2010</td>
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<tr>
<td>Norfork Southern RXR</td>
<td>January 29, 2010</td>
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</tbody>
</table>
March 1, 2010

Mr. William S. Herold, Jr., P.E.
WV Office of Environmental Health Services
Capitol and Washington Streets
1 Davis Square, Suite 200
Charleston, WV 25301-1798

Re: Mingo County Redevelopment Authority
King Coal Highway/Mingo Central High School
Water and Sewer Extension Project

Dear Mr. Herold:

On behalf of the Mingo County Redevelopment Authority we are requesting approval to construct a potable waterline and sewer system extension to serve approximately 50 new residential customers and the Mingo Central High School in the Matewan area of Mingo County. The Town of Matewan will own, operate and maintain the systems when construction is complete. It consists of approximately 81,890 feet of 10-inch and smaller diameter waterline, two water booster stations, one 221,000 gallons water storage tank, one 16,000 gallons transfer tank, two pressure reducing stations, fire hydrants, valves and other related items. Water for the extension will be provided by the Town of Matewan at a point along Mate Creek. The sewer portion consists of approximately 61,000 feet of 10" and smaller diameter gravity sewer pipe, 30,580 feet of 6" and smaller diameter sewage force main, manholes, cleanouts and other related items. In support of this request, we are enclosing the following:

1. Project Plans (4 Copies)
2. Project Specifications (4 Copies)
3. WVBPH Forms EW 100 and EG 5 (Original and 3 Copies)
4. Design Report (4 Copies)
5. Check for $300.00

If you have any questions, please let us know.

Sincerely,

Rick Roberts, P.E.
Project Manager
E.L. Robinson Engineering Company
WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES  
Bureau for Public Health  
Office of Environmental Health Services  
Capitol and Washington Streets  
1 Davis Square, Suite 200  
Charleston, West Virginia 25301-1798  
Telephone: 304-558-2981  
Fax: 304-558-0691  

PUBLIC WATER SUPPLY SYSTEM APPLICATION  
FOR A PERMIT TO CONSTRUCT, ALTER, OR RENOVATE  
(please prepare in 4 copies)

APPLICANT: Mingo Co. Redevelopment Auth.  
DATE: February 26, 2011  
STREET OR PO BOX: P.O. Box 298  
TELEPHONE: (304) 335-0342  
CITY: Williamson, WV  
COUNTY: Mingo  
ZIP: 25661  

ENGINEERING FIRM: E.I. Robinson Engineering Company  
STREET OR PO BOX: 5088 Wash. St. West  
TELEPHONE: (304) 776-7473  
CITY: Charleston  
STATE: WV  
ZIP: 25313

<table>
<thead>
<tr>
<th>LOCATION OF PLANT</th>
<th>LOCATION OF SOURCE WATER</th>
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</thead>
<tbody>
<tr>
<td>Latitude</td>
<td>Latitude</td>
</tr>
<tr>
<td>Longitude</td>
<td>Longitude</td>
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</tbody>
</table>

(If applying for water plant or water well permit)

IN ACCORDANCE WITH TITLE 64, SERIES 3, PUBLIC WATER SUPPLY REGULATIONS  
OF THE WEST VIRGINIA DIVISION OF HEALTH, WE HEREBY MAKE APPLICATION TO  
CONSTRUCT, ALTER, OR RENOVATE AS FOLLOWS:

[Signature]

Signature of Applicant or Authorized Agent

NOTE: A $300 application fee must accompany a permit application ($150 application fee for a  
water well permit application). Make check or money order payable to "West Virginia Department  
of Health and Human Resources". Cash not accepted. Permit applications which include both water  
and sewer systems require only a single $300 fee.
Complete all portions of the Design Data Sheet applicable to the project. Omission of required information will result in the application being denied. When both sewer system and water system are to be constructed, Design Data Sheets for both sewage and water must be completed and attached to the application.

Applicant: Mingo County Redevelopment Authority (MCRA)

Project Location: King Coal Highway, Matewan, WV

County: Mingo

Number of customers: 51  or  Estimated population or population equivalent served:

Number of home sites: 50  Number of mobile home sites:

Estimated peak flow: 70 gpm

Minimum consumer pressure (static/residual): 165 / 136 psi

Source of Supply: Town of Matewan

Municipal Public Service District Private Well

Other (specify)

Pressure at connection to public supply (static/residual): 170 / 164 psi

Capacity of well, if applicable: (specify)

Type of system: Gravity  Hydropneumatic

Other (specify)

Length of water lines of each size: Water 71,370' of 10" DIP, 10,360' of 8" DIP, 160' of 6" DIP

YES NO

Details of well construction attached

Fire hydrants to be installed (hydraulic calculations must be included)

Storage tank required Size of tank 221,000 gallons

Elevation of top and bottom of storage tank 2,359.83 / 2,227.00

Booster station required Size of station 2@200 gpm

Pressure reducing station required

Details of water treatment equipment (if applicable)

Chlorination Contact time: ______ minutes
January 14, 2010

Mr. Thomas Meddings
WV Division of Highways
District Two
801 Madison Ave.
Huntington, WV 25712

Re: Mingo County Redevelopment Authority
Mingo Central Water and Sewer Extension Project

Dear Mr. Dorsey:

On behalf of the Mingo County Redevelopment Authority we are requesting a permit to enter upon WV Division of Highways right-of-way with the construction of approximately 780 feet 10-inch and smaller diameter water line and 406 feet 10-inch and smaller diameter sewer line on WV Department of Highways right-of-way to extend service to the Mingo Central High School area of Mingo County. In support of our request, we are enclosing six (6) copies each of the following:

1. Permit Form MM-109
2. Project Plans
3. Project Specifications
4. Location Map
5. Waterline Summary

If you have any questions or need any additional information, please feel free to contact me at 1-800-776-7473.

Sincerely,

Rick Roberts, P.E.
Project Manager
E. L. Robinson Engineering Co.

Enclosures
PERMIT TO ENTER UPON, UNDER, OVER OR ACROSS THE STATE ROADS OF THE STATE OF WEST VIRGINIA, AS PROVIDED FOR IN SECTION 6, ARTICLE 16, CHAPTER 17; SECTION 9, ARTICLE 16, CHAPTER 17; SECTION 8, ARTICLE 4, CHAPTER 17, WEST VIRGINIA CODE, 1931, AS AMENDED.

THIS PERMIT, Made this __________ day of ________ 20_ , between the WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, a statutory corporation hereinafter called DIVISION and Mingo County Redevelopment Authority Address: P.O. Box 298, 1100 East 4th Avenue, Williamson, WV 25661 Phone No: (304) 235-0042 hereinafter called APPLICANT.

WITNESSETH

In consideration of the hereinafter set out covenants and in accordance with Section 6, Article 16, Chapter 17; or Section 9, Article 16, Chapter 17; or Section 8, Article 4, Chapter 17, of the Official Code of West Virginia, 1931, as amended, and the rules and regulations promulgated thereunder, APPLICANT does hereby apply to enter

Route Type & No. ___________________ DOH Project No. ___________________ (if applicable): at ___________________ Mile Post ___________
in: ___________________ County, for the purposes hereinafter set forth and in accordance with the plans and specifications which are attached hereto and made a part hereof: Construction of approximately _______feet of water line and _______ feet of sewer line on WVDOT ROW

APPLICANT further agrees to accept the conditions hereinafter set forth:

1. APPLICANT shall deposit with DIVISION the sum of $ ___________ in the form of an official, certified or cashier's check, or executed bond with surety satisfactory to DIVISION to cover any damage and inspection costs DIVISION may sustain by reason of the granting of this permit, including any expense incurred in restoring said highway to its original condition or the proper repair of any and all damages that may result within one (1) year from the date of the completion of said work.

2. APPLICANT agrees to reimburse DIVISION for inspection costs as follows:
   A. For any inspection costs incurred under this permit.
   B. At $ 0.43 per linear foot for _______ feet of water line installed under this permit
   C. At $ 0.80 per linear foot for _______ feet of sewer line installed under this permit

3. APPLICANT shall notify DIVISION at least 48 hours in advance of the date the work will begin. Failure to comply will be cause for cancellation of this permit.

4. APPLICANT agrees to protect its employees, equipment and users of the highway at all times in accordance with the current Division of Highways manual "Traffic Control For Street and Highway Construction and Maintenance Operations".

5. APPLICANT agrees to comply with all applicable state and federal laws in the performance of work under this permit.

6. Supplementary conditions cited on the reverse side of this permit are understood and agreed to be a part hereof.

7. The work authorized under this permit shall be completed on or before (Date) ____________

Applicant's signature on this permit affirms that all text herein is a verbatim reproduction of The West Virginia Division of Highways Encroachment Permit Form MM-109, revision date May 19, 2005. All attachments are inclusive to this permit.

RECOMMENDED:

Title ________________________________

BOND REQUIREMENT:

BOND NO.

DATE

[ ] Attached [ ] On File [ ]

INSPECTION

Owner/Contractor [ ]

Full Time [ ] Part Time [ ]

Periodic [ ] Removable [ ] No Cost [ ]

AUTHORIZATION NO. ___________________
From: DEP NPDESEP [DEP.NPDESEP@wv.gov]
Sent: Tuesday, March 02, 2010 10:22 AM
To: whitt_mcra@verizon.net; DEP NPDESEP
Cc: rroberts@erobinson.com; Chambers, Jason; Hopson, Jeremy M; Musser, Cynthia J; Larue, Tina C
Subject: Approval for WVR104816, Mingo Central High School Water and Sewer Extension, Mingo Co., 3.95 Acres
_SW_Cons_Termination_notice.doc

Mike Whitt, Exec. Director
Mingo County Redevelopment
PO Box 298
Williamson, WV 25661
(304) 235-0042

Physical Site Location: CR 6, Matewan

Please be advised that this e-mail constitutes approval for your construction activity and your registration no. is WVR104816. You are now authorized to operate under WV/NPDES General Water Pollution Control Permit No. WV0115924, issued on November 5, 2007, copy attached.

Applicant will notify the office once the waste site has been determined.

You should carefully read the contents of this General Permit and become familiar with all requirements needed to remain in compliance with your permit. We’ve also attached a “Notice of Termination” form to be completed and submitted when all disturbed areas are stabilized. You can find the permit and Notice of Termination form via the Internet by visiting Permitting, Division of Water and Waste Management at www.wvdep.org. Your annual permit fee has been assessed as $250.00. You will be invoiced by this agency upon the anniversary date of this approval date. Failure to submit the annual fee within ninety (90) days of the due date will render your permit void upon the date you are mailed a certified written notice to that effect. Please be advised that a pro-rated annual permit fee may be assessed upon the completion date and proper stabilization.

Scott G. Mandirola
Acting Director
WV DEP-Division of Water & Waste Mgt.
601 57th St SE
Charleston, WV 25304-2345
Phone: (304) 926-0495
Fax: (304) 926-0496
This is to certify that any establishment with discharges composed entirely of stormwater associated with construction activities disturbing one acre or greater of land area (construction activities are land disturbing operations such as grubbing, grading, filling and excavation operations during site development for residential, commercial or industrial purposes) and agreeing to be regulated under the terms of this general permit, except for:

1. Operations that result in the disturbance of less than one acre of total land area, which are not part of a larger common plan of development or sale.

2. Stormwater discharges associated with land disturbing activities that may reasonably be expected to be causing or contributing to a violation of a water quality standard as determined by the Director.

3. Land disturbing activities already governed by other Department of Environmental Protection NPDES permits. This includes Division of Mining and Reclamation permits for coal mining and non-metallic quarries.

4. Landfills, except in the preparation of a new landfill and/or clay borrow areas.

5. Other activities exempt from NPDES permitting requirements as set forth in 40CFR 122.3(e) and 47CSR 10-3.2.b.4 (NPDES Program).

6. Land disturbing activities related to oil and gas activities as required by the Energy Policy Act of 2005. These activities include but are not limited to construction of drilling sites, waste management pits, and access roads, as
well as construction of the transportation and treatment infrastructure such as pipelines, natural gas treatment plants, natural gas pipeline compressor stations, and crude oil pumping stations. Construction activities that result in a discharge of a reportable quantity release or that contribute pollutants (other than non-contaminated sediments) to a violation of a water quality standard are still subject to permit coverage.

is hereby granted coverage under this General WV/NPDES Water Pollution Control Permit to allow stormwater discharges into the surface waters of the State. This General Permit is subject to the following terms and conditions:

The information submitted on and with the site registration application form will hereby be made terms and conditions of the General Permit with like effect as if all such information were set forth herein, and other pertinent conditions set forth in Sections A, B, C, D, E, F, G, H, I and J.

Construction of single family residences by the homeowner or homeowner’s contractor requiring land disturbances less than three acres in size are provided coverage under the General WV/NPDES Water Pollution Control Permit and do not require application for registration. However, all other terms and conditions of the General WV/NPDES Water Pollution Control Permit still apply except for the Notice of Termination requirement.

Sites approved from January 1, 2006, thru November 4, 2007, are hereby granted coverage under General WV/NPDES Water Pollution Control Permit WV0115924. Sites approved prior to January 1, 2006, will have until June 30, 2008, to have final stabilization completed. Final stabilization means disturbed areas shall be covered by the appropriate permanent protection. Final stabilization includes; pavement, buildings, stable waterways (riprap, concrete, grass or pipe), a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground, stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse, and any other approved structure or material. If these sites are not stabilized by June 30, 2008, an application to receive permit coverage will be required to be submitted to the Division of Water and Waste Management on or before, July 1, 2008.

SECTION A. TERMS OF PERMIT

Discharges from sites covered under the General Permit shall not cause or contribute to a violation of 47CSR2 (Requirements Governing Water Quality Standards) and 46CSR12, (Requirements Governing Groundwater Standards) of the West Virginia Legislative Rules pursuant to Chapter 22, Article 11 and Article 12. Discharges that are not in compliance with these standards are not authorized.

SECTION B. SCHEDULE OF COMPLIANCE

Compliance with this General Permit and the approved Stormwater Pollution Prevention Plan is required upon the beginning of the construction project.
SECTION C. MANAGEMENT CONDITIONS

C.1. Duty to Comply

C.1.a. The permittee must comply with all conditions of this permit. Permit noncompliance constitutes a violation of the federal Clean Water Act (CWA) and State Act (Chapter 22, Article 11 and Article 12) and is grounds for enforcement action; for permit modification, revocation and reissuance, suspension or revocation; or denial of a permit renewal application.

C.1.b. The permittee shall comply with all effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

C.2. Duty to Reapply

If the permittee seeks to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit or general permit registration as detailed in permit reissuance.

C.3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.

C.4. Permit Actions

This permit may be modified, revoked and reissued, suspended, or revoked for cause. The filing of a request by the permittee for permit modification, revocation and reissuance, or revocation, or a notification of a planned change or anticipated noncompliance, does not stay any permit condition.

C.5. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

C.6. Signatory Requirements

All applications, reports, or information submitted to the Director shall be signed and certified as required in 47CSR10-4.6. (NPDES Program). If an authorization becomes inaccurate because a different individual or position has responsibility for the overall operation of the project, a new authorization must be submitted to the Director prior
to, or together with any reports, information, or applications to be signed by an authorized representative.

C.7. Transferability

This permit is not transferable to any person, except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary.

C.8. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable specified time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, suspending, or revoking this permit, or to determine compliance with this permit. This information may include water quality information as specified by the Director. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

C.9. Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall immediately submit such facts or information.

C.10. Inspections and Entry

The permittee shall allow the Director or an authorized representative upon the presentation of credentials and such other documents as may be required by law

C.10.a. To enter upon the permittee’s premises in which an effluent source or activity is located, or where records must be kept under the conditions of this permit;

C.10.b. To have access to and copy at reasonable times any records that must be kept under the conditions of this permit;

C.10.c. To inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

C.10.d. To sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the State Act, any substances or parameters at any location.
C.11. Permit Modification

This permit may be modified, suspended, or revoked in whole or in part during its term in accordance with the provisions of Chapter 22, Article 11 of the Code of West Virginia. Any permittee wishing to modify his coverage under this permit shall submit such request at least 45 days prior to the commencement of the proposed action for modification if no public notice period is required. A modification that will have a public notice period must be submitted at least 90 days prior to construction to allow for the public notice procedure.

C.12. Water Quality

The effluent or effluents covered by this permit are to be of such quality so as to not cause violations of applicable water quality standards.

C.13. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA.

C.14. Liabilities

C.14.a. Any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the CWA is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Section 301, 302, 306, 307, or 308 of the CWA is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both.

C.14.b. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more that $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

C.14.c. Nothing in C.14.a. and C.14.b. shall be construed to limit or prohibit any other authority the Director may have under the State Water Pollution Control Act, Chapter 22, Article 11 and State Groundwater Protection Act, Chapter 22, Article 12.

C.15 Outlet Markers

An outlet marker shall be posted during the term of General Permit coverage in accordance with Title 47, Series 11, Section 9 (Special Rules) of the West Virginia Legislative Rules.
SECTION D. OPERATION AND MAINTENANCE

D.1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit.

D.2. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D.3. Bypass

D.3.a. Definitions

D.3.a.1. “Bypass” means the intentional diversion of waste streams from any portion of a treatment facility; and

D.3.a.2. “Severe property damage” means substantial physical damage to property, damage to the treatment facility which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

D.3.b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of D.3.c. and D.3.d. of this permit.

D.3.c. Notification of bypass

D.3.c.1. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

D.3.c.2. If the permittee does not know in advance of the need for bypass, notice shall be submitted as requires in F.2.a. of this permit.

D.3.d. Prohibition of bypass

D.3.d.1. Bypass is permitted only under the following conditions, and the Director may take enforcement action against a permittee for bypass, unless;
D.3.d.1.A. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

D.3.d.1.B. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated sediment, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance. This condition is not satisfied if the sediment and erosion control structures were not installed in the proper sequence; and

D.3.d.1.C. The permittee submitted notices as required under D.3.c. of this permit.

D.3.d.2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in D.3.d.1. of this permit.

D.4. Upset

D.4.a. “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with the terms and conditions of the permit and the Stormwater Pollution Prevention Plan because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

D.4.b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of D.4.c. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

D.4.c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

D.4.c.1. An upset occurred and that the permittee can identify the cause(s) of the upset.

D.4.c.2. The permitted project was at the time being properly operated.

D.4.c.3. The permittee submitted notice of the upset as required in F.2.a. of this permit.

D.4.c.4. The permittee complied with any remedial measures required under C.3. of this permit.
D.4.d. Burden of proof. In any enforcement proceedings the permittee seeking to establish the occurrence of an upset has the burden of proof.

D.5. Removed Substances

Where removed substances are not otherwise covered by the terms and conditions of this permit or other existing permits by the Director, any solids, sludge, filter backwash or other pollutants (removed in the course of treatment or control of wastewater) and which are intended for disposal within the State, shall be disposed of only in a manner and at a site subject to the approval by the Director. If such substances are intended for disposal outside the State or for reuse, i.e., as a material used for making another product, which in turn has another use, the permittee shall notify the Director in writing of the proposed disposal or use of such substances, the identity of the prospective disposer or users, and the intended place of disposal or use, as appropriate.

SECTION E. MONITORING AND REPORTING

Monitoring of discharges is not required for construction activities unless directed by the Director.

E.1. Definitions

"As-built drawing" means a certified drawing of conditions as they were actually constructed.

"Best management practices" (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, other management practices and various structural practices such as but not limited to silt fence, sediment traps, seeding and mulching, and rip-rap used to prevent or reduce erosion and sediment runoff and the pollution of surface waters of the State. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Buffer zone" means the region near the border of a protected area; a transition zone between areas managed for different objectives.

"Clearing" means cutting and removing vegetation with chain saws, brush axes, brush hogs and other mechanical means where there is little or no soil disturbance.


"Common plan of development" is a contiguous construction project where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan. The "plan" is broadly defined as any announcement or piece of documentation or physical demarcation indicating construction activities may occur on a specific plot; included in this definition are most subdivisions.
"Control" is a best management practice such as erosion control or sediment control that will reduce sedimentation on a construction project.

"Construction Activity" means land disturbance operations such as grubbing, grading, filling, and excavating during site development for residential, commercial or industrial purposes. This includes, but is not limited to, access roads, borrow and spoil areas.

"Director" means the Director of the Division of Water and Waste Management, Department of Environmental Protection, or her designated representative.

"Disturbed area" is the total area of land disturbing activity that will take place during all phases of a construction project, including, but not limited to, all waste and borrow sites, utility installation, road building, mass grading, and site development.

"Diversion" means a berm or excavated channel or combination berm and channel constructed across sloping land on a predetermined grade. This includes but is not limited to protecting work areas from upslope runoff and reducing the size of the drainage going to sediment trapping structures (clean water diversion), transporting runoff across a project to minimize erosion and diverting sediment-laden water to an appropriate sediment-trapping structure.

"Erosion" means the displacement of solids (soil, mud, rock, and other particles) by the agents of wind, water, and ice in response to gravity.

"Establishment" means an industrial establishment, mill, factory, tannery, paper and pulp mill, mine, colliery, breaker or mineral processing operation, quarry, refinery, well and each and every industry or plant or works in the operation or process of which industrial wastes, sewage or other wastes are produced.

"Estimate" means to be based on a technical evaluation of the sources contributing to the discharge.

"Excavating" means large scale grading accomplished usually with heavy machinery.

"Final stabilization" means disturbed areas shall be covered permanent protection. Final stabilization includes pavement, buildings, stable waterways (riprap, concrete, grass or pipe), a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground, stable outlet channels with velocity dissipation that directs site runoff to a natural watercourse, and any other approved structure or material.

"Grading" means changing surface contours by removing soil and stone from one place and building it up in another.

"Groundwater" means the water occurring in the zone of saturation beneath the seasonal high water table or any perched water zones.
“Groundwater Protection Plan” (GPP) means groundwater protection practices developed and implemented in accordance with WV Legislative Rules, 47CSR58 (Groundwater Protection Rule).

“Grubbing” means physically removing vegetative stumps and roots from the ground and disturbing the earth, usually by heavy machinery.

“Intermittent stream” means a stream that has no flow during sustained periods of no precipitation and does not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six months.

“Karst” means a type of topography formed over limestone, dolomite, or gypsum resulting in dissolving or solution of the underlying calcareous rock.

“Minor construction activity” means an activity which disturbs one acre or more, but less than three acres.

“National Pollutant Discharge Elimination System” (NPDES) means the national program for issuing, denying, modifying, revoking and reissuing, suspending, revoking, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under Section 307, 318, 402, and 405 of CWA, including any approved state program.

“Notice of Intent” (NOI) is the form to be submitted by the applicant to register a small construction project (one that disturbs one to less than three acres) under the Construction Stormwater General Permit. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application Form.

“Notice of Termination” (NOT) is the form to be submitted by the permittee to terminate coverage under the Construction General Stormwater Permit, after final stabilization has been completed. See Final Stabilization.

“Permanent detention/retention facility” means: Detention. The process of reducing offsite stormwater discharge rates by temporarily holding the water in a storage basin and then releasing it slowly over a period of time. The objective of a detention facility is to regulate the runoff from a given rainfall event and to control discharge rates to reduce the impact on downstream stormwater systems. Retention. The prevention of stormwater runoff from being discharged into receiving waters by storing it in a storage area. Water is retained and stored until it is lost through percolation, removed by evapotranspiration by plants, or through evaporation from the free water surface. Retention systems are designed to not have any offsite discharges.

“Point source” is any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the state.

“Pollutant” means industrial waste, sewage or other wastes.
"Post-development” means the anticipated final conditions of the project, including rooftops, parking lots, streets, drainage systems, vegetation, and any other structure planned. For subdivisions and speculative developments, it will be assumed that all lots are developed.

"Pre-development” means the condition of the land, the amount and health of the ground cover and vegetation prior to development.

"Runoff coefficient” means the fraction of total rainfall that is not infiltrated into the ground that will appear at the point of discharge as runoff.

"Runoff curve number” is the numeric value reflecting the runoff coefficient and is based on soils, slopes, and type and health of the ground cover.

"Secretary” means the Secretary of the Department of Environmental Protection, or her designated representative.

"Sediment” means any particulate matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water or other liquid.

"Sedimentation” means the deposition by settling of a suspended material.

"Sediment trap” means a temporary ponding area formed by constructing an embankment or excavation and embankment that will trap the flow of sediment-laden runoff. Sediment traps have a properly stabilized outlet/weir or riser and pipe to detain sediment-laden runoff from small disturbed areas of five acres or less. Outlets must be designed to extend the detention time and allow the majority of the sediment to settle out.

"Sediment basin” means a temporary structure consisting of an earthen embankment, or embankment and excavated area, located in a suitable area to capture sediment-laden runoff from a construction site. A sediment basin reduces the energy of the water through extended detention (48 to 72 hours) to settle out the majority of the suspended solids and sediment and prevent sedimentation in waterways, culverts, streams and rivers. Sediment basins have both wet and dry storage space to enhance the trapping efficiency and are appropriate in drainage areas of five acres and greater.

"Sinkhole” means a depression in the land surface formed by solution or collapse that directs surface runoff into subsurface or to an underground drainage flow.

"Site Registration Application forms” means the forms designed by the Director for the purpose of registering for coverage under a general permit. Under the General Permit there will be two separate forms, one for one to less than three acres (Notice of Intent) and the Site Registration Application form for projects that disturb three acres and greater. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application form.
"Stormwater" means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

"Stormwater management facilities" means structures such as ponds, basins, outlets, ditches, velocity dissipaters, infiltration trenches and basins, extended detention basins and ponds, and any other structure used to control the quality and quantity of stormwater from a development project.

"Stormwater Pollution Prevention Plan" (SWPPP) means the erosion and sediment control plan and the post development plan submitted as part of the Site Registration Application form.

"Tier 2.5 Waters" means Waters of Special Concern as identified in 60CSR5 (Antidegradation Implementation Procedures) and 47CSR2-4.1.c. (Requirements Governing Water Quality Standards).

"Tier 3 Waters" means waters as otherwise identified in 47CSR2-4.1.d. (Requirements Governing Water Quality Standards).

"Trout Streams" means any waters which meet the definition of 47CSR2-2.18. (Requirements Governing Water Quality Standards).

"1-year, 24-hour precipitation event" means the maximum 24-hour precipitation event with a probable recurrence interval of once in one year.

"25-year, 24-hour precipitation" means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years.

SECTION F. OTHER REPORTING

F.1. Reporting Spill and Accidental Discharges

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to 47CSR11-2. (Special Rules) of the West Virginia Legislative Rules promulgated pursuant to Chapter 22, Article 11.

F.2. Immediate Reporting

F.2.a. The permittee shall report any noncompliance which may endanger health or the environment immediately after becoming aware of the circumstances by using the Department's designated spill alert telephone number ((800) 642-3074). A written submission shall be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time, and if, the noncompliance has not been corrected, the anticipated time it is
expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

SECTION G. OTHER REQUIREMENTS

G.1. Requiring an Individual Permit or an Alternative General Permit.

G.1.a. The Director may require any person authorized by this permit to apply for and obtain either an individual NPDES permit or an alternative NPDES General Permit. Any interested person may petition the Director to take action under this paragraph. The Director may require any owner or operator authorized by this permit to apply for an individual NPDES permit only if the owner or operator has been notified in writing that such a permit application is required.

G.2. Prohibition of Non-Stormwater Discharges

All discharges authorized by this permit shall be composed entirely of stormwater. Discharges of material other than stormwater are not authorized by this permit except as follows.

The following non-stormwater discharges are authorized by this permit: discharges from firefighting activities, fire hydrant flushing; waters used to wash vehicles or control dust; potable water sources, including waterline flushing; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwater where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated groundwater; and foundation or footing drains where flows are not contaminated with process materials such as solvents that are combined with stormwater discharges associated with industrial activity.

This permit does not authorize the conveyance, diversion, channeling, directing or otherwise allowing the discharge of stormwater into a sinkhole without an Underground Injection Control Permit.

G.3. Releases in Excess of Reportable Quantities

This permit does not relieve the permittee of the reporting requirements of 40CFR117 and 40CFR302. The discharge of hazardous substances in the stormwater discharge(s) from a project is not authorized by this General Permit, and in no case shall the discharge(s) contain a hazardous substance equal to or in excess of reporting quantities.

A Stormwater Pollution Plan and a Groundwater Protection Plan shall be developed for each project covered by this permit. These two plans may be combined into one plan if all of the requirements for both plans are met. Alternatively, they may be developed and maintained as separate stand-alone documents.

Stormwater Pollution Prevention Plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with construction activity. In addition, the plan shall describe and ensure the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction activity and to assure compliance with the terms and conditions of this permit.

Groundwater Protection Plans (GPP) shall be prepared in accordance with the requirements of 47CSR58-4.11. et seq (Groundwater Protection Regulations). The GPP shall identify all operations that may reasonably be expected to contaminate the groundwater resources with an indication of the potential for soil and groundwater contamination from those operations. In addition the GPP shall provide a thorough and detailed description of procedures designed to protect groundwater from the identified potential contamination sources. The GPP is not required to be submitted to the Division of Water and Waste Management for review. Guidance in the completion of a GPP is available from the Division of Water and Waste Management.

G.4.a. The SWPPP and the GPP shall be signed in accordance with Section C.6. and retained onsite.

G.4.b. The application and SWPPP shall be submitted to the Division of Water and Waste Management at least 45 days before construction is to begin, except as noted in G.4.b.3. and G.4.b.4. Prospective permittees should submit applications for review prior to accepting construction bids on the project. As the plans are evaluated by the Director or authorized representative, the Director or authorized representative may notify the permittee during the 45-day review period that the plan does not meet one or more of the minimum requirements of this section. After such notification from the Director or authorized representative, the permittee shall make changes to the plan in accordance with the time frames established below, and shall submit to the Director a written certification that the requested changes have been made.

G.4.b.1. Except as provided in G.4.b.2., the permittee shall have 30 days after such notification to make the changes necessary.

G.4.b.2. The permittee shall have 24 hours after such notification to make changes relating to sediment and erosion controls to prevent loss of sediment from an active construction site, unless additional time is provided by the Director or an authorized representative.
G.4.b.3. Projects disturbing less than three acres and that do not discharge to or upstream of Tier 2.5 or Tier 3 waters shall submit only the Notice of Intent Form (NOI) 10 days prior to initiating construction. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application form.

G.4.b.4. Projects that will discharge to or upstream of Tier 2.5 or Tier 3 waters and disturb three acres or more, or that will disturb 100 or more acres, or that the grading phase of construction will last for more than one year, shall submit the application and SWPPP at least 90 days prior to construction to allow for the public notice procedure.

G.4.b.5. Within 24 hours of filing an NOI (one to less than three acres) or a Site Registration Application (three acres or more) with DWWM, all projects shall display a sign for the duration of the construction project near the entrance of the project or, for linear projects, at a location near an active part of the project that is accessible by the public, which contains the following information using the template found in the instructions:
1) the registrant's name or the name of a contact person along with a telephone number;
2) A brief description of the project; 3) a statement indicating that the NOI or SWPPP, as applicable, has been filed with the DWWM; 4) the address and telephone number of the agency where the NOI or SWPPP is maintained; and 5) That any person may obtain a copy of the NOI or SWPPP by contacting the DWWM at (800) 654-5227. The sign shall be a minimum of two feet by two feet and at least three feet above ground level, clearly visible and legible from a public roadway or right-of-way. If it is not feasible to display a sign at or near the project, the registrant, with prior approval from the DWWM, may post a notice containing the foregoing information at a local public building, including, but not limited to, a town hall or public library.

G.4.c. The permittee shall modify, using forms provided by DWWM, the SWPPP whenever there is a change in design, construction, scope of operation, or maintenance, which has the potential to adversely impact the surface waters of the State, or if the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activities. Should conditions warrant, the Director, or the Director's representative, may request changes to the SWPPP during a field inspection. The Director may review changes or modifications to the SWPPP in the same manner as above.

The permittee shall amend the GPP whenever there is a change in design, construction, operation, or maintenance which could reasonably be expected to have an impact on the potential contamination of groundwater.

G.4.d. In addition to the requirements of G.4.e, the SWPPP shall also include, at a minimum, the following items:

G.4.d.1. General management controls
G.4.d.1.A. Preventive maintenance – A preventive maintenance program shall involve inspection and maintenance of sediment and erosion control best management practices to identify and address conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters.

G.4.d.1.B. Good housekeeping – Good housekeeping requires the maintenance of a clean and orderly project.

G.4.d.1.C. Spill prevention and response procedures – Areas where potential spills may occur, and their accompanying drainage points, shall be identified clearly in the SWPPP/GPP. Where appropriate, specify material handling procedures and storage requirements in the SWPPP/GPP. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a cleanup shall be available to personnel, including spill kits.

G.4.d.2. Consistency with other plans

Stormwater Pollution Prevention Plans may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under section 311 of the CWA or any Best Management Practices (BMP) and Groundwater Protection Plans (GPP) pursuant to 47CSR58 (Groundwater Protection Rule) or otherwise required by an NPDES permit and may incorporate any part of such plans into the Stormwater Pollution Prevention Plan by reference.

G.4.e. Requirements for construction activities – Operations that discharge stormwater associated with construction activity disturbing one or more acres are not only subject to the requirements of Section G.4.d. of this permit, but are also subject to the following requirements. The SWPPP shall include, as a minimum, the following items.

G.4.e.1. Site description – Each plan shall, at a minimum, provide a description of the following:

G.4.e.1.A. A description of the nature of the construction activity, including a proposed timetable for major activities;

G.4.e.1.B. Estimates of the total area of the site and the part of the site that is expected to undergo excavation or grading and the total amount of excavation by cut and fill;

G.4.e.1.C. For each discharge design point, the pre-construction peak discharge from a one year, 24-hour storm in cubic feet per second and an the post-development peak discharge from a one year, 24-hour storm in cubic feet per second shall be calculated. The design procedures shall follow professionally accepted engineering and hydrologic methodologies.

G.4.e.1.D. Site maps indicating, with a minimum of five-foot contours, drainage patterns and slopes prior to construction and anticipated conditions after grading activities, topsoil stockpiles, waste areas, borrow sites, locations of sediment control structures identified
in the narrative, the location of impervious areas after construction is complete, final stormwater routing including all ditches and pipe systems, property boundaries and easements, nearest receiving stream, access roads, legend and springs, surface waters and any other information necessary to describe the project in detail.

G.4.e.1.E. A description and detail of the proposed construction entrance(s). Each site shall have stone access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads. Except for haul roads, all unpaved roads on the site carrying more than 25 vehicles per day shall be graveled.

G.4.e.2. Controls – Each construction operation covered by this permit shall develop a description of controls appropriate for the project and implement such controls. The description of these controls shall address the following minimum components, including a schedule for implementing such controls.

G.4.e.2.A. Erosion and sediment controls

G.4.e.2.A.i. Vegetative practices – A description of interim and permanent stabilization practices, including site specific implementation schedules of the practices, shall be provided. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized as rapidly as possible. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Also include in the plan seedbed preparation requirements and the type and amount of soil amendments necessary to establish a healthy stand of vegetation. A record of the dates when major grading activities will occur, and when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures will be initiated shall be included in the plan. Except as noted below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven days after the construction activity in that portion of the site has permanently ceased.

G.4.e.2.A.i.a. Where the initiation of stabilization measures by the seventh day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as conditions allow.

G.4.e.2.A.i.b. Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g., the total time period that construction activity is temporarily halted is less than 21 days) then stabilization measures do not have to be initiated on that portion of the site by the seventh day after construction activities have temporarily ceased.

G.4.e.2.A.i.c. Areas where the seed has failed to germinate adequately (uniform perennial vegetative cover with a density of 70%) within 30 days after seeding and
mulching must be reseeded immediately, or as soon as weather conditions allow.

G.4.e.2.A.i.d. Diversions must be stabilized prior to becoming functional.

G.4.e.2.A.ii. Structural practices – A description of the structural practices to be used to divert flows around exposed soils, store flows or otherwise limit runoff from exposed areas and eliminate sediment-laden runoff from the site. Such practices may include but are not limited to silt fences, earth dikes and berms, land grading, diversions, drainage swales, check dams subsurface drains, pipe slope drains, storm drain inlet protection, rock outlet protection, reinforced soil retention systems and geotextiles, gabions and riprap, and permanent and temporary sediment traps/basins.

G.4.e.2.A.ii.a. For locations on a site that have a drainage area of five acres or less, a sediment trap which provides a storage volume equal to 3,600 cubic feet per acre of drainage area shall be installed. Half of the volume of the trap will be in a permanent pool and half will be dry storage.

G.4.e.2.A.ii.b. For drainage areas of greater than five acres, a sediment basin providing 3,600 cubic feet per drainage acre shall be installed. Half of the volume of the basin shall be in a permanent pool and half shall be dry storage. Sediment basins must be able to dewater the dry storage volume in 48 to 72 hours. A sediment basin must be able to pass through the spillway(s) a 25-year, 24-hour storm event, and still maintain at least one foot of freeboard.

G.4.e.2.A.ii.c. The inlet(s) and outlet(s) for a sediment trapping structure must be protected against erosion by appropriate material such as riprap or other similar media.

G.4.e.2.A.ii.d. If necessary, diversions will be used to direct runoff to the trapping structure. Diversions must be stabilized prior to becoming functional.

G.4.e.2.A.ii.e. For locations served by a common drainage where a detention basin providing 3,600 cubic feet of storage is not attainable, additional sediment and erosion controls within the project area are required in lieu of the required sized sediment basin. Justification and a narrative description of the additional measures proposed must be provided for use of any practice(s) other than sediment basins or traps.

G.4.e.2.A.ii.f. Fill slopes must be protected by measures used to divert runoff away from fill slopes to conveyance measures such as pipe slope drains or stable channels.

G.4.e.2.A.ii.g. Sediment trapping structures will be eliminated and the area properly reclaimed and stabilized when the contributing drainage area is stabilized and the structures are no longer needed, unless the structure is converted into a permanent stormwater detention/retention structure.
G.4.e.2.A.ii.h. All trapped sediments will be disposed on an upland area where there is no chance of entering nearby streams.

G.4.e.2.A.ii.i. Breaching the embankment to dewater the structure is not permitted. Dewatering and structure removal shall not cause a violation of water quality standards. Provide a description of the procedures that will be used in removing these structures and the timeframe.

G.4.e.2.A.ii.j. No sediment-laden water will be allowed to leave the site without going through an appropriate best management practice.

G.4.e.2.A.ii.k. Hay or straw bales are not acceptable BMPs.

G.4.e.2.A.iii. Presumptive conditions for discharges to Tier 2.5 and Tier 3 waters

Construction activities discharging to Tier 2.5 or Tier 3 waters will go through the Tier 2.5 or Tier 3.0 antidegradation review process.

G.4.e.2.B. Stormwater management plan

A description of measures that will be installed during construction to control pollutants in stormwater discharges after the project is completed shall be included in the SWPPP. The completed project shall convey stormwater runoff in a manner that will protect both the site and the receiving stream from post-construction erosion. All surface waters and other runoff conveyance structures shall be permanently stabilized as appropriate for expected flows. In developing structural practices for stormwater control, the permittee shall consider the use of, but not limited to: infiltration of runoff onsite; flow attenuation by use of open vegetated swales and natural depressions; stormwater retention structures and stormwater detention structures. A combination of practices may be utilized. The permittee should consider low impact development (LID) in the design of the site and the best management practices. This will allow the site to retain its natural hydrology and infiltrate stormwater within the boundary of the site. The use of impervious surfaces for stabilization should be avoided. Velocity dissipation devices shall be placed at the outlet of all detention or retention structures and along the length of any outlet channel as necessary to provide a non-erosive velocity flow from the structure to a water course.

Projects located in areas that have local government requirements and/or criteria for post development stormwater management must meet those requirements and/or criteria. Compliance with this general permit does not assure compliance with local codes regulations, or ordinances.

The permittee shall submit all calculations, watershed mapping, design drawings, and any other information necessary to explain the technical basis for the stormwater management plan. Since development site conditions vary widely, plan preparers will have significant latitude in designing practices to comply with this provision of the
permit. However, design procedures shall follow professionally accepted engineering and hydrologic methodologies. Permanent stormwater management structures that will impound water (detention/retention basins or similar structures) shall be designed and certified by a registered professional engineer. These structures shall also have a certified as-built drawing submitted with the Notice of Termination at the completion of the project.

G.4.e.2.C Other controls

G.4.e.2.C.i. Waste disposal – All solid waste and construction/demolition material must be disposed of in accordance with the Code of West Virginia and Legislative Rule Title 33 Series 1, (Solid Waste Management Rule).

G.4.e.2.C.ii. Provisions must be made to control fugitive dust.

G.4.e.2.C.iii. Groundwater Protection Plan (GPP) – The applicant shall prepare a GPP that will satisfy the 47CSR58-4.11. et seq. Groundwater must be protected in accordance with the Code of West Virginia and Legislative Rule Title 47 Series 58 (Groundwater Protection Rule).

G.4.e.2.C.iv. Employee training – Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping and routine inspection. Training shall be on a quarterly basis and records of the training shall be maintained on site for review by the Director or the Director’s representative.

G.4.e.2.C.v. Visual inspection – Company personnel shall be identified to inspect as set forth under G.4.e.2.D. A tracking procedure shall be used to ensure that adequate corrective actions have been taken in response to deficiencies identified during an inspection. Records of inspections shall be maintained onsite for review by the Director or the Director’s representative.

G.4.e.2.C.vi. Recordkeeping and internal reporting procedures – Incidents such as spills, leaks and improper dumping, along with other information describing the quality and quantity of stormwater discharges should be included in the records. Inspection and maintenance records must be kept onsite for review by the Director or the Director’s representative.

G.4.e.2.D Maintenance

A description of procedures to maintain in good and effective condition and promptly repair or restore all grade surfaces, walls, dams and structures, vegetation, erosion and sediment control measures and other protective devices identified in the site plan. At a minimum, procedures in a plan shall provide that all erosion controls on the site are inspected at least once every seven calendar days and within 24 hours after any storm event of greater than 0.5 inches of rain per 24-hour period.
G.4.e.2.D.i. All public and private roads adjacent to a construction entrance must be inspected and cleaned of debris originating from the construction site as necessary.

G.4.f. All Stormwater Pollution Prevention Plans and Groundwater Protection Plans required under this permit are considered reports that shall be available to the public under Section 308(b) of the CWA. The owner or operator of a project with stormwater discharges covered by this permit shall make plans available to members of the public upon request. However, the permittee may claim any portion of a Stormwater Pollution Plan or Groundwater Protection Plan as confidential in accordance with 47 CSR10-12.7. (NPDES Program).

G.4.g. Compliance with other laws and statutes

Nothing in this general permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G.5. Discharges to Impaired Waters

This permit does not authorize new sources or new discharges of constituents of concern to impaired waters unless consistent with the approved total maximum daily load (TMDL) and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the Clean Water Act Section 303(d) list. Pollutants of concern are those constituents for which the water body is listed as impaired. Discharges of pollutants of concern to impaired waterbodies for which there is an approved TMDL are not eligible for coverage under this permit unless they are consistent with the approved TMDL. Within six months of the TMDL approval, permittees must incorporate any limitations, conditions or requirements applicable to their discharges necessary for compliance with the TMDL, including any monitoring or reporting required by DWWM rules, into their SWPPP in order to be eligible for coverage under this general permit.

Sites that discharge into a receiving water that has been listed on the Clean Water Act 303(d) list of impaired waters, and with discharges that contain the pollutant(s) for which the water body is impaired, must document in the SWPPP how the BMPs will control the discharge of the pollutant(s) of concern.

G.6. Endangered and Threatened Species

If a site discharges to a stream where a federally endangered or threatened species or its habitats are present, the applicant shall contact the U.S. Fish and Wildlife Service to insure that requirements of the federal Endangered Species Act are met.

H. Reopener Clause
If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge authorized by this general permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Section G.1. of this permit, or the permit may be modified to include different limitations and/or requirements.

1. The conditions, standards, and limitations of this General Permit will be reviewed at the time of reissuance for possible revisions that may lead to more or less stringent conditions, standards, and limitations.

J. Permit coverage for construction activities encompassed by this permit expires upon satisfactory stabilization of the site. Satisfactory stabilization means **ALL** disturbed areas shall be covered by some permanent protection. Stabilize includes pavement, buildings, waterways (riprap, concrete, grass, or pipe), a healthy, vigorous stand of grass that uniformly covers more than 70 percent of the ground, stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse, and any other approved structure or material. The permittee will request a final inspection by sending in the Notice of Termination. The Notice of Termination shall also include as-built drawings, certified by a registered professional engineer, for any permanent ponds or basins. Sites not stabilized will continue to have coverage under this permit and will be assessed an annual permit fee as promulgated by the West Virginia Legislature. Sites will be assessed a prorated annual fee based upon the completion date and proper stabilization. The Notice of Termination must be submitted within 30 days after final stabilization is achieved.

The herein-described activity is to be constructed or installed and operated, used and maintained strictly in accordance with the terms and conditions of this permit with any plans, specifications, and information submitted with the individual site registration application form, with any plan of maintenance and method of operation thereof submitted and with any applicable rules and regulations promulgated by the Environmental Quality Board and the Secretary of the Department of Environmental Protection.

Failure to comply with the terms and conditions of this permit, with any plans, specifications and information submitted, and with any plan of maintenance and method of operation thereof submitted shall constitute grounds for the revocation or suspension of this permit to any individual establishment or other person and for the invocation of all the enforcement procedures set forth in Chapter 22, Articles 11 and 12 of the Code of West Virginia.

This permit is issued in accordance with the provisions of Chapter 22, Article 11 of the Code of West Virginia.

By: [Signature]
Director
Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Construction Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with construction activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Registration Number: WVR10

Date Storm Water Discharge Terminated:

II. Facility Operator Information

Name: 

Address: 

City: 

State: 

ZIP Code: 

Phone: 

III. Facility/Site Location Information

Name: 

Address: 

City: 

County: 

ZIP Code: 

Latitude: 

Longitude: 

IV. Certification: I certify under penalty of law that all storm water discharges associated with construction activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with construction activity under this general permit, and that discharging pollutants in storm water associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: 

Date: 

Signature: 

Instructions for Completing Notice of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with construction activity.

For construction activities, elimination of all storm water discharges associated with construction activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for upland areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Send this form to the Charleston address below:

WV DEP - DWWM
Permitting and Engineering Branch
661 57th Street SE
Charleston, WV 25304-2345
Instructions
Notice of Termination (NOT) of Coverage Under The NPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information
Enter the existing NPDES Storm Water General Permit registration number assigned to the facility or site identified in Section III.

Enter the date that the construction project was terminated and all disturbed areas were stabilized as required by the General Permit. A final inspection to determine the adequacy of the stabilization will be conducted by this agency.

Section II Facility Operator Information
Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information
Enter the facility's or site's official or legal name and complete address, including city, county and ZIP code.

Section IV Certification
State statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures:

For a partnership or sole proprietorship: by a general partner or the proprietor, or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

The completed form is to be submitted to the Charleston address for all projects.
February 1, 2010

Ms. Susan Pierce  
Deputy State Historic Preservation Officer  
WV Division of Culture and History  
The Cultural Center  
1900 Kanawha Boulevard, E  
Charleston, WV 25305-0300

Re: Mingo County Redevelopment Authority  
Mingo Central High School & King Coal Highway Water & Sewer Extension  
Project

Dear Ms. Pierce:

The Mingo County Redevelopment Authority hereby requests comments regarding the proposed water and sewer line extension project and its potential effects to cultural resources pursuant to Section 106 of the National Historic Preservation Act.

The water portion of the project consists of approximately 81,890 feet of 10” and smaller diameter water main, two (2) water booster stations, one (1) 200,000 gallon water storage tank, two (2) pressure reducing stations, valves, fire hydrants and other related items. The sewer portion consists of approximately 61,000 feet of 10” and smaller diameter gravity sewer pipe, 30,580 feet of 6” and smaller diameter sewage force main, manholes, cleanouts and other related items. Connection for both utilities will be made at the ends of existing systems on WV Route 65 just north of its intersection with Mate Creek Road (WV Route 6) and along WV Route 6 near the Community of Newtown, all in Mingo County. Maps and a video showing line locations and the proposed booster station and tank sites are attached.

Should you need additional information or clarification, please do not hesitate to contact me at 304-776-7473.

Sincerely,

Rick Roberts, PE  
Project Manager

Attachment
January 29, 2010

AECOM
260 South Broad Street
Suite 1500
Philadelphia, PA 19102
Attn: NS Pipe and Wire Administrator

RE: Mingo Central High School Water and Sewer Extensions
Milepost 5.16, NS Crossing 471235J Mate Creek

To Whom it may Concern:

Please find enclosed an application, plan, profiles and vicinity map, for two railroad crossings, one for water and the other for sanitary sewer. The crossings are for a water and sewer extension for the Mingo Central High School. The new high school is currently being built along the King Coal Highway, near the community of Red Jacket in Mingo County, West Virginia. Below is a brief project description:

This is a water and sewer construction project, consisting of the following items:

- Construction of approximately 11,420 feet of 10" water main, water booster stations(s), water storage tank(s); 10,320 feet of gravity sewer and sewage lift stations(s).

The two railroad crossings are at an existing private crossing #471235J for Cobra Natural Resources, LLC along Mingo County Route 6 as shown on the attached plan. The utilities are to be connected to existing water and sewer currently owned and operated by the Town of Matewan.

Please contact me if you need any additional information.

Sincerely,

Rick Roberts, P. E.
APPLICATION FOR PIPE OR WIRE OCCUPANCY
(Please fill out questions 1-7 and include these pages with your application)

Please answer all questions and return to:

Before 2/12/2010
AECOM
260 South Broad Street
Suite 1500
Philadelphia, PA 19102
(215) 735-0832
Attn: NS Pipe and Wire Administrator

After 2/12/2010
AECOM
1700 Market Street
16th Floor
Philadelphia, PA 19103
(215) 735-0832
Attn: NS Pipe and Wire Administrator

1) Legal Name and Address of Applicant (party to agreement)
   Legal Name**: Town of Matewan - Mayor Sheila L. Kessler
   Street: P.O. Box 306
   City: Matewan
   State: WV
   Zip: 25672
   **Please ensure that the exact legal name is provided with no abbreviations. This name
   will be used for agreement preparation, as well as the information below.

2) Applicant (party to agreement) is a:
   ( ) Corporation - give state of formation:
   ( ) Limited Partnership - give state of formation:
   ( ) General Partnership - give state of formation:
   ( ) Sole Proprietorship - give state of formation:
   ( ) Individual
   ( ) Government Entity
   ( ) Other: Municipal Water Utility

3) Name and Address of Applicant's Representative:
   Name: Charles R. Roberts, Jr., P.E.
   Title: Project Manager
   Company: E.L. Robinson Engineering Co.
   Street: 5088 Washington Street, West
   City: Charleston
   State: WV
   Zip: 25313
   Telephone: 304-776-7473
   Fax: 304-776-6426
   E-Mail Address: croberts@elrobinson.com

4) Location of Proposed Facility:
   City/Municipality: Red Jacket
   County: Mingo
   State: WV
   Name of Closest Street Crossing of Railroad: Katet Creek
   Street Grade Crossing AARDOT #: 471235.7
   GPS Coordinates: Latitude N37°38'20.79"
   Longitude W82°58'08.90"
   Footage (670' NE) and direction (N/S/E/W) from Railroad Mile Post No. 5 or
   center of public Highway Crossing or Bridge Mate Creek along County Route 6
   (Name of Street)
5) Will Facility be Located Entirely Within Confinement of a Public Right of Way?
   ( ) Yes  *(x) No
   * If yes, provide conclusive evidence for verification in the form of a letter or memo
   from the appropriate Road Authority indicating that proposed installation is acceptable
   to the Road Authority
   Street width: __________________________ Street Right of Way width: __________________________
   Road Authority Responsible for Street Maintenance
   Name: ________________________________________________________________________________
   Address: ______________________________________________________________________________
   Contact: _______________________________________________________________________________
   Telephone: ______________________________________________________________________________

6) Proposed Facility to be Installed is a:
   ( ) New facility  ( ) Upgrade of an existing facility*
   *(if an upgrade, please identify and attach copy of current agreement for the facility.

7) Proposed Installation/Construction Date(s): __________________________

If application is approved, applicant agrees to reimburse the Railroad for any cost incurred
by the Railroad incident to installation, maintenance, and/or supervision necessitated by
this pipeline or wireline installation, and further agrees to assume all liability for accidents
or injuries which arise as a result of this installation.

________________________________________  __________________________
Date                                             Signature
Aerial Wire Lines or Cable Lines (Complete all Applicable Information)

a. Type of Proposed Installation:
   i. Transverse Crossing Only
   ii. Longitudinal (parallel to tracks) Occupancy Only
   iii. Longitudinal and Transverse Crossing(s)
   iv. Wire line in highway under railroad bridge
   v. Wire line on highway bridge over railroad

b. Type of wire: ( ) Cable TV ( ) Telephone ( ) Electric Power ( ) Fiber Optic ( ) Other – please specify: ____________________________

c. Will poles be located on Railroad Company’s right of way?
   ( ) Yes  ( ) No

d. Are the poles existing or new poles? Steel or wood poles?
   ( ) Existing - ( ) Steel or ( ) Wood
   ( ) New - ( ) Steel or ( ) Wood

e. Will there be any guy wires on the Railroad right of way?
   ( ) Yes, # of guy wires - __________ ( ) No

f. Will wire line cross existing Railroad communication and/or signal lines?
   ( ) Yes  ( ) No

g. Minimum height of wire above top of rail at 650°F _______ (ft.)
   Minimum height of wire above railroad communication and signal wires at 650°F _______ (ft.)

h. Specification of Wire Line:
   Gauge of Wire: ____________________________
   Total Number of Wires: ____________________________
   Material of Wire: ____________________________
   Maximum circuit voltage: ____________________________
   Total Number of Fibers or pairs in FOC: ____________________________
   Cable type and capacity: ____________________________

All wire line applications shall include a Plan and Profile View of the proposed facility. See the NSCE-4 for the required format. Below is a suggested check-list for your plan development.

Plan View (See NSCE-4 Specification, Plate I)
   All railroad tracks
   ______ Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   ______ Angle of Crossing relative to railroad track(s)
   ______ Dimensioned Property Lines
   ______ Location of Poles and distance to butt of pole to nearest railroad track centerline
   ______ Location of all existing railroad pole lines and all utility lines
   ______ Indicate span length across tracks from pole to pole
   ______ Location of Railroad pole lines or signal facilities
   ______ Location of any above ground utilities
   ______ If proposed wire line is within highway limits or in the vicinity of a grade crossing, location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.) and clearance from existing devices to proposed wire line

Cross Section View (See NSCE-4 Specification, Plate II)
All railroad tracks
Dimensioned Property Lines
Location of Poles and distance to butt of pole to nearest railroad track centerline
Vertical clearance from top of rail of all tracks to bottom of sag
Location of all existing railroad pole lines and all utility lines
Vertical clearance from existing railroad pole lines and proposed wire line
Indicate span length across tracks from pole to pole
If proposed wire line is within highway limits or in the vicinity of a grade crossing, location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.) and clearance from existing devices to proposed wire line
Underground Wires and Conduits (Complete all Applicable Information)

a) Type of Proposed Installation:
   i)  ___ Transverse Crossing Only
   ii) ___ Longitudinal (parallel to tracks) Occupancy Only
   iii) ___ Longitudinal and Transverse Crossing(s)
   iv)  ___ Wire line in highway under railroad bridge
   v)  ___ Wire line on highway bridge over railroad

b) Type of wire: ( ) Cable TV  ( ) Telephone  ( ) Electric Power  ( ) Fiber Optic
   ( ) Other (Specify): ______________________________

   c) Specification of Wire Line:
      Gauge of Wire: ___________________________________________
      Material of Wire: __________________________________________
      Max. circuit voltage for Electric Power line: _______________________
      Total Number of Fibers in FOC: ________________________________
      Total Number of Pairs in Telephone: ____________________________
      Cable type and capacity: _____________________________________

   d) Specification of Conduit (Encasement):
      Please use the CONDUIT DATA SHEET on last page of this application.

   e) Will conduit be a casing pipe for multiple innerducts?
      ( ) Yes*  ( ) No

      *If yes, provide a cross section of the casing pipe indicating all innerducts with the
      content of each innerduct clearly labeled. See last page of this application for Conduit Data Sheet and an Example of a cross section.

   f) Proposed method of installation (Check proposed method):
      WET BORES OR WATER JETTING IS NOT PERMITTED.
      i)  ___ Bore and jack (See Section 5.1.3 of NSCE-8)
      ii) ___ Jacking (See Section 5.1.4 of NSCE-8)
      iii) ___ Tunneling (Tunnel Liner Plate) (See Section 5.1.5 of NSCE-8)
      iv)  ___ Direction Boring/Horiz. Direction Drilling – Method A (See Section 5.1.6
           of NSCE-8)
      v)   ___ Direction Boring/Horiz. Direction Drilling – Method B (See Section 5.1.6
           of NSCE-8)
      vi)  ___ Open Cut (See Section 5.1.2 of NSCE-8)
      vii) ___ Other (Specify):

All underground conduit applications must include a Conduit Data Sheet, Plan and
Profile View of the proposed facility. See the NSCE-4 and NSCE-8 for the required
format. Below is a suggested check-list for your plan development.

Conduit Data Sheet (blank copy attached)

Plan View of Crossing (See NSCE-8 Specification Plate II, check blanks to verify
complete plans)
   ___ All railroad tracks, including distance to any turnouts from proposed conduit
   ___ Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   ___ Angle of Crossing relative to railroad track(s)
   ___ Dimensioned Property Lines
Location of Signs (preferably located at edge of Property or Right of Way Lines)
Location of Railroad pole lines or signal facilities
Location of any above or below ground utilities
Conduit casing pipe length
if proposed conduit is within highway limits, show the location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.)
Location of launching and receiving pits
Profile View of Crossing (See NSCE-8 Specification Plate III)
Profile of ground above crossing
Dimensioned Property Lines
Theoretical Railroad embankment lines (see NSCE-8, Section 4.3.1.F)
Proposed location and elevations of launching and receiving pits
Casing pipe length
Bottom of rail elevation
Depth of cover between bottom of rail and top of conduit or casing pipe
Location of and the minimum depth of cover from ground line to top of conduit or casing pipe on right of way (such as ditches)
Proposed installation:

i) Transverse Crossing Only
ii) Longitudinal Occupancy Only
iii) Longitudinal and Transverse Crossing(s)
iv) Pipeline in highway under railroad bridge
v) Pipeline on highway bridge over railroad
vi) Pipeline bridge over railroad

Material to be conveyed: Water

Diameter of carrier pipe: 8"

Diameter of casing pipe: 18"

Proposed method of installation (Check proposed method)

i) Bore and jack (See Section 5.1.3 of NSCE-8)
ii) Jacking (See Section 5.1.4 of NSCE-8)
iii) Tunneling (Tunnel Liner Plate) (See Section 5.1.5 of NSCE-8)
iv) Direction Boring/Horiz. Direction Drilling – Method A (See Section 5.1.6 of NSCE-8)
v) Direction Boring/Horiz. Direction Drilling – Method B (See Section 5.1.6 of NSCE-8)
vi) Open Cut (See Section 5.1.2 of NSCE-8)
vii) Other (Specify):

All proposed transverse pipeline crossing applications shall include the following:

a. Pipe Data Sheet (blank copy attached)
b. Plan View of Crossing (See NSCE-8 Specification Plate I, below is a suggested check-list for your plan development)
   - All railroad tracks, including distance to any turnouts from proposed pipeline
   - Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   - Angle of Crossing relative to railroad track(s)
   - Dimensioned Property Lines
   - Location of Valves (if required by NSCE-8)
   - Location of Vents (if required by NSCE-8)
   - Location of Signs (preferably located at edge of Property or Right of Way Lines)
   - Location of Railroad pole lines or signal facilities
   - Location of any above or below ground utilities
   - If proposed pipeline is within highway limits, show the location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.)
   - Casing pipe length
   - Location of launching and receiving pits
c. Profile View of Crossing (See NSCE-8 Specification Plate III, below is a suggested check-list for your plan development)
   - Profile of ground above crossing
   - Distance to Valves (if required by NSCE-8)
   - Distance to Vents and height above ground (if required by NSCE-8)
   - Distance to Signs
   - All known property lines
   - Theoretical Railroad embankment lines
   - Proposed location and elevations of launching and receiving pits
   - Casing pipe length
   - Bottom of rail elevation
   - Depth of cover between bottom of rail and top of casing pipe (or carrier pipe if casing pipe not required)
c. **General Notes**
All plans shall include the following General Notes:

Contractor shall follow all requirements of Norfolk Southern’s NSCE-8 Specifications

Pipe Line and Crossing to be installed and maintained in accordance with last approved AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION Specifications for Pipelines Conveying Flammable and Non-flammable Substances

Blasting Not Permitted
### PIPE DATA SHEET

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<th>CARRIER PIPE</th>
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<td>Bore &amp; Jack</td>
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<td>CHARACTER OF SUBSURFACE MATERIAL</td>
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<td>SOURCE OF INFORMATION ON SUBSURFACE CONDITIONS</td>
<td>Visual Inspection</td>
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CONDUIT DATA SHEET
(For crossings and longitudinal occupancy)

- Please specify your proposed method of installation and clearly indicate the entry and exit points (especially for Directional Boring Method "A"). As per the NSCE-8, the following are approved methods for installing conduits or casing pipes for wirelines:
  - Open Cut (Section 5.1.2)
  - Jack & Bore (Section 5.1.3)
  - Directional Boring Method "A" (Section 5.1.6) – no pits required; must have at least 10’ depth
  - Directional Boring Method "B" (Section 5.1.6) – pits required, but can only be used for casing pipes (conduits) 6 inches or less.

MULTIPLE INNERDUCTS
NUMBER OF INNERDUCTS WITHIN CASING PIPE: ____
  - Provide a detail or cross section of the casing pipe with innerducts (see below).
  - Clearly mark the type of facility that will be installed within each innerduct. If innerduct will be left spare or empty, please identify that.
APPLICATION FOR PIPE OR WIRE OCCUPANCY

(Please fill out questions 1-7 and include these pages with your application)

Please answer all questions and return to:

Before 2/12/2010
AECOM
260 South Broad Street
Suite 1500
Philadelphia, PA 19102
(215) 735-0832
Attn: NS Pipe and Wire Administrator

After 2/12/2010
AECOM
1700 Market Street
16th Floor
Philadelphia, PA 19103
(215) 735-0832
Attn: NS Pipe and Wire Administrator

1) Legal Name and Address of Applicant (party to agreement)
   Legal Name**: Town of Matewan- Mayor Sheila L. Kessler
   Street: P.O. Box 306
   City: Matewan State: WV Zip: 25672

   **Please ensure that the exact legal name is provided with no abbreviations. This name will be used for agreement preparation, as well as the information below.

2) Applicant (party to agreement) is a:
   ( ) Corporation – give state of formation: 
   ( ) Limited Partnership – give state of formation: 
   ( ) General Partnership – give state of formation: 
   ( ) Sole Proprietorship – give state of formation: 
   ( ) Individual 
   ( ) Government Entity 
   (X) Other: Municipal Sewer Utility

3) Name and Address of Applicant’s Representative:
   Name: Charles R. Roberts, Jr., P.E.
   Title: Project Manager
   Company: E.L. Robinson Engineering Co.
   Street: 5088 Washington Street, West
   City: Charleston State: WV Zip: 25313
   Telephone: 304-776-7473 Fax: 304-776-6426
   E-Mail Address: rroberts@robinson.com

4) Location of Proposed Facility:
   City/Municipality: Red Jacket County: Mingo State: WV
   Name of Closest Street Crossing of Railroad: 471235J
   Street Grade Crossing AARDOT #:
   GPS Coordinates: Latitude N37°33'20.79" Longitude W82°06'08.90"
   Footage (ft) and direction (N/S/E/W) from Railroad Mile Post No. 5 or center of public Highway Crossing or Bridge: Mate Creek along County Route 6 (Name of Street)
5) Will facility be located entirely within confines of a public right of way?
   ( ) Yes  ( ) No
   *If yes, provide conclusive evidence for verification in the form of a letter or memo
   from the appropriate Road Authority indicating that proposed installation is acceptable
   to the Road Authority
   Street width: ____________________ Street Right of Way width: _______________
   Road Authority Responsible for Street Maintenance
   Name: ____________________________
   Address: __________________________
   Contact: ___________________________
   Telephone: _________________________

6) Proposed Facility to be installed is a:
   ( ) New facility  ( ) Upgrade of an existing facility
   *If an upgrade, please identify and attach copy of current agreement for the facility.

7) Proposed Installation/Construction Date(s):  Spring 2010

If application is approved, applicant agrees to reimburse the Railroad for any cost incurred
by the Railroad incident to installation, maintenance, and/or supervision necessitated by
this pipeline or wireline installation, and further agrees to assume all liability for accidents
or injuries which arise as a result of this installation.

____________________________________  ____________________________________
Date                                                Signature
e. Type of Proposed Installation:
   i. ____ Transverse Crossing Only
   ii. ____ Longitudinal (parallel to tracks) Occupancy Only
   iii. ____ Longitudinal and Transverse Crossing(s)
   iv. ____ Wire line in highway under railroad bridge
   v. ____ Wire line on highway bridge over railroad

b. Type of wire: ( ) Cable TV ( ) Telephone ( ) Electric Power ( ) Fiber Optic ( ) Other – please specify: ____________________________________________

c. Will poles be located on Railroad Company's right of way?
   ( ) Yes ( ) No

d. Are the poles existing or new poles? Steel or wood poles?
   ( ) Existing - ( ) Steel or ( ) Wood
   ( ) New - ( ) Steel or ( ) Wood

e. Will there be any guy wires on the Railroad right of way?
   ( ) Yes, # of guy wires - ________ ( ) No

f. Will wire line cross existing Railroad communication and/or signal lines?
   ( ) Yes ( ) No

g. Minimum height of wire above top of rail at 65°F ________ (ft.)
Minimum height of wire above railroad communication and signal wires at 65°F ________ (ft.)

h. Specification of Wire Line:
   Gauge of Wire: ____________________________________________
   Total Number of Wires: ____________________________________
   Material of Wire: _________________________________________
   Maximum circuit voltage: _________________________________
   Total Number of Fibers or pairs in FOC: ___________________
   Cable type and capacity: __________________________________

All wire line applications shall include a Plan and Profile View of the proposed facility. See the NSCE-4 for the required format. Below is a suggested check-list for your plan development.

Plan View (See NSCE-4 Specification, Plate I)
   ___ All railroad tracks
   ___ Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   ___ Angle of Crossing relative to railroad track(s)
   ___ Dimensioned Property Lines
   ___ Location of Poles and distance to butt of pole to nearest railroad track centerline
   ___ Location of all existing railroad pole lines and all utility lines
   ___ Indicate span length across tracks from pole to pole
   ___ Location of Railroad pole lines or signal facilities
   ___ Location of any above ground utilities
   ___ If proposed wire line is within highway limits or in the vicinity of a grade crossing, location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.) and clearance from existing devices to proposed wire line

Cross Section View (See NSCE-4 Specification, Plate II)
___ All railroad tracks
___ Dimensioned Property Lines
___ Location of poles and distance to butt of pole to nearest railroad track centerline
___ Vertical clearance from top of rail of all tracks to bottom of sag
___ Location of all existing railroad pole lines and all utility lines
___ Vertical clearance from existing railroad pole lines and proposed wire line
___ Indicate span length across tracks from pole to pole
___ If proposed wire line is within highway limits or in the vicinity of a grade crossing, location and type of grade crossing traffic control devices (Mast flashes, cantilever flashes, gates, etc.) and clearance from existing devices to proposed wire line
Underground Wires and Conduits (Complete all Applicable Information)

a) Type of Proposed Installation:
   i) ___ Transverse Crossing Only
   ii) ___ Longitudinal (parallel to tracks) Occupancy Only
   iii) ___ Longitudinal and Transverse Crossing(s)
   iv) ___ Wire line in highway under railroad bridge
   v) ___ Wire line on highway bridge over railroad

b) Type of wire: (   ) Cable TV (   ) Telephone (   ) Electric Power (   ) Fiber Optic
   (   ) Other (Specify): __________________________

c) Specification of Wire Line:
   Gauge of Wire: ____________________________
   Material of Wire: __________________________
   Max. circuit voltage for Electric Power line: __________________________
   Total Number of Fibers in FOC: __________________________
   Total Number of Pairs in Telephone: __________________________
   Cable type and capacity: __________________________

d) Specification of Conduit (Encasement):
   Please use the CONDUIT DATA SHEET on last page of this application.

e) Will conduit be a casing pipe for multiple innerducts?
   (   ) Yes* (   ) No

   *If yes, provide a cross section of the casing pipe indicating all innerducts with the content of each innerduct clearly labeled. See last page of this application for Conduit Data Sheet and an Example of a cross section.

f) Proposed method of installation (Check proposed method):
   WET BORES OR WATER JETTING IS NOT PERMITTED.
   i) ____ Bore and jack (See Section 5.1.3 of NSCE-8)
   ii) ____ Jacking (See Section 5.1.4 of NSCE-8)
   iii) ____ Tunneling (Tunnel Liner Plate) (See Section 5.1.5 of NSCE-8)
   iv) ____ Direction Boring/Horiz. Direction Drilling – Method A (See Section 5.1.6 of NSCE-8)
   v) ____ Direction Boring/Horiz. Direction Drilling – Method B (See Section 5.1.6 of NSCE-8)
   vi) ____ Open Cut (See Section 5.1.2 of NSCE-8)
   vii) ____ Other (Specify): __________________________

All underground conduit applications must include a Conduit Data Sheet, Plan and Profile View of the proposed facility. See the NSCE-4 and NSCE-8 for the required format. Below is a suggested check-list for your plan development.

Conduit Data Sheet (blank copy attached)

Plan View of Crossing (See NSCE-8 Specification Plate II, check blanks to verify complete plans)
   ____ All railroad tracks, including distance to any turnouts from proposed conduit
   ____ Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   ____ Angle of Crossing relative to railroad track(s)
   ____ Dimensioned Crossing relative to railroad track(s)

AECOM

NORFOLK SOUTHERN
Location of Signs (preferably located at edge of Property or Right of Way lines)
Location of Railroad pole lines or signal facilities
Location of any above or below ground utilities
Conduit casing pipe length
If proposed conduit is within highway limits, show the location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.)
Location of launching and receiving pits

Profile View of Crossing (See NSCE-8 Specification Plate III)
Profile of ground above crossing
Dimensioned Property Lines
Theoretical Railroad embankment lines (see NSCE-8, Section 4.3.1.F)
Proposed location and elevations of launching and receiving pits
Casing pipe length
Bottom of rail elevation
Depth of cover between bottom of rail and top of conduit or casing pipe
Location of and the minimum depth of cover from ground line to top of conduit or casing pipe on right of way (such as ditches)
Pipeline (Complete all Applicable Information)

a) Type of Proposed Installation:
   i) X Transverse Crossing Only
   ii) __ Longitudinal Occupancy Only
   iii) __ Longitudinal and Transverse Crossing(s)
   iv) __ Pipeline in highway under railroad bridge
   v) __ Pipeline on highway bridge over railroad
   vi) __ Pipeline bridge over railroad

b) Material to be conveyed: __

c) Diameter of carrier pipe: __

d) Diameter of casing pipe: __

e) Proposed method of installation (Check proposed method)
   i) X Bore and jack (See Section 5.1.3 of NSCE-8)
   ii) __ Jacking (See Section 5.1.4 of NSCE-8)
   iii) __ Tunneling (Tunnel Liner Plate) (See Section 5.1.5 of NSCE-8)
   iv) __ Direction Boring/Horiz. Drilling - Method A (See Section 5.1.6 of NSCE-8)
   v) __ Direction Boring/Horiz. Drilling - Method B (See Section 5.1.6 of NSCE-8)
   vi) __ Open Cut (See Section 5.1.2 of NSCE-8)
   vii) __ Other (Specify):

All proposed transverse pipeline crossing applications shall include the following:

a. Pipe Data Sheet (blank copy attached)

b. Plan View of Crossing (See NSCE-8 Specification Plate II, below is a suggested check-list for your plan development)
   x All railroad tracks, including distance to any turnouts from proposed pipeline
   x Indicates distance (in feet) to Norfolk Southern Mile Post or Grade Crossing
   x Angle of Crossing relative to railroad track(s)
   x Dimensioned Property Lines
   x Location of Valves (if required by NSCE-8)
   x Location of Vents (if required by NSCE-8)
   x Location of Signs (preferably located at edge of Property or Right of Way Lines)
   x Location of Railroad pole lines or signal facilities
   x Location of any above or below ground utilities
   x If proposed pipeline is within highway limits, show the location and type of grade crossing traffic control devices (Mast flashers, cantilever flashers, gates, etc.)
   x Casing pipe length
   x Location of launching and receiving pits

c. Profile View of Crossing (See NSCE-8 Specification Plate III, below is a suggested check-list for your plan development)
   x Profile of ground above crossing
   x Distance to Valves (if required by NSCE-8)
   x Distance to Vents and height above ground (if required by NSCE-8)
   x Distance to Signs
   x All known property lines
   x Theoretical Railroad embankment lines
   x Proposed location and elevations of launching and receiving pits
   x Casing pipe length
   x Bottom of rail elevation
   x Depth of cover between bottom of rail and top of casing pipe (or carrier pipe if casing pipe not required)
d. **General Notes**
   
   All plans shall include the following General Notes:
   
   Contractor shall follow all requirements of Norfolk Southern's NSCE-8 Specifications
   
   Pipe Line and Crossing to be installed and maintained in accordance with last approved AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION Specifications for Pipelines Conveying Flammable and Non-flammable Substances
   
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CONDUIT DATA SHEET
(For crossings and longitudinal occupancy)

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* - Please specify your proposed method of installation and clearly indicate the entry and exit points (especially for Directional Boring Method "A"). As per the NSCE-8, the following are approved methods for installing conduits or casing pipes for wirelines:

1. Open Cut (Section 5.1.2)
2. Jack & Bore (Section 5.1.3)
3. Directional Boring Method "A" (Section 5.1.6) – no pits required; must have at least 10’ depth
4. Directional Boring Method "B" (Section 5.1.6) – pits required, but can only be used for casing pipes (conduits) 6 inches or less.

MUTIPLE INNERDUCTS
NUMBER OF INNERDUCTS WITHIN CASING PIPE: _______

- Provide a detail or cross section of the casing pipe with innerducts (see below).
- Clearly mark the type of facility that will be installed within each innerduct. If innerduct will be left spare or empty, please identify that.
# KING COAL HIGHWAY

## PERMIT SUMMARY/STATUS

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March 1, 2010

Mr. William S. Herold, Jr., P.E.
WV Office of Environmental Health Services
Capitol and Washington Streets
1 Davis Square, Suite 200
Charleston, WV 25301-1798

Re: Mingo County Redevelopment Authority
King Coal Highway/Mingo Central High School
Water and Sewer Extension Project

Dear Mr. Herold:

On behalf of the Mingo County Redevelopment Authority we are requesting approval to construct a potable waterline and sewer system extension to serve approximately 50 new residential customers and the Mingo Central High School in the Matewan area of Mingo County. The Town of Matewan will own, operate and maintain the systems when construction is complete. It consists of approximately 81,890 feet of 10-inch and smaller diameter waterline, two water booster stations, one 221,000 gallons water storage tank, one 16,000 gallons transfer tank, two pressure reducing stations, fire hydrants, valves and other related items. Water for the extension will be provided by the Town of Matewan at a point along Mate Creek. The sewer portion consists of approximately 61,000 feet of 10" and smaller diameter gravity sewer pipe, 30,580 feet of 6" and smaller diameter sewage force main, manholes, cleanouts and other related items. In support of this request, we are enclosing the following:

1. Project Plans (4 Copies)
2. Project Specifications (4 Copies)
3. WVBPH Forms EW 100 and EG 5 (Original and 3 Copies)
4. Design Report (4 Copies)
5. Check for $300.00

If you have any questions, please let us know.

Sincerely,

Rick Roberts, P.E.
Project Manager
E.L. Robinson Engineering Company

5088 Washington Street, West • Charleston, West Virginia 25313
304-776-7472 • toll-free 800-856-6485 • fax 304-776-6426 • www.elrobinson.com
Other locations: Beckley, WV • Chapmanville, WV • Columbus, OH • Ironton, OH • Ashland, KY
IN ACCORDANCE WITH TITLE 64, SERIES 3, PUBLIC WATER SUPPLY REGULATIONS OF THE WEST VIRGINIA DIVISION OF HEALTH, WE HEREBY MAKE APPLICATION TO CONSTRUCT, ALTER, OR RENOVATE AS FOLLOWS:

NOTE: A $300 application fee must accompany a permit application ($150 application fee for a water well permit application). Make check or money order payable to "West Virginia Department of Health and Human Resources". Cash not accepted. Permit applications which include both water and sewer systems require only a single $300 fee.
WATER SYSTEM DESIGN INFORMATION AND DATA SHEET

Complete all portions of the Design Data Sheet applicable to the project. Omission of required information will result in the application being denied. When both sewer system and water system are to be constructed, Design Data Sheets for both sewage and water must be completed and attached to the application.

Applicant: Mingo County Redevelopment Authority (MCRA)
Project Location: King Coal Highway, Matewan, WV
County: Mingo
Number of customers: 51 or Estimated population or population equivalent served
Number of home sites: 50
Number of mobile home sites:
Estimated peak flow: 70 gpm
Minimum consumer pressure (static/residual): 165 / 136 psi
Source of Supply: Town of Matewan
(name of utility)
Municipal: √
Other: (specify)
Pressure at connection to public supply (static/residual): 170 / 164 psi
Capacity of well, if applicable: gpm
Type of system: Gravity: √, Hydropneumatic:
Other: (specify)
Length of water lines of each size: Water 71,370' of 10" DIP, 10,360' of 8" DIP, 160' of 6" DIP

YES NO
Details of well construction attached
Fire hydrants to be installed (hydraulic calculations must be included)
Storage tank required Size of tank: 221,000 gallons
Elevation of top and bottom of storage tank: 2,359.83 / 2,227.00
Booster station required Size of station: 2@200 gpm
Pressure reducing station required
Details of water treatment equipment (if applicable)
Chlorination Contact time: minutes
August 26, 2009

Mr. Thomas Meddings
W.V. Division of Highways
District Two
801 Madison Ave.
Huntington, WV 25712

Re: Mingo County Redevelopment Authority
King Coal Highway Water and Sewer Extension Project

Dear Mr. Meddings:

On behalf of the Mingo County Redevelopment Authority we are requesting a permit to enter upon W.V. Division of Highways right-of-way with the construction of approximately 87,707 feet 10-inch and smaller diameter sanitary sewerline and waterline on W.V. Department of Highways right-of-way to improve sewer and water service along the King Coal Highway Utility Corridor in Mingo County. In support of our request, we are enclosing six (6) copies each of the following:

1. Permit Form MM-109
2. Project Plans
3. Project Specifications
4. Location Map
5. Waterline Summary

If you have any questions or need any additional information, please feel free to contact me at 1-800-856-6485.

Sincerely,

Rick Roberts, P.E.
Project Manager
E. L. Robinson Engineering Co.

Enclosures
THIS PERMIT TO ENTER UPON, UNDER, OVER OR ACROSS THE STATE ROADS OF THE STATE OF WEST VIRGINIA, AS PROVIDED FOR IN SECTION 6, ARTICLE 16, CHAPTER 17, SECTION 9, ARTICLE 16, CHAPTER 17; SECTION 8, ARTICLE 4, CHAPTER 17, WEST VIRGINIA CODE, 1931, AS AMENDED.

THIS PERMIT, Made this 26 day of August 2009, between the WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, a statutory corporation hereinafter called DIVISION and Mingo County Redevelopment Authority called APPLICANT.

Address: P.O. Box 296, 1100 East 4th Avenue, Williamson, WV 25661 Phone No: (304) 235-0042

WITNESSETH

In consideration of the hereinafter set out covenants and in accordance with Section 6, Article 16, Chapter 17; or Section 9, Article 16, Chapter 17; or Section 8, Article 4, Chapter 17, of the Official Code of West Virginia, 1931, as amended, and the rules and regulations promulgated thereunder. APPLICANT does hereby apply to enter

Route Type & No. King Coal Highway/WV 65 DOH Project No. __________ (if applicable) Mile Post N/A

at ______________ in __________ County, for the purposes hereinafter set forth and in accordance with the plans and specifications which are attached hereto and made a part hereof: Construction of approximately 87,707 feet of water and sanitary sewer line on WVDOT ROW.

APPLICANT further agrees to accept the conditions hereinafter set forth:

1. APPLICANT shall deposit with DIVISION the sum of $________________ in the form of an official, certified or cashier’s check, or executed bond with surety satisfactory to DIVISION to cover any damage and inspection costs DIVISION may sustain by reason of the granting of this permit, including any expense incurred in restoring said highway to its original condition or the proper repair of any and all damages that may result within (1) year from the date of the completion of said work.

2. APPLICANT agrees to reimburse DIVISION for inspection costs as follows:

   A. For any inspection costs incurred under this permit.

   B. At $0.43 per linear foot for 43,785 feet of water line installed under this permit.

   C. At $0.80 per linear foot for 43,992 feet of sewer line installed under this permit.

3. APPLICANT shall notify DIVISION at least 48 hours in advance of the date the work will begin. Failure to comply will be cause for cancellation of this permit.

4. APPLICANT agrees to protect its employees, equipment and users of the highway at all times in accordance with the current Division of Highways manual “Traffic Control For Street and Highway Construction and Maintenance Operations”.

5. APPLICANT agrees to comply with all applicable state and federal laws in the performance of work under this permit.

6. Supplementary conditions cited on the reverse side of this permit are understood and agreed to be a part hereof.

7. The work authorized under this permit shall be completed on or before (Date): __________

Applicant's signature on this permit affirms that all text herein is a verbatim reproduction of The West Virginia Division of Highways Encroachment Permit Form MM-109, revision date May 19, 2005. All attachments are inclusive to this permit.

RECOMMENDED:

Title ____________________________

Signature and Title of Applicant ____________________________

RECORD REQUIREMENTS:

AUTHORIZED NO: ____________________________

APPROVED ____________________________

Signature and Title of Applicant ____________________________

Date ____________________________
From: DEP NPDESEP [DEP.NPDESEP@wv.gov]
Sent: Tuesday, March 02, 2010 2:46 PM
To: whitt_mcra@verizon.net
Cc: Chambers, Jason; Hopson, Jeremy M; Musser, Cynthia J; Larue, Tina C; rroberts@erobinson.com
Subject: Approval for WVR104817, King Coal Highway Water and Sewer Extension, Mingo Co., 13.01 Acres

Mike Whitt, Exec. Director
Mingo County Redevelopment Authority
PO Box 298
Williamson, WV 25661
(304) 235-0042

Physical Site Location: CR 65, Matewan

Please be advised that this e-mail constitutes approval for your construction activity and your registration no. is WVR104817. You are now authorized to operate under WV/NPDES General Water Pollution Control Permit No. WV0115924, issued on November 5, 2007, copy attached.

DEP will be notified of the waste site locations once the contractor has selected them.

You should carefully read the contents of this General Permit and become familiar with all requirements needed to remain in compliance with your permit. We've also attached a “Notice of Termination” form to be completed and submitted when all disturbed areas are stabilized. You can find the permit and Notice of Termination form via the Internet by visiting Permitting, Division of Water and Waste Management at www.wvdep.org. Your annual permit fee has been assessed as $500.00. You will be invoiced by this agency upon the anniversary date of this approval date. Failure to submit the annual fee within ninety (90) days of the due date will render your permit void upon the date you are mailed a certified written notice to that effect. Please be advised that a pro-rated annual permit fee may be assessed upon the completion date and proper stabilization.

Scott G. Mandirola
Acting Director
WV DEP-Division of Water & Waste Mgt.
601 57th St SE
Charleston, WV 25304-2345
Phone: (304) 926-0495
Fax: (304) 926-0496
STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER AND WASTE MANAGEMENT
601 57th STREET SE
CHARLESTON, WV 25304-2345
GENERAL
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WATER POLLUTION CONTROL PERMIT

Permit No.  WV0115924  Issue Date: November 5, 2007
Effective Date: December 5, 2007
Expiration Date: December 4, 2012

Subject: Stormwater Associated
With Construction Activities

To Whom It May Concern:

This is to certify that any establishment with discharges composed entirely of stormwater associated with construction activities disturbing one acre or greater of land area (construction activities are land disturbing operations such as grubbing, grading, filling and excavation operations during site development for residential, commercial or industrial purposes) and agreeing to be regulated under the terms of this general permit, except for:

1. Operations that result in the disturbance of less than one acre of total land area, which are not part of a larger common plan of development or sale.

2. Stormwater discharges associated with land disturbing activities that may reasonably be expected to be causing or contributing to a violation of a water quality standard as determined by the Director.

3. Land disturbing activities already governed by other Department of Environmental Protection NPDES permits. This includes Division of Mining and Reclamation permits for coal mining and non-metallic quarries.

4. Landfills, except in the preparation of a new landfill and/or clay borrow areas.

5. Other activities exempt from NPDES permitting requirements as set forth in 40 CFR 122.3(e) and 47CSR 10-3.2.b.4 (NPDES Program).

6. Land disturbing activities related to oil and gas activities as required by the Energy Policy Act of 2005. These activities include but are not limited to construction of drilling sites, waste management pits, and access roads, as
well as construction of the transportation and treatment infrastructure such as pipelines, natural gas treatment plants, natural gas pipeline compressor stations, and crude oil pumping stations. Construction activities that result in a discharge of a reportable quantity release or that contribute pollutants (other than non-contaminated sediments) to a violation of a water quality standard are still subject to permit coverage.

is hereby granted coverage under this General WV/NPDES Water Pollution Control Permit to allow stormwater discharges into the surface waters of the State. This General Permit is subject to the following terms and conditions:

The information submitted on and with the site registration application form will hereby be made terms and conditions of the General Permit with like effect as if all such information were set forth herein, and other pertinent conditions set forth in Sections A, B, C, D, E, F, G, H, I and J.

Construction of single family residences by the homeowner or homeowner's contractor requiring land disturbances less than three acres in size are provided coverage under the General WV/NPDES Water Pollution Control Permit and do not require application for registration. However, all other terms and conditions of the General WV/NPDES Water Pollution Control Permit still apply except for the Notice of Termination requirement.

Sites approved from January 1, 2006, thru November 4, 2007, are hereby granted coverage under General WV/NPDES Water Pollution Control Permit WV0115924. Sites approved prior to January 1, 2006, will have until June 30, 2008, to have final stabilization completed. Final stabilization means disturbed areas shall be covered by the appropriate permanent protection. Final stabilization includes; pavement, buildings, stable waterways (riprap, concrete, grass or pipe), a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground, stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse, and any other approved structure or material. If these sites are not stabilized by June 30, 2008, an application to receive permit coverage will be required to be submitted to the Division of Water and Waste Management on or before, July 1, 2008.

SECTION A. TERMS OF PERMIT

Discharges from sites covered under the General Permit shall not cause or contribute to a violation of 47CSR2 (Requirements Governing Water Quality Standards) and 46CSR12, (Requirements Governing Groundwater Standards) of the West Virginia Legislative Rules pursuant to Chapter 22, Article 11 and Article 12. Discharges that are not in compliance with these standards are not authorized.

SECTION B. SCHEDULE OF COMPLIANCE

Compliance with this General Permit and the approved Stormwater Pollution Prevention Plan is required upon the beginning of the construction project.
SECTION C. MANAGEMENT CONDITIONS

C.1. Duty to Comply

C.1.a. The permittee must comply with all conditions of this permit. Permit noncompliance constitutes a violation of the federal Clean Water Act (CWA) and State Act (Chapter 22, Article 11 and Article 12) and is grounds for enforcement action; for permit modification, revocation and reissuance, suspension or revocation; or denial of a permit renewal application.

C.1.b. The permittee shall comply with all effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

C.2. Duty to Reapply

If the permittee seeks to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit or general permit registration as detailed in permit reissuance.

C.3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.

C.4. Permit Actions

This permit may be modified, revoked and reissued, suspended, or revoked for cause. The filing of a request by the permittee for permit modification, revocation and reissuance, or revocation, or a notification of a planned change or anticipated noncompliance, does not stay any permit condition.

C.5. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

C.6. Signatory Requirements

All applications, reports, or information submitted to the Director shall be signed and certified as required in 47CSR10-4.6, (NPDES Program). If an authorization becomes inaccurate because a different individual or position has responsibility for the overall operation of the project, a new authorization must be submitted to the Director prior
to, or together with any reports, information, or applications to be signed by an authorized representative.

C.7. Transferability

This permit is not transferable to any person, except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary.

C.8. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable specified time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, suspending, or revoking this permit, or to determine compliance with this permit. This information may include water quality information as specified by the Director. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

C.9. Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall immediately submit such facts or information.

C.10. Inspections and Entry

The permittee shall allow the Director or an authorized representative upon the presentation of credentials and such other documents as may be required by law

C.10.a. To enter upon the permittee’s premises in which an effluent source or activity is located, or where records must be kept under the conditions of this permit;

C.10.b. To have access to and copy at reasonable times any records that must be kept under the conditions of this permit;

C.10.c. To inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;

C.10.d. To sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the State Act, any substances or parameters at any location.
C.11. Permit Modification

This permit may be modified, suspended, or revoked in whole or in part during its term in accordance with the provisions of Chapter 22, Article 11 of the Code of West Virginia. Any permittee wishing to modify his coverage under this permit shall submit such request at least 45 days prior to the commencement of the proposed action for modification if no public notice period is required. A modification that will have a public notice period must be submitted at least 90 days prior to construction to allow for the public notice procedure.

C.12. Water Quality

The effluent or effluents covered by this permit are to be of such quality so as to not cause violations of applicable water quality standards.

C.13. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA.

C.14. Liabilities

C.14.a. Any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the CWA is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Section 301, 302, 306, 307, or 308 of the CWA is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both.

C.14.b. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more that $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

C.14.c. Nothing in C.14.a. and C.14.b. shall be construed to limit or prohibit any other authority the Director may have under the State Water Pollution Control Act, Chapter 22, Article 11 and State Groundwater Protection Act, Chapter 22, Article 12.

C.15 Outlet Markers

An outlet marker shall be posted during the term of General Permit coverage in accordance with Title 47, Series 11, Section 9 (Special Rules) of the West Virginia Legislative Rules.
SECTION D. OPERATION AND MAINTENANCE

D.1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit.

D.2. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D.3. Bypass

D.3.a. Definitions

D.3.a.1. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility; and

D.3.a.2. "Severe property damage" means substantial physical damage to property, damage to the treatment facility which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

D.3.b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of D.3.c. and D.3.d. of this permit.

D.3.c. Notification of bypass

D.3.c.1. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

D.3.c.2. If the permittee does not know in advance of the need for bypass, notice shall be submitted as requires in F.2.a. of this permit.

D.3.d. Prohibition of bypass

D.3.d.1. Bypass is permitted only under the following conditions, and the Director may take enforcement action against a permittee for bypass, unless;
D.3.d.1.A. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

D.3.d.1.B. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated sediment, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance. This condition is not satisfied if the sediment and erosion control structures were not installed in the proper sequence; and

D.3.d.1.C. The permittee submitted notices as required under D.3.c. of this permit.

D.3.d.2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in D.3.d.1. of this permit.

D.4. Upset

D.4.a. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with the terms and conditions of the permit and the Stormwater Pollution Prevention Plan because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

D.4.b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of D.4.c. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

D.4.c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

D.4.c.1. An upset occurred and that the permittee can identify the cause(s) of the upset.

D.4.c.2. The permitted project was at the time being properly operated.

D.4.c.3. The permittee submitted notice of the upset as required in F.2.a. of this permit.

D.4.c.4. The permittee complied with any remedial measures required under C.3. of this permit.
D.4.d. Burden of proof. In any enforcement proceedings the permittee seeking to establish the occurrence of an upset has the burden of proof.

D.5. Removed Substances

Where removed substances are not otherwise covered by the terms and conditions of this permit or other existing permits by the Director, any solids, sludge, filter backwash or other pollutants (removed in the course of treatment or control of wastewater) and which are intended for disposal within the State, shall be disposed of only in a manner and at a site subject to the approval by the Director. If such substances are intended for disposal outside the State or for reuse, i.e., as a material used for making another product, which in turn has another use, the permittee shall notify the Director in writing of the proposed disposal or use of such substances, the identity of the prospective disposer or users, and the intended place of disposal or use, as appropriate.

SECTION E. MONITORING AND REPORTING

Monitoring of discharges is not required for construction activities unless directed by the Director.

E.1. Definitions

"As-built drawing" means a certified drawing of conditions as they were actually constructed.

"Best management practices" (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, other management practices and various structural practices such as but not limited to silt fence, sediment traps, seeding and mulching, and rip-rap used to prevent or reduce erosion and sediment runoff and the pollution of surface waters of the State. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Buffer zone" means the region near the border of a protected area; a transition zone between areas managed for different objectives.

"Clearing" means cutting and removing vegetation with chain saws, brush axes, brush hogs and other mechanical means where there is little or no soil disturbance.


"Common plan of development" is a contiguous construction project where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan. The "plan" is broadly defined as any announcement or piece of documentation or physical demarcation indicating construction activities may occur on a specific plot; included in this definition are most subdivisions.
“Control” is a best management practice such as erosion control or sediment control that will reduce sedimentation on a construction project.

“Construction Activity” means land disturbance operations such as grubbing, grading, filling, and excavating during site development for residential, commercial or industrial purposes. This includes, but is not limited to, access roads, borrow and spoil areas.

“Director” means the Director of the Division of Water and Waste Management, Department of Environmental Protection, or her designated representative.

“Disturbed area” is the total area of land disturbing activity that will take place during all phases of a construction project, including, but not limited to, all waste and borrow sites, utility installation, road building, mass grading, and site development.

“Diversion” means a berm or excavated channel or combination berm and channel constructed across sloping land on a predetermined grade. This includes but is not limited to protecting work areas from upslope runoff and reducing the size of the drainage going to sediment trapping structures (clean water diversion), transporting runoff across a project to minimize erosion and diverting sediment-laden water to an appropriate sediment-trapping structure.

“Erosion” means the displacement of solids (soil, mud, rock, and other particles) by the agents of wind, water, and ice in response to gravity.

“Establishment” means an industrial establishment, mill, factory, tannery, paper and pulp mill, mine, colliery, breaker or mineral processing operation, quarry, refinery, well and each and every industry or plant or works in the operation or process of which industrial wastes, sewage or other wastes are produced.

“Estimate” means to be based on a technical evaluation of the sources contributing to the discharge.

“Excavating” means large scale grading accomplished usually with heavy machinery.

“Final stabilization” means disturbed areas shall be covered permanent protection. Final stabilization includes pavement, buildings, stable waterways (riprap, concrete, grass or pipe), a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground, stable outlet channels with velocity dissipation that directs site runoff to a natural watercourse, and any other approved structure or material.

“Grading” means changing surface contours by removing soil and stone from one place and building it up in another.

“Groundwater” means the water occurring in the zone of saturation beneath the seasonal high water table or any perched water zones.
"Groundwater Protection Plan" (GPP) means groundwater protection practices developed and implemented in accordance with WV Legislative Rules, 47CSR58 (Groundwater Protection Rule).

"Grubbing" means physically removing vegetative stumps and roots from the ground and disturbing the earth, usually by heavy machinery.

"Intermittent stream" means a stream that has no flow during sustained periods of no precipitation and does not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six months.

"Kars" means a type of topography formed over limestone, dolomite, or gypsum resulting in dissolving or solution of the underlying calcareous rock.

"Minor construction activity" means an activity which disturbs one acre or more, but less than three acres.

"National Pollutant Discharge Elimination System" (NPDES) means the national program for issuing, denying, modifying, revoking and reissuing, suspending, revoking, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under Section 307, 318, 402, and 405 of CWA, including any approved state program.

"Notice of Intent" (NOI) is the form to be submitted by the applicant to register a small construction project (one that disturbs one to less than three acres) under the Construction Stormwater General Permit. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application Form.

"Notice of Termination" (NOT) is the form to be submitted by the permittee to terminate coverage under the Construction General Stormwater Permit, after final stabilization has been completed. See Final Stabilization.

"Permanent detention/retention facility" means: Detention: The process of reducing offsite stormwater discharge rates by temporarily holding the water in a storage basin and then releasing it slowly over a period of time. The objective of a detention facility is to regulate the runoff from a given rainfall event and to control discharge rates to reduce the impact on downstream stormwater systems. Retention: The prevention of stormwater runoff from being discharged into receiving waters by storing it in a storage area. Water is retained and stored until it is lost through percolation, removed by evapotranspiration by plants, or through evaporation from the free water surface. Retention systems are designed to not have any offsite discharges.

"Point source" is any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the state.

"Pollutant" means industrial waste, sewage or other wastes.
"Post-development" means the anticipated final conditions of the project, including rooftops, parking lots, streets, drainage systems, vegetation, and any other structure planned. For subdivisions and speculative developments, it will be assumed that all lots are developed.

"Pre-development" means the condition of the land, the amount and health of the ground cover and vegetation prior to development.

"Runoff coefficient" means the fraction of total rainfall that is not infiltrated into the ground that will appear at the point of discharge as runoff.

"Runoff curve number" is the numeric value reflecting the runoff coefficient and is based on soils, slopes, and type and health of the ground cover.

"Secretary" means the Secretary of the Department of Environmental Protection, or her designated representative.

"Sediment" means any particulate matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water or other liquid.

"Sedimentation" means the deposition by settling of a suspended material.

"Sediment trap" means a temporary ponding area formed by constructing an embankment or excavation and embankment that will trap the flow of sediment-laden runoff. Sediment traps have a properly stabilized outlet/weir or riser and pipe to detain sediment-laden runoff from small disturbed areas of five acres or less. Outlets must be designed to extend the detention time and allow the majority of the sediment to settle out.

"Sediment basin" means a temporary structure consisting of an earthen embankment, or embankment and excavated area, located in a suitable area to capture sediment-laden runoff from a construction site. A sediment basin reduces the energy of the water through extended detention (48 to 72 hours) to settle out the majority of the suspended solids and sediment and prevent sedimentation in waterways, culverts, streams and rivers. Sediment basins have both wet and dry storage space to enhance the trapping efficiency and are appropriate in drainage areas of five acres and greater.

"Sinkhole" means a depression in the land surface formed by solution or collapse that directs surface runoff into subsurface or to an underground drainage flow.

"Site Registration Application forms" means the forms designed by the Director for the purpose of registering for coverage under a general permit. Under the General Permit there will be two separate forms, one for one to less than three acres (Notice of Intent) and the Site Registration Application form for projects that disturb three acres and greater. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application form.
“Stormwater” means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

“Stormwater management facilities” means structures such as ponds, basins, outlets, ditches, velocity dissipaters, infiltration trenches and basins, extended detention basins and ponds, and any other structure used to control the quality and quantity of stormwater from a development project.

“Stormwater Pollution Prevention Plan” (SWPPP) means the erosion and sediment control plan and the post development plan submitted as part of the Site Registration Application form.

“Tier 2.5 Waters” means Waters of Special Concern as identified in 60CSR5 (Antidegradation Implementation Procedures) and 47CSR2-4.1.c. (Requirements Governing Water Quality Standards).

“Tier 3 Waters” means waters as otherwise identified in 47CSR2-4.1.d. (Requirements Governing Water Quality Standards).

“Trout Streams” means any waters which meet the definition of 47CSR2-2.18. (Requirements Governing Water Quality Standards).

“1-year, 24-hour precipitation event” means the maximum 24-hour precipitation event with a probable recurrence interval of once in one year.

“25-year, 24-hour precipitation” means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years.

SECTION F. OTHER REPORTING

F.1. Reporting Spill and Accidental Discharges

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to 47CSR11-2. (Special Rules) of the West Virginia Legislative Rules promulgated pursuant to Chapter 22, Article 11.

F.2. Immediate Reporting

F.2.a. The permittee shall report any noncompliance which may endanger health or the environment immediately after becoming aware of the circumstances by using the Department’s designated spill alert telephone number ((800) 642-3074). A written submission shall be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time, and if, the noncompliance has not been corrected, the anticipated time it is
expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

SECTION G. OTHER REQUIREMENTS

G.1. Requiring an Individual Permit or an Alternative General Permit.

G.1.a. The Director may require any person authorized by this permit to apply for and obtain either an individual NPDES permit or an alternative NPDES General Permit. Any interested person may petition the Director to take action under this paragraph. The Director may require any owner or operator authorized by this permit to apply for an individual NPDES permit only if the owner or operator has been notified in writing that such a permit application is required.

G.2. Prohibition of Non-Stormwater Discharges

All discharges authorized by this permit shall be composed entirely of stormwater. Discharges of material other than stormwater are not authorized by this permit except as follows.

The following non-stormwater discharges are authorized by this permit: discharges from firefighting activities, fire hydrant flushing; waters used to wash vehicles or control dust; potable water sources, including waterline flushing; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwater where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated groundwater; and foundation or footing drains where flows are not contaminated with process materials such as solvents that are combined with stormwater discharges associated with industrial activity.

This permit does not authorize the conveyance, diversion, channeling, directing or otherwise allowing the discharge of stormwater into a sinkhole without an Underground Injection Control Permit.

G.3. Releases in Excess of Reportable Quantities

This permit does not relieve the permittee of the reporting requirements of 40CFR117 and 40CFR302. The discharge of hazardous substances in the stormwater discharge(s) from a project is not authorized by this General Permit, and in no case shall the discharge(s) contain a hazardous substance equal to or in excess of reporting quantities.

A Stormwater Pollution Plan and a Groundwater Protection Plan shall be developed for each project covered by this permit. These two plans may be combined into one plan if all of the requirements for both plans are met. Alternatively, they may be developed and maintained as separate stand-alone documents.

Stormwater Pollution Prevention Plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with construction activity. In addition, the plan shall describe and ensure the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction activity and to assure compliance with the terms and conditions of this permit.

Groundwater Protection Plans (GPP) shall be prepared in accordance with the requirements of 47CSR58-4.11. et seq (Groundwater Protection Regulations). The GPP shall identify all operations that may reasonably be expected to contaminate the groundwater resources with an indication of the potential for soil and groundwater contamination from those operations. In addition the GPP shall provide a thorough and detailed description of procedures designed to protect groundwater from the identified potential contamination sources. The GPP is not required to be submitted to the Division of Water and Waste Management for review. Guidance in the completion of a GPP is available from the Division of Water and Waste Management.

G.4.a. The SWPPP and the GPP shall be signed in accordance with Section C.6. and retained onsite.

G.4.b. The application and SWPPP shall be submitted to the Division of Water and Waste Management at least 45 days before construction is to begin, except as noted in G.4.b.3. and G.4.b.4. Prospective permittees should submit applications for review prior to accepting construction bids on the project. As the plans are evaluated by the Director or authorized representative, the Director or authorized representative may notify the permittee during the 45-day review period that the plan does not meet one or more of the minimum requirements of this section. After such notification from the Director or authorized representative, the permittee shall make changes to the plan in accordance with the time frames established below, and shall submit to the Director a written certification that the requested changes have been made.

G.4.b.1. Except as provided in G.4.b.2., the permittee shall have 30 days after such notification to make the changes necessary.

G.4.b.2. The permittee shall have 24 hours after such notification to make changes relating to sediment and erosion controls to prevent loss of sediment from an active construction site, unless additional time is provided by the Director or an authorized representative.
G.4.b.3. Projects disturbing less than three acres and that do not discharge to or upstream of Tier 2.5 or Tier 3 waters shall submit only the Notice of Intent Form (NOI) 10 days prior to initiating construction. A project that disturbs one to less than three acres but will have construction activities one year or longer must file a Site Registration Application form.

G.4.b.4. Projects that will discharge to or upstream of Tier 2.5 or Tier 3 waters and disturb three acres or more, or that will disturb 100 or more acres, or that the grading phase of construction will last for more than one year, shall submit the application and SWPPP at least 90 days prior to construction to allow for the public notice procedure.

G.4.b.5. Within 24 hours of filing an NOI (one to less than three acres) or a Site Registration Application (three acres or more) with DWWM, all projects shall display a sign for the duration of the construction project near the entrance of the project or, for linear projects, at a location near an active part of the project that is accessible by the public, which contains the following information using the template found in the instructions:
1) the registrant's name or the name of a contact person along with a telephone number;
2) A brief description of the project;
3) a statement indicating that the NOI or SWPPP, as applicable, has been filed with the DWWM;
4) the address and telephone number of the agency where the NOI or SWPPP is maintained;
5) That any person may obtain a copy of the NOI or SWPPP by contacting the DWWM at (800) 654-5227. The sign shall be a minimum of two feet by two feet and at least three feet above ground level, clearly visible and legible from a public roadway or right-of-way. If it is not feasible to display a sign at or near the project, the registrant, with prior approval from the DWWM, may post a notice containing the foregoing information at a local public building, including, but not limited to, a town hall or public library.

G.4.c. The permittee shall modify, using forms provided by DWWM, the SWPPP whenever there is a change in design, construction, scope of operation, or maintenance, which has the potential to adversely impact the surface waters of the State, or if the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activities. Should conditions warrant, the Director, or the Director’s representative, may request changes to the SWPPP during a field inspection. The Director may review changes or modifications to the SWPPP in the same manner as above.

The permittee shall amend the GPP whenever there is a change in design, construction, operation, or maintenance which could reasonably be expected to have an impact on the potential contamination of groundwater.

G.4.d. In addition to the requirements of G.4.e, the SWPPP shall also include, at a minimum, the following items:

G.4.d.1. General management controls
G.4.d.1.A. Preventive maintenance – A preventive maintenance program shall involve inspection and maintenance of sediment and erosion control best management practices to identify and address conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters.

G.4.d.1.B. Good housekeeping – Good housekeeping requires the maintenance of a clean and orderly project.

G.4.d.1.C. Spill prevention and response procedures – Areas where potential spills may occur, and their accompanying drainage points, shall be identified clearly in the SWPPP/GPP. Where appropriate, specify material handling procedures and storage requirements in the SWPPP/GPP. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a cleanup shall be available to personnel, including spill kits.

G.4.d.2. Consistency with other plans

Stormwater Pollution Prevention Plans may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under section 311 of the CWA or any Best Management Practices (BMP) and Groundwater Protection Plans (GPP) pursuant to 47CSR58 (Groundwater Protection Rule) or otherwise required by an NPDES permit and may incorporate any part of such plans into the Stormwater Pollution Prevention Plan by reference.

G.4.e. Requirements for construction activities – Operations that discharge stormwater associated with construction activity disturbing one or more acres are not only subject to the requirements of Section G.4.d. of this permit, but are also subject to the following requirements. The SWPPP shall include, as a minimum, the following items.

G.4.e.1. Site description – Each plan shall, at a minimum, provide a description of the following:

G.4.e.1.A. A description of the nature of the construction activity, including a proposed timetable for major activities;

G.4.e.1.B. Estimates of the total area of the site and the part of the site that is expected to undergo excavation or grading and the total amount of excavation by cut and fill;

G.4.e.1.C. For each discharge design point, the pre-construction peak discharge from a one year, 24-hour storm in cubic feet per second and the post-development peak discharge from a one year, 24-hour storm in cubic feet per second shall be calculated. The design procedures shall follow professionally accepted engineering and hydrologic methodologies.

G.4.e.1.D. Site maps indicating, with a minimum of five-foot contours, drainage patterns and slopes prior to construction and anticipated conditions after grading activities, topsoil stockpiles, waste areas, borrow sites, locations of sediment control structures identified
in the narrative, the location of impervious areas after construction is complete, final stormwater routing including all ditches and pipe systems, property boundaries and easements, nearest receiving stream, access roads, legend and springs, surface waters and any other information necessary to describe the project in detail.

G.4.e.1.E. A description and detail of the proposed construction entrance(s). Each site shall have stone access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads. Except for haul roads, all unpaved roads on the site carrying more than 25 vehicles per day shall be graveled.

G.4.e.2. Controls – Each construction operation covered by this permit shall develop a description of controls appropriate for the project and implement such controls. The description of these controls shall address the following minimum components, including a schedule for implementing such controls.

G.4.e.2.A. Erosion and sediment controls

G.4.e.2.A.i. Vegetative practices – A description of interim and permanent stabilization practices, including site specific implementation schedules of the practices shall be provided. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized as rapidly as possible. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Also include in the plan seedbed preparation requirements and the type and amount of soil amendments necessary to establish a healthy stand of vegetation. A record of the dates when major grading activities will occur, and when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures will be initiated shall be included in the plan. Except as noted below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven days after the construction activity in that portion of the site has permanently ceased.

G.4.e.2.A.i.a. Where the initiation of stabilization measures by the seventh day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as conditions allow.

G.4.e.2.A.i.b. Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g., the total time period that construction activity is temporarily halted is less that 21 days) then stabilization measures do not have to be initiated on that portion of the site by the seventh day after construction activities have temporarily ceased.

G.4.e.2.A.i.c. Areas where the seed has failed to germinate adequately (uniform perennial vegetative cover with a density of 70%) within 30 days after seeding and
mulching must be reseeded immediately, or as soon as weather conditions allow.

G.4.e.2.A.i.d. Diversions must be stabilized prior to becoming functional.

G.4.e.2.A.ii. Structural practices – A description of the structural practices to be used to divert flows around exposed soils, store flows or otherwise limit runoff from exposed areas and eliminate sediment-laden runoff from the site. Such practices may include but are not limited to silt fences, earth dikes and berms, land grading, diversions, drainage swales, check dams subsurface drains, pipe slope drains, storm drain inlet protection, rock outlet protection, reinforced soil retention systems and geotextiles, gabions and riprap, and permanent and temporary sediment traps/basins.

G.4.e.2.A.ii.a. For locations on a site that have a drainage area of five acres or less, a sediment trap which provides a storage volume equal to 3,600 cubic feet per acre of drainage area shall be installed. Half of the volume of the trap will be in a permanent pool and half will be dry storage.

G.4.e.2.A.ii.b. For drainage areas of greater than five acres, a sediment basin providing 3,600 cubic feet per drainage acre shall be installed. Half of the volume of the basin shall be in a permanent pool and half shall be dry storage. Sediment basins must be able to dewater the dry storage volume in 48 to 72 hours. A sediment basin must be able to pass through the spillway(s) a 25-year, 24-hour storm event, and still maintain at least one foot of freeboard.

G.4.e.2.A.ii.c. The inlet(s) and outlet(s) for a sediment trapping structure must be protected against erosion by appropriate material such as riprap or other similar media.

G.4.e.2.A.ii.d. If necessary, diversions will be used to direct runoff to the trapping structure. Diversions must be stabilized prior to becoming functional.

G.4.e.2.A.ii.e. For locations served by a common drainage where a detention basin providing 3,600 cubic feet of storage is not attainable, additional sediment and erosion controls within the project area are required in lieu of the required sized sediment basin. Justification and a narrative description of the additional measures proposed must be provided for use of any practice(s) other than sediment basins or traps.

G.4.e.2.A.ii.f. Fill slopes must be protected by measures used to divert runoff away from fill slopes to conveyance measures such as pipe slope drains or stable channels.

G.4.e.2.A.ii.g. Sediment trapping structures will be eliminated and the area properly reclaimed and stabilized when the contributing drainage area is stabilized and the structures are no longer needed, unless the structure is converted into a permanent stormwater detention/retention structure.
G.4.e.2.A.ii.h. All trapped sediments will be disposed on an upland area where there is no chance of entering nearby streams.

G.4.e.2.A.ii.i. Breaching the embankment to dewater the structure is not permitted. Dewatering and structure removal shall not cause a violation of water quality standards. Provide a description of the procedures that will be used in removing these structures and the time frame.

G.4.e.2.A.ii.j. No sediment-laden water will be allowed to leave the site without going through an appropriate best management practice.

G.4.e.2.A.ii.k. Hay or straw bales are not acceptable BMPs.

G.4.e.2.A.iii. Presumptive conditions for discharges to Tier 2.5 and Tier 3 waters

Construction activities discharging to Tier 2.5 or Tier 3 waters will go through the Tier 2.5 or Tier 3.0 antidegradation review process.

G.4.e.2.B. Stormwater management plan

A description of measures that will be installed during construction to control pollutants in stormwater discharges after the project is completed shall be included in the SWPPP. The completed project shall convey stormwater runoff in a manner that will protect both the site and the receiving stream from post-construction erosion. All surface waters and other runoff conveyance structures shall be permanently stabilized as appropriate for expected flows. In developing structural practices for stormwater control, the permittee shall consider the use of, but not limited to: infiltration of runoff onsite; flow attenuation by use of open vegetated swales and natural depressions; stormwater retention structures and stormwater detention structures. A combination of practices may be utilized. The permittee should consider low impact development (LID) in the design of the site and the best management practices. This will allow the site to retain its natural hydrology and infiltrate stormwater within the boundary of the site. The use of impervious surfaces for stabilization should be avoided. Velocity dissipation devices shall be placed at the outlet of all detention or retention structures and along the length of any outlet channel as necessary to provide a non-erosive velocity flow from the structure to a water course.

Projects located in areas that have local government requirements and/or criteria for post development stormwater management must meet those requirements and/or criteria. Compliance with this general permit does not assure compliance with local codes regulations, or ordinances.

The permittee shall submit all calculations, watershed mapping, design drawings, and any other information necessary to explain the technical basis for the stormwater management plan. Since development site conditions vary widely, plan preparers will have significant latitude in designing practices to comply with this provision of the
permit. However, design procedures shall follow professionally accepted engineering and hydrologic methodologies. Permanent stormwater management structures that will impound water (detention/retention basins or similar structures) shall be designed and certified by a registered professional engineer. These structures shall also have a certified as-built drawing submitted with the Notice of Termination at the completion of the project.

G.4.e.2.C  Other controls

G.4.e.2.C.i. Waste disposal — All solid waste and construction/demolition material must be disposed of in accordance with the Code of West Virginia and Legislative Rule Title 33 Series 1, (Solid Waste Management Rule).

G.4.e.2.C.ii. Provisions must be made to control fugitive dust.

G.4.e.2.C.iii. Groundwater Protection Plan (GPP) — The applicant shall prepare a GPP that will satisfy the 47CSR58-4.11. et seq. Groundwater must be protected in accordance with the Code of West Virginia and Legislative Rule Title 47 Series 58 (Groundwater Protection Rule).

G.4.e.2.C.iv. Employee training — Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping and routine inspection. Training shall be on a quarterly basis and records of the training shall be maintained on site for review by the Director or the Director’s representative.

G.4.e.2.C.v. Visual inspection — Company personnel shall be identified to inspect as set forth under G.4.e.2.D. A tracking procedure shall be used to ensure that adequate corrective actions have been taken in response to deficiencies identified during an inspection. Records of inspections shall be maintained onsite for review by the Director or the Director’s representative.

G.4.e.2.C.vi. Recordkeeping and internal reporting procedures — Incidents such as spills, leaks and improper dumping, along with other information describing the quality and quantity of stormwater discharges should be included in the records. Inspection and maintenance records must be kept onsite for review by the Director or the Director’s representative.

G.4.e.2.D  Maintenance

A description of procedures to maintain in good and effective condition and promptly repair or restore all grade surfaces, walls, dams and structures, vegetation, erosion and sediment control measures and other protective devices identified in the site plan. At a minimum, procedures in a plan shall provide that all erosion controls on the site are inspected at least once every seven calendar days and within 24 hours after any storm event of greater than 0.5 inches of rain per 24-hour period.
G.4.e.2.D.i. All public and private roads adjacent to a construction entrance must be inspected and cleaned of debris originating from the construction site as necessary.

G.4.f. All Stormwater Pollution Prevention Plans and Groundwater Protection Plans required under this permit are considered reports that shall be available to the public under Section 308(b) of the CWA. The owner or operator of a project with stormwater discharges covered by this permit shall make plans available to members of the public upon request. However, the permittee may claim any portion of a Stormwater Pollution Plan or Groundwater Protection Plan as confidential in accordance with 47 CSR10-12.7. (NPDES Program).

G.4.g. Compliance with other laws and statutes

Nothing in this general permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G.5. Discharges to Impaired Waters

This permit does not authorize new sources or new discharges of constituents of concern to impaired waters unless consistent with the approved total maximum daily load (TMDL) and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the Clean Water Act Section 303(d) list. Pollutants of concern are those constituents for which the water body is listed as impaired. Discharges of pollutants of concern to impaired waterbodies for which there is an approved TMDL are not eligible for coverage under this permit unless they are consistent with the approved TMDL. Within six months of the TMDL approval, permittees must incorporate any limitations, conditions or requirements applicable to their discharges necessary for compliance with the TMDL, including any monitoring or reporting required by DWWM rules, into their SWPPP in order to be eligible for coverage under this general permit.

Sites that discharge into a receiving water that has been listed on the Clean Water Act 303(d) list of impaired waters, and with discharges that contain the pollutant(s) for which the water body is impaired, must document in the SWPPP how the BMPs will control the discharge of the pollutant(s) of concern.

G.6. Endangered and Threatened Species

If a site discharges to a stream where a federally endangered or threatened species or its habitats are present, the applicant shall contact the U.S. Fish and Wildlife Service to insure that requirements of the federal Endangered Species Act are met.

H. Reopener Clause
If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge authorized by this general permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Section G.1. of this permit, or the permit may be modified to include different limitations and/or requirements.

1. The conditions, standards, and limitations of this General Permit will be reviewed at the time of reissuance for possible revisions that may lead to more or less stringent conditions, standards, and limitations.

1. Permit coverage for construction activities encompassed by this permit expires upon satisfactory stabilization of the site. Satisfactory stabilization means ALL disturbed areas shall be covered by some permanent protection. Stabilize includes pavement, buildings, waterways (riprap, concrete, grass, or pipe), a healthy, vigorous stand of grass that uniformly covers more than 70 percent of the ground, stable outlet channels with velocity dissipation which directs site runoff to a natural watercourse, and any other approved structure or material. The permittee will request a final inspection by sending in the Notice of Termination. The Notice of Termination shall also include as-built drawings, certified by a registered professional engineer, for any permanent ponds or basins. Sites not stabilized will continue to have coverage under this permit and will be assessed an annual permit fee as promulgated by the West Virginia Legislature. Sites will be assessed a prorated annual fee based upon the completion date and proper stabilization. The Notice of Termination must be submitted within 30 days after final stabilization is achieved.

The herein-described activity is to be constructed or installed and operated, used and maintained strictly in accordance with the terms and conditions of this permit with any plans, specifications, and information submitted with the individual site registration application form, with any plan of maintenance and method of operation thereof submitted and with any applicable rules and regulations promulgated by the Environmental Quality Board and the Secretary of the Department of Environmental Protection.

Failure to comply with the terms and conditions of this permit, with any plans, specifications and information submitted, and with any plan of maintenance and method of operation thereof submitted shall constitute grounds for the revocation or suspension of this permit to any individual establishment or other person and for the invocation of all the enforcement procedures set forth in Chapter 22, Articles 11 and 12 of the Code of West Virginia.

This permit is issued in accordance with the provisions of Chapter 22, Article 11 of the Code of West Virginia.

[Signature]
Director
Notice of Termination (NOT) of Coverage Under a NPDES General Permit for Storm Water Discharges Associated with Construction Activity

I. Permit Information

NPDES Storm Water General Permit Registration Number: WVR10

Date Storm Water Discharge Terminated: ____________________________

II. Facility/Operator Information

Name: ____________________________ Phone: ____________________________

Address: ____________________________

City: ____________________________ State: ___ ZIP Code: ______________

III. Facility/Site Location Information

Name: ____________________________

Address: ____________________________ ZIP Code: ______________

City: ____________________________

County: ____________________________

Latitude: ____________________________ Longitude: ____________________________

IV. Certification: I certify under penalty of law that all storm water discharges associated with construction activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with construction activity under this general permit, and that discharging pollutants in storm water associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: ____________________________ Date: ____________________________

Signature: ____________________________

Instructions for Completing Notice Of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with construction activity.

For construction activities, elimination of all storm water discharges associated with construction activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geosynthetics) have been employed.

Send this form to the Charleston address below:

WV DEP - DWWM
Permitting and Engineering Branch
601 57th Street SP
Charleston, WV 25304-2345
Section I Permit Information

Enter the existing NPDES Storm Water General Permit registration number assigned to the facility or site identified in Section III.

Enter the date that the construction project was terminated and all disturbed areas were stabilized as required by the General Permit. A final inspection to determine the adequacy of the stabilization will be conducted by this agency.

Section II Facility/Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, county and ZIP code.

Section IV Certification

State statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

The completed form is to be submitted to the Charleston address for all projects.
Dear Mr. Roberts:

The Division of Natural Resources hereby grants to you for a term of 25 years, from the date hereof, a License and Right of Entry to construct, replace, cover, repair, operate, maintain, use and remove a ten-inch (10") water pipeline and a ten-inch (10") sewer pipeline together at a single location along an unnamed tributary of Mate Creek, Stafford District, Mingo County, West Virginia, as shown located and highlighted in red on the map attached hereto as Exhibit A.

This License and Right of Entry is subject to the following terms and conditions:

1. No in-stream work during the fish-spawning season (April 1-June 30).
2. The pipeline must be buried at least three-feet (3').
3. Any stream bed disturbance should be restricted to the immediate area. In-stream use of equipment should be kept to a minimum.
4. All shore areas disturbed by this operation must be reshaped, seeded and mulched immediately upon completion of work. The prompt establishment of vegetative cover will reduce future damage from high water levels.
5. Green concrete must not be put in the stream (highly toxic to aquatic life).
6. Amount of stream side vegetation disturbed should be kept to a minimum.
7. Best management practices should be followed; measures such as hay bales must be used to reduce downstream siltation.
8. Any plastic pipeline less than four-inch (4") in diameter shall be encased in a metal conduit.
9. The State's issuance of this Right-of-Entry does not provide for the applicant to work outside the requested boundaries nor does the State assume any liability for the applicant's/landowner's construction activities. By accepting this Right-of-Entry, the applicant/landowner assumes liability for any/all damages caused by this activity to both upstream and downstream landowners.

Guidelines of Best Management Practices for Sediment and Erosion Control as outlined by the Section of Water Resources, Division of Environmental Protection must be followed. Copies of those guidelines are available from the Section of Water Resources, Telephone No. (304) 926-0440.

The issuance of this License and Right of Entry by the Division of Natural Resources does not preclude the necessity to obtain a permit from the Corps of Engineers or any other state or federal permits which may be required by law, nor does this License and Right of Entry negate the need to comply with the West Virginia Water Pollution Control Act and/or the State Environmental Quality Board's administrative regulations, applicant is also responsible for determining if the proposed activity is located within an identified flood plain and if the applicant's responsibility for contacting the local governmental agency in charge of that program and obtaining a flood plain development permit for it. This License and Right of Entry does not grant any rights or privileges, or permission to enter upon or to cross the property of any other person, nor is permission granted to remove any material that lies upon the property of any other person. Work should be completed in as brief a period as possible and within one year from the date of this letter. In the event you fail or refuse to comply with any of the terms or conditions herein, this License and Right of Entry will be canceled and considered null and void and the Division will reject further applications.

There is no fee for this Right of Entry.

Sincerely,

Joe T. Scarberry, Supervisor
Office of Land and Streams

JTS:ah

pc: DNR Fish Biologist
Mr. Mike Zeto, Environmental Enforcement
DNR Conservation Officers
February 1, 2010

Ms. Susan Pierce  
Deputy State Historic Preservation Officer  
WV Division of Culture and History  
The Cultural Center  
1900 Kanawha Boulevard, E  
Charleston, WV 25305-0300  

Re: Mingo County Redevelopment Authority  
Mingo Central High School & King Coal Highway Water & Sewer Extension Project  

Dear Ms. Pierce:

The Mingo County Redevelopment Authority hereby requests comments regarding the proposed water and sewer line extension project and its potential effects to cultural resources pursuant to Section 106 of the National Historic Preservation Act.

The water portion of the project consists of approximately 81,890 feet of 10" and smaller diameter water main, two (2) water booster stations, one (1) 200,000 gallon water storage tank, two (2) pressure reducing stations, valves, fire hydrants and other related items. The sewer portion consists of approximately 61,000 feet of 10" and smaller diameter gravity sewer pipe, 30,580 feet of 6" and smaller diameter sewage force main, manholes, cleanouts and other related items. Connection for both utilities will be made at the ends of existing systems on WV Route 65 just north of its intersection with Mate Creek Road (WV Route 6) and along WV Route 6 near the Community of Newtown, all in Mingo County. Maps and a video showing line locations and the proposed booster station and tank sites are attached.

Should you need additional information or clarification, please do not hesitate to contact me at 304-776-7473.

Sincerely,

Rick Roberts, PE  
Project Manager

Attachment
January 14, 2010

District Engineer
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, WV 25701

Re: Application for Permit
Mingo County Redevelopment Authority
King Coal Highway
Water and Sewer Extensions
ELR# 1009051

The Mingo County Redevelopment Authority hereby requests a permit to construct a stream crossing at a location on an unnamed tributary of the Tug Fork River along WV State Route 65 north of Red Jacket in Mingo County.

The subject project is fully funded and construction is anticipated in March 2010.

Should you have any questions regarding the work, please do not hesitate to contact me.

Sincerely,

Rick Roberts, P.E.
Project Manager

cc: Mingo County Redevelopment Authority
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INFORMATION</th>
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<tr>
<td>1. APPLICATION NO.</td>
<td></td>
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<tr>
<td>2. FIELD OFFICE CODE</td>
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<td>3. DATE RECEIVED</td>
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<tr>
<td>4. DATE APPLICATION COMPLETED</td>
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<tr>
<td>5. APPLICANT'S NAME</td>
<td>Mingo County Redevelopment Authority</td>
</tr>
<tr>
<td>6. APPLICANT'S ADDRESS</td>
<td>P.O. Box 298</td>
</tr>
<tr>
<td></td>
<td>1100 East Fourth Avenue</td>
</tr>
<tr>
<td></td>
<td>Williamson, WV 25661</td>
</tr>
<tr>
<td>7. APPLICANT'S PHONE NUMBERS WITH AREA CODE</td>
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</tr>
<tr>
<td></td>
<td>b. Business 304-235-0042</td>
</tr>
<tr>
<td>8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)</td>
<td>E.L. Robinson Engineering Co.</td>
</tr>
<tr>
<td>9. AGENT'S ADDRESS</td>
<td>5088 Washington Street, West</td>
</tr>
<tr>
<td></td>
<td>Charleston, WV 25313</td>
</tr>
<tr>
<td>10. AGENT'S PHONE NUMBERS WITH AREA CODE</td>
<td>a. Residence</td>
</tr>
<tr>
<td></td>
<td>b. Business 304-776-7473</td>
</tr>
<tr>
<td>11. STATEMENT OF AUTHORIZATION</td>
<td>I hereby authorize E.L. Robinson Engineering Co. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.</td>
</tr>
</tbody>
</table>

APPLICANT'S SIGNATURE: ___________________________ DATE: ____________

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) King Coal Highway Water and Sewer Extensions

13. NAME OF WATERBODY, IF KNOWN (if applicable) Unnamed trib. of Mate Creek of Tug Fork River

14. PROJECT STREET ADDRESS (if applicable) WV Route 65 north of Red Jacket

15. LOCATION OF PROJECT

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mingo</td>
<td>WV</td>
</tr>
</tbody>
</table>

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) WV Route 65 north of Red Jacket

17. DIRECTIONS TO THE SITE

Head north along WV 65 0.4 miles from intersection of WV 65 and CR 6 at Red Jacket, WV.
18. Nature of Activity (Description of project, include all features)

Public water and sewer mains shall cross an unnamed tributary at one location along WV Route 65 approximately 0.4 miles north of the streams confluence with Mate Creek. (Total of two crossings at same location) Water main to be 10" ductile iron, ball and socket pipe. Sewer main to be 10" ductile iron, ball and socket pipe. Water and sewer mains to be buried with 3'-6" minimum cover. Trench to be excavated by hydraulic excavator, typically a 50'- 60' bucket, and backfilled with the excavated material. No dredging or fill will be necessary. The stream channel will be restored to its current condition. Riprap will be placed on the stream banks for erosion control of the excavated trench. No structures will be visible in the waterway.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Extend public water and sewer service to and along the King Coal Highway. The projected construction is to take place in Spring and Summer of 2010.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Excavate, install and backfill 10" water main and 10" sewer force main. The stream and channel will be restored to its current condition. No dredged or fill material needed.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

Crossing No. 1 (water)- 14 cy (30'x3'x4'); Crossing No. 2 (sewer)- 14 cy (30'x3'x4'); rock, sand & gravel

22. Surface Area In Acres of Wetlands or Other Waters Filled (see instructions)

No fill. 0.004 acres disturbed.

23. Is Any Portion of the Work Already Complete? Yes ___ No ___

IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners. Lessees, etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list)

West Virginia Division of Highways, 801 Madison Ave. Huntington, WV 25712

25. List of Other Certifications or Approvals/Permits Received from other Federal, State, or Local Agencies for Work Described in This Application

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>TYPE APPROVAL</th>
<th>IDENTIFICATION NUMBER</th>
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<td>01/13/10</td>
<td>pending</td>
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</table>

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States, knowingly and willfully falsifies, conceals, or covers up any trick scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.
VERIFICATION

STATE OF WEST VIRGINIA,
COUNTY OF KANAWHA, to-wit:

Charles R. Roberts, Jr., P.E., after first being duly sworn upon his oath, states that he is the Professional Engineer on behalf of Joint Applicants in the foregoing reference proceeding, that he prepared and has read the foregoing Responses Nos. 1 and 8 through 10, and that said responses are true and correct to the best of his knowledge, information and belief.

Charles R. Roberts, Jr., P.E.
CHARLES R. ROBERTS, JR., P.E.

Taken, sworn to and subscribed before me this 3 day of March, 2010.
My commission expires March 1, 2016.

Mark McGettigan
NOTARY PUBLIC

[Stamp]
CERTIFICATE OF SERVICE

I, Robert R. Rodecker, counsel for Mingo County Redevelopment Authority, do hereby certify that copies of the foregoing Responses have been served upon the following parties of record on this 8th day of March, 2010, in the manner so indicated:

ORIGINAL VIA HAND DELIVERY:

Ronald E. Robertson, Jr., Esquire
Legal Division
Public Service Commission
201 Brooks Street
Charleston, West Virginia

VIA HAND DELIVERY:

Sandra Squire, Executive Secretary
Public Service Commission
201 Brooks Street
Charleston, West Virginia 25301

[Signature]
Robert R. Rodecker
ATTACHMENT NO. 2

RESPONSE NO. 8
MINGO COUNTY REDEVELOPMENT AUTHORITY
AND TOWN OF MATEWAN TO COMMISSION STAFF'S
FIRST SET OF INTERROGATORIES, DATA REQUEST OR
REQUESTS FOR INFORMATION
DESIGN REPORT

KING COAL HIGHWAY/MINGO CENTRAL HIGH SCHOOL WATER AND SEWER SYSTEM EXTENSION PROJECT

February, 2010

Prepared for:
MINGO COUNTY REDEVELOPMENT AUTHORITY

Prepared by:

E.L. ROBINSON
the Challenge, the Choice.

5088 Washington Street, West
Charleston, West Virginia 25313
Office: 304/776-7473

Charles R. Roberts, Jr., P.E.
I. Introduction

The Mingo County Redevelopment Authority proposes to construct a water and sewer extension project to provide service to multiple developable sites along a 7-8 mile section of the King Coal Highway in Mingo County, West Virginia. This section of the King Coal Highway is currently under construction and includes a utility corridor adjacent to the highway on which the water and sewer lines will be constructed. The water portion of the project consists of approximately 81,890 feet of 10" and smaller diameter water main, two (2) water booster stations, one (1) 221,000 gallon water storage tank, two (2) pressure reducing stations, valves, fire hydrants and other related items. The sewer portion consists of approximately 61,000 feet of 10" and smaller diameter gravity sewer pipe, 30,580 feet of 6" and smaller diameter sewage force main, manholes, cleanouts and other related items. Connection for both utilities will be made at the ends of existing systems on WV Route 65 just north of its intersection with Mate Creek Road (WV Route 6) and along WV Route 6 near the Community of Newtown, all in Mingo County.

The Mingo County Redevelopment Authority has obtained funding for the project and will own the system through construction. Following the completion of construction, ownership of the water and sewer systems will be transferred to the Town of Matewan. A case has been filed with the Public Service Commission of West Virginia (Case No. 10-0057-WS-PC-CN) to accomplish this transfer. Following the transfer, the Town of Matewan will own and operate the systems.

The Town’s Water System currently serves approximately 906 customers in the Town of Matewan, the communities of North Matewan, Lobata, Blackberry City, Red Jacket and surrounding areas of Mingo County. It includes a 350 gallons per minute surface treatment plant (constructed in 1981) which utilizes the Tug Fork River as a source of raw water. The distribution system consists of two (2) booster stations, four (4) water storage tanks with a total capacity of 483,000 gallons, approximately 63,000 feet of 8-inch and smaller diameter water mains, fire hydrants, valves, customer services and other related items.

The Town’s Wastewater System consists of a 0.350 MGD rotating biological contactor (RBC) treatment plant (constructed in 1984), nine (9) major pump stations, approximately 51,800 feet of 12-inch and smaller diameter gravity sewer line, 15,926 feet of 10-inch and smaller diameter force main, 355 manholes, 28 cleanouts, individual customer services and other related items. The system currently serves approximately 859 customers in the Town of Matewan, the communities of North Matewan, Lobata, Blackberry City, Red Jacket and surrounding areas of Mingo County.
II. **DESIGN CRITERIA**

The Design Criteria follows the WV Bureau for Public Health's *Public Water System Design Standards* and *Sewage Treatment and Collection System Design Standards*.

A fire flow of 250 gallons per minute (gpm) was used in the hydraulic calculations and a volume of 30,000 gallons was added to tank sizing to provide such a flow for two hours.

The existing water system consists of 8-inch and smaller diameter mains and will not be upgraded with this project. The new water extension will be constructed of ten-inch and smaller diameter Ductile Iron Pipe (DIP), Class 350 lines.

The existing sewer system consists of 8-inch and larger diameter mains and will not be upgraded with this project. The new gravity sewer extension will be constructed of ten-inch diameter Ductile Iron Pipe (DIP), Class 350.

Major sewer system design elements are as follows:

1. Average Daily Flow per Residence = 70 GPD x 4.0 persons per household.
2. Peak Flow = 4.0 x Average Daily Flow (Branch Lines)
3. Peak Flow = 2.5 x Average Daily Flow (Trunk Lines)
4. Pump Station Capacity = 4.0 x Average Daily Flow (Per Pump)
5. Minimum Velocity in Force Main and Gravity Collection System = 2.0 FPS

III. **Investigation**

A. **Projected Water and Sewer Usage:**

There are approximately 50 new residential customers and the Mingo Central High School that will initially be served by the project. Assuming 70 gallons of water per person per day and four (4) persons per household, the estimated 50 new residential customers of the extension area would require an average of 14,000 gallons of water per day. The proposed Mingo Central High School is expected to initially house approximately 900 students and staff. At 10 gallons per day, the school will initially use approximately 9,000 gallons per day. This equates to a total usage of approximately 23,000 gallons per day.
The project is designed to serve the High School and provide water and sewer service to approximately 700 developable acres along a 7-8 mile segment of the King Coal Highway. The pipes, water storage tank, water booster stations and sewage pump stations will be sized to serve, or be upgraded to serve the entire segment of the highway. Assume low density development of 250 gallons per day per acre of developable land. 250 x 700 = 175,000 gallons per day.

B. **Existing Pressure Zone:**

The existing Town of Matewan water system serves the area which the project will connect to. A fire hydrant test was conducted by the on July 23, 2009 at a hydrant near the connection point. The results of this test are as follows:

<table>
<thead>
<tr>
<th>Hydrant Flow Test</th>
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<tbody>
<tr>
<td>Flow (gpm) Static (0)</td>
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<tr>
<td>240</td>
</tr>
<tr>
<td>340</td>
</tr>
<tr>
<td>410</td>
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<tr>
<td>480</td>
</tr>
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</table>

The static pressure at test hydrant was 170 psi. Data from the flow test indicates that at a flow rate of 200 gpm, the residual pressure will be approximately 164 psi, well above the 20 psi required by the WV Bureau for Public Health. The fire hydrant tested is located near the connection point to the existing system. Based on this data, the system will experience a 6 psi pressure drop when the pumps are operating. According to the system operator, all customers of the existing system have pressure of 40 psi or higher. It is therefore concluded that the construction of the proposed extension and the peak flow associated with the extension will have little effect on the residual pressure of existing customers.

C. **Proposed Pressure Zone:**

Booster Station No. 1 will be located along a coal haul road to pump out of the existing system. It will pump into a 16,000 gallons tank will be located at Booster Station No. 2 to serve as a transfer tank for the station. No customers will served in this new Zone No. 1. The Transfer Tank will have a base elevation of approximately 1,539.00 and an overflow elevation of approximately 1,552.68. Booster Station No. 1 will be constructed as part of
this project and will be located near elevation 1,171.00. Elevations within the pressure zone range from 920 at the connection point to the existing system, to 1,171 at Booster Station No. 1.

The proposed main storage tank that will serve the new zone is to be located above the King Coal Highway across from the Mingo Central High School. It will have a base elevation of approximately 2,227.00 and an overflow elevation of approximately 2,359.83. Booster Station No. 2, discussed below, would be located near the Transfer Tank. The booster will be constructed as part of this project and will be located near elevation 1,539. Elevations within the pressure zone range from 1,539 at the proposed Booster Station No. 2, to 2,034 at the highest residence in the system located near the proposed water storage tank.

D. Booster Sizing:

The Booster Station No. 1 will need to provide water for approximately 50 residential customers and the Mingo Central High School. As was discussed in part A of this section, this is a volume of 23,000 gallons per day. The Mingo County Redevelopment Authority wants to build additional capacity into the system to provide for further development along the King Coal Highway and has requested 200 gpm pumps. To deliver an average volume of 23,000 gallons per day at a pumping rate of 200 gpm will require the booster stations to operate an average of 2.0 hours per day. Following development of additional sites and assuming a maximum pump run time of 16 hours per day, the booster stations will be capable of pumping an additional 169,000 gallons of water per day into the system without upgrade.

Data from the fire hydrant flow test indicates that the suction pressure at the pump will be 54 psi or 125’ of head. The proposed booster site is located at elevation 1,171.00. Assuming the new transfer water storage tank is located with a base elevation of 1,539.00 and an overflow elevation of 1,552.68. The worst case static head would be the difference between the tank overflow elevation and the elevation of the booster pump station or 1,552.68 – 1,171.00 = 381.68. Adding allowances for losses within the booster and friction loss in the pipe of 8’ (see Appendix B), TDH is estimated to be 390 feet.

Accordingly, pump design will be based upon 200 GPM at 265’ Discharge Head. Chose a Grundfos, Series CR 45-3-1 Pump which will deliver approximately 200 gallons per minute at 280’ of total head. Pump details are included in Appendix B.
Booster Station No. 2 will need to provide water for approximately 50 residential customers and the Mingo Central High School. As was discussed in part A of this section, this is a volume of 23,000 gallons per day. The Mingo County Redevelopment Authority wants to build additional capacity into the system to provide for further development along the King Coal Highway and has requested 200 gpm pumps. To deliver an average volume of 23,000 gallons per day at a pumping rate of 200 gpm will require the booster stations to operate an average of 2.0 hours per day. Following development of additional sites and assuming a maximum pump run time of 16 hours per day, the booster stations will be capable of pumping an additional 169,000 gallons of water per day into the system without upgrade.

Booster Pump No. 2 will pump from a transfer tank located beside the station with a base elevation of 1,539.00 and a overflow elevation of 1,552.68. Using the mid point of the transfer tank, the suction head at the pump will be 7 feet. The proposed booster site is located at elevation 1,539.00. Assuming the new water storage tank is located with a base elevation of 2,227.00 and an overflow elevation of 2,359.83. The worst case static head would be the difference between the tank overflow elevation and the elevation of the booster pump station or 2,359.83 – 1,539.00 = 820.83. Adding allowances for losses within the booster and friction loss in the pipe of 8’ (see Appendix B), TDH is estimated to be 830 feet.

Accordingly, pump design will be based upon 200 GPM at 830’ TDH. Chose a Goulds, 7WALC-E6207WBPCO Pump which will deliver approximately 200 gallons per minute at 830’ of total head. Pump details are included in Appendix B.

E. Water Plant Impact.

The existing Town of Matewan Water Treatment Plant supplies water to the project area. The water treatment plant is designed to treat 500,000 gallons per day (gpd) and is currently producing 250,000 gpd in 13 hours of operation (320 gpm). At 320 gpm, the plant will have to operate a little less than one (1) additional hour per day in order to produce the 16,500 gallons per day of additional water needed for the project. It is therefore concluded that the existing treatment plant has adequate capacity to supply the project without upgrade.

F. Storage Tank Sizing.

The Transfer Tank is intended to feed Booster Station No. 2 only and will not provide water to any customers. At a pumping rate of 200 gpm, the tank will allow the pumps to run around 80 minutes without refilling. This should be
adequate capacity should there be minor differences in pumping rates between Booster Stations 1 and 2.

Main Tank

As already established, the daily demand for this pressure zone is estimated at 23,000 gallons per day. Two times water demand is 46,000 gallons. An additional 30,000 gallons is required to provide 250 gpm of fire flow for two hours. This results in a minimum storage requirement of 76,000 gallons. Allowing for an additional new customers to be added to the system and rounding up to a standard size, a 221,000 gallon tank is proposed. At 23,000 gallons per day usage, tank turnover would be around 10.5 percent. This is unacceptable, it is required that tank turnover be not less than 20 percent per day. To avoid this problem, initially the tank will need to be operated at approximately ½ capacity. During initial operation (following start-up), Booster Station No. 2 will be set up to come on at 50 feet and shut down at 60 feet. Under this scenario, between 83,200 and 99,800 gallons of water would be in the tank at all times. Worse case, turnover would be around 23 percent.

G. Hydraulics:

A flow of 70 gpm was used as a peak demand for this project to correlate with the estimated demand to the Mingo Central High School. The total peak demand was placed at the appropriate pressure junction. The water level of the proposed tank was set at ½ full to simulate a peak demand situation. A steady state analysis was then run using these peak demand conditions. The calculated pressures, hydraulic grades, flow, etc. are shown in the Analysis Report (Peak Demand Scenario.).

A steady state analysis was also run using 0.1 gpm demand and water level in the tank at the maximum to simulate static pressure. A 0.1 gpm demand was placed at the end of the line to simulate the pressure reducing stations are working. The calculated pressures, hydraulic grades and elevations are shown in the Analysis Report (Static Scenario Tank Full With Pressure Reducing Stations). A drawing showing the layout of the waterline and locations of the proposed water tank, pressure reducing station, pressure pipes and junctions is also provided with this report.

A Fire Flow Analysis was performed at all pressure junctions located on the 10 inch diameter lines. This analysis was run with a minimum demand of 250 gpm at the highest location on the project. The residual pressure at this point is 17.2 psi. The only customers to be served by the waterline extension are 50 residential customers and the Mingo County High
School and the residual pressure at that location is 136 psi during fire flow.

It should be noted that a high point is located at Junction 13. At that location, under static conditions, the pressure is 48.9 psi and at peak demand conditions the residual pressure is 20.3 psi. At Junction 13, the residual pressure drops to 17.2 psi during fire flow conditions. Regulations prohibit the residual pressure from dropping below 20 psi at any time. As additional development occurs, additional storage will be required. At build out, it is estimated that average daily usage will be 175,000 gallons per day. To provide a minimum of two days storage plus fire flow, the total storage capacity of the system will need to be at least 380,000 gallons. At some point, additional storage tanks will need to be installed to increase storage capacity by at least 159,000 gallons. To avoid the low pressure issue at Junction 13 and address the need for additional storage at a later date, a requirement will be placed on the owner/operator that no service can be provided at Junction 13 and beyond until a second storage tank is install at or near Junction 13.

The project will include the installation of two (2) new PRV Stations on the system to address high pressure areas on the western end of the system. PRV No. 1 will be located at an elevation of approximately 1,703' and will reduce system pressure from 284 psi to 40 psi. PRV No. 1 will be a two valve installation with a 6" main valve and a 2" low flow valve. PRV No. 2 will be located at an elevation of approximately 1,148' and will reduce system pressure from 280 psi to 71 psi. PRV No. 2 will have a single 6" main valve and a 2" low flow valve. All valves will be as manufactured by CLA-VAL or approved equal. Details are included in Appendix C.

The maximum service elevation for the Booster Station No. 2 Pressure Zone would be 2,170'.

It has been estimated that the initial flows from the system will be 23,000 gallons per day. Using a peaking factor of 4.0, the peak daily flow from the
system will be approximately 92,000 gallons per day.

Sewer mains are 10-inch and have a minimum slope of 0.28%. It will transport flows from the entire project. From above, maximum peak flows from the project are 92,000 GPD. From Manning’s Formula, using n=0.013, a 10-inch pipe with a slope of 0.2% will carry up to 630,000 GPD with a velocity of 1.79 FPS. A 10-inch pipe with a slope of 0.3% will carry up to 771,000 GPD with a velocity of 2.19 FPS. It is therefore concluded that the sewer mains are adequately sized for peak project flows.

K. **Wastewater Treatment Plant Capacity**

The Town of Matewan currently owns a wastewater collection and treatment system serving approximately 859 customers. The District’s treatment plant utilizes the Rotating Biological Contactor (RBC) process and has a rated capacity of 0.350 million gallons per day (MGD). The plant currently treats an average of 0.150-0.250 MGD. The addition of 23,000 gallons per day of flows from the project will increase flows at the plant to an average of 0.173-0.273 MGD. It is therefore concluded that the existing Town of Matewan Treatment Plant has adequate excess capacity to serve the project area.

L. **Pump Station Capacity**

Flows from the initial 50 residential customers and the Mingo Central High School will flow by gravity into the existing system and pumping will not be required. As the remaining developable sites are served, pumping stations will be added as needed to serve the sites. Because it is not known at this point what flows will be generated at the remaining sites, both 6” and 3” inch force mains are to be constructed. At the time that development occurs, the pumping stations will be sized based upon anticipated flow and connected to either the 6” or 3” force main as appropriate.

Flow from the project area will go through the existing Red Jacket Pump Station which has a rated capacity of 0.500 MGD. As calculated above the after project peak flow from the entire system will be 0.273 MGD. Clearly, the Red Jacket Pump Station has adequate excess capacity to handle the added flow from the project area.
Booster Station No. 1 - Section Head

Tie-in Elevation: 920.00
BS#1 Flow Elevation: 1,171.00

Static Head = 1,171.00' - 920.00' = 251.00'

Pressure at Tie-in @ 200 gpm Flow = 184 psi on 379.00'

Suction Head = 379.00' - 251.00' = 128.00' - Hf = 128.00' - 2.33' = 125.67' say 125'

* Using Hazen-Williams Formula, w/C = 130

\[ H_f = (10.44) \left( \frac{1.85}{130} \right) \left( \frac{(200)^{1.85}}{4.85} \right) \]

\[ H_f = 10.44 \times 2.560 \left[ \frac{200^{1.85}}{130^{1.85} \times 4.85} \right] \]

\[ H_f = 10.44 \times 2.560 \left[ \frac{18,066}{24,773} \right] = 2.38' \]
Fire Hydrant Flow Test

Flow vs Pressure

Flow (gpm)

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<td>200</td>
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Residual Pressure (psi)

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<tr>
<td>164</td>
</tr>
<tr>
<td>200</td>
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Scale:
Booster Station No. 1 -- Discharge Head

BS No. 1 Elev. 1,171.00
Transfer Tank Elev. 1,552.63

Static Head = 1,552.63 - 1,171.00 = 381.63

Discharge Head = 381.63 + hf
= 381.63 + 2.59
= 384.22 ft

* Use Hazen-Williams Formula with C = 130

hf = (10.44)(Z,450) \left[ \frac{(18,000)^{1.85}}{(130)^{1.85} \times 14.66 \times 5} \right]

B.S. No. 1
Flow = 200 gpm
Suction Head = 125 ft
Discharge Head = 350 ft
Booster Station No. 2 - Discharge Head

BS No. 2 Elev. = 1,539.00
Tank Overflow Elev. = 2,359.83

Static Head = 2,359.83 - 1,539.00 = 820.83'

Discharge Head = 820.83' + Hs%
= 820.83' + 4.80'
= 825.63' say 830'

* Use Hazen-Williams Formula n/C = 130

\[ h_L = (10.44)(3.54)(1.65) \left[ \frac{(200)}{(130)(1.52)} \right] + (10.44)(4.710)(1.65) \left[ \frac{(200)}{(130)(1.65)} \right] \]

\[ h_f = (10.44)(3.54)(18.066) \left[ \frac{18.066}{24.773} \right] + (10.44)(4.710)(8.143)(7.367) \]

\[ h_f = 3.3' + 1.49' = 4.80' \]

B.S. No. 2 Flow = 200 gpm

Section Head = 7.87'
Discharge Head = 830.83'
<table>
<thead>
<tr>
<th>Label</th>
<th>Elevation (ft)</th>
<th>Hydraulic Grade (ft)</th>
<th>Pressure (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-1</td>
<td>2,041.00</td>
<td>2,293.90</td>
<td>109.4</td>
</tr>
<tr>
<td>J-2</td>
<td>2,048.00</td>
<td>2,293.90</td>
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</tr>
<tr>
<td>J-3</td>
<td>1,979.00</td>
<td>2,293.90</td>
<td>136.2</td>
</tr>
<tr>
<td>J-4</td>
<td>1,933.00</td>
<td>2,293.90</td>
<td>156.1</td>
</tr>
<tr>
<td>J-5</td>
<td>1,911.00</td>
<td>2,293.90</td>
<td>165.6</td>
</tr>
<tr>
<td>J-6</td>
<td>1,807.00</td>
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<td>210.6</td>
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<td>J-7</td>
<td>1,851.00</td>
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<td>J-8</td>
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<td>887</td>
<td>1,141.00</td>
<td>109.9</td>
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<td>J-10</td>
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<td>2,293.90</td>
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<td>J-12</td>
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<td>J-13</td>
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<td>2,293.90</td>
<td>20.3</td>
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<tr>
<td>J-14</td>
<td>2,164.00</td>
<td>2,293.90</td>
<td>56.2</td>
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<tr>
<td>J-15</td>
<td>2,208.00</td>
<td>2,293.90</td>
<td>37.2</td>
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<tr>
<td>Label</td>
<td>Elevation (ft)</td>
<td>Hydraulic Grade (ft)</td>
<td>Pressure (psi)</td>
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<tr>
<td>-------</td>
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<td>----------------------</td>
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</tr>
<tr>
<td>Label</td>
<td>Elevation (ft)</td>
<td>Demand (gpm)</td>
<td>Hydraulic Grade (ft)</td>
</tr>
<tr>
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<td>---------------</td>
<td>--------------</td>
<td>----------------------</td>
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<td>2,293.40</td>
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<tr>
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<td>2,101.00</td>
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</tr>
<tr>
<td>J-15</td>
<td>2,208.00</td>
<td>0</td>
<td>2,286.90</td>
</tr>
</tbody>
</table>
Q = 200 US GPM
H = 280 ft
n = 98 % / 59 Hz
Pumped liquid = Water
Liquid temperature = 68 °F
Density = 62.29 lb/ft³

Eta pump = 76.4 %
P2 = 18.5 HP
**96419123 CR 45-3-1 60 Hz**

**Input**

**Select Application**
- Industrial applications

**Select Type of Installation**
- Pressure Boosting

**Your Requirements**
- Dimensioning flow: 200 US GPM
- Liquid temperature during operation: 65 °F
- Total head: 280 ft

**Pump design**
- No

**Control Mode**
- Variable speed

**Configuration**
- Parallel

**Electrical data**
- Frequency: 60 Hz
- Min. power limit for SD start: 5.5 kW

**Hit list settings**
- Calculation period: 5 years
- Increase of energy price: 6 %
- Max. hits total: 8

**Load Profile**
- Flow: 100 %
- Head: 100 %
- Time: 1825 h/Year
- Energy consumption: 28706 kWh/Year

**Sizing result**

- Type: CR 45-3-1
- Quantity: 1
- Supply: 230/460 V
- Motor: 25 HP
- Flow: 200 US GPM (max. +2 %)
- Operation down to: 52 %
- Head: 280 ft (max. +5 %)
- Max. velocity: 6.23 ft/s
- Min. inlet pressure: 9.8 psi (77 °F, against atmosphere)
- Power P1: 14.9 kW
- Power P2: 18.5 HP
- Eta pump: 76.4 %
- Eta motor: 92.4 %
- Eta pump+motor: 70.6 % = Eta pump * Eta motor
- Eta total: 66.6 % = Eta relative to the duty point
- Energy consumption: 28706 kWh/Year
- CO2 emission: 36100 lb/Year
- Price: USD On request
- Energy cost: USD 4306 /Year
- Price + energy costs: USD On request /5 Years

Controller is not included and must be appended to meet the required input.

---

**Graph**

- CR 45-3-1

- Q = 200 US GPM
- H = 280 ft
- n = 98 % / 59 Hz
- Pumped liquid = Water
- Liquid temperature = 68 °F
- Density = 62.29 lb/ft³
- Eta pump = 76.4 %

- P2 = 18.5 HP

---

Printed from Grundfos CAPS
- The MPC-EF system maintains a constant pressure through continuous adjustment of the speed of the pumps.

- The system performance is adjusted to the demand through cutting in/out the required number of pumps and through parallel control of the pumps in operation.

- Pump changeover is automatic and depends on load, operating hours and fault.

- All pumps in operation will run at equal speed.
4.2 PUMP1 FAULT

4.3 Jumper X1 1 2

4.4 10 12 14 16

4.5 18

4.6

4.7

4.8 PUMP2 FAULT

4.9 Jumper X2 1 2

4.10 5 9 50 PTC1

4.11

4.12

4.13

4.14

4.15

4.16

4.17

4.18

4.19

4.20

4.21

4.22

4.23

4.24

4.25

4.26

4.27
Data sheet  
MBS 3000 pressure transmitter for industrial applications

Introduction

- Designed for use in severe industrial environments
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- All standard output signals: 4-20 mA, 0-5 V, 1-5 V, 1-6 V, 0-10 V
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated
- Typical applications:
  - Pumps
  - Compressors
  - Pneumatics
  - Water treatment

Dimensions

Ordering

<table>
<thead>
<tr>
<th>Type code</th>
<th>8</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMP Superseal series (male)</td>
<td>AMP Econoseal series (male)</td>
<td>IEC 947-5-2 M12x1, 4-pin</td>
<td>ISO 15170-A1-3.2-Sn (Bayonet plug)</td>
<td>DIN 43650, Pg 9</td>
<td>2 m screened cable</td>
<td></td>
</tr>
</tbody>
</table>


Ordering

<table>
<thead>
<tr>
<th>¼ - 18 NPT</th>
<th>½ - 14 NPT</th>
<th>DIN 3852-E-G ¼</th>
<th>G ¼ A (EN 837)</th>
<th>G ⅛ A (EN 837)</th>
<th>G ½ A (EN 837)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC04</td>
<td>AC06</td>
<td>GB04</td>
<td>AB04</td>
<td>AB06</td>
<td>AB08</td>
</tr>
</tbody>
</table>

Page 4
# Data sheet

**Pressure transmitter for industrial application MBS 3000**

## Technical data

**Main specifications**

<table>
<thead>
<tr>
<th>Pressure connections</th>
<th>see page 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring ranges</td>
<td>[bar]</td>
</tr>
<tr>
<td>0-1</td>
<td>0-1.6</td>
</tr>
<tr>
<td>0-2.5</td>
<td>0-4</td>
</tr>
<tr>
<td>0-6</td>
<td>0-10</td>
</tr>
<tr>
<td>0-25</td>
<td>0-40</td>
</tr>
<tr>
<td>0-60</td>
<td>0-100</td>
</tr>
<tr>
<td>0-160</td>
<td>0-250</td>
</tr>
<tr>
<td>0-400</td>
<td>0-600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output signals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 mA</td>
<td>0.5 V</td>
</tr>
<tr>
<td>1-5 V</td>
<td>1-6 V</td>
</tr>
<tr>
<td>0-10 V</td>
<td></td>
</tr>
</tbody>
</table>

| Electrical connections | see page 3 |

**Performance (IEC 770)**

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>±0.5% FS (typ.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>±1% FS (max.)</td>
</tr>
<tr>
<td>Non-linearity (best fit straight line)</td>
<td>≤ ±0.5% FS</td>
</tr>
<tr>
<td>Hysteresis and repeatability</td>
<td>≤ ±0.1% FS</td>
</tr>
<tr>
<td>Thermal zero point shift</td>
<td>≤ ±0.1% FS/10K (typ.)</td>
</tr>
<tr>
<td></td>
<td>≤ ±0.2% FS/10K (max.)</td>
</tr>
<tr>
<td>Thermal sensitivity (span) shift</td>
<td>≤ ±0.1% FS/10K (typ.)</td>
</tr>
<tr>
<td></td>
<td>≤ ±0.2% FS/10K (max.)</td>
</tr>
<tr>
<td>Response time</td>
<td>&lt; 4 ms</td>
</tr>
<tr>
<td>Overload pressure</td>
<td>6 x FS (max. 1500 bar)</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>6 x FS (max. 2000 bar)</td>
</tr>
<tr>
<td>Durability, P: 10-90% FS</td>
<td>&gt;10x10^6 cycles</td>
</tr>
</tbody>
</table>

**Electrical specifications**

<table>
<thead>
<tr>
<th>Nom. output signal (short-circuit protected)</th>
<th>0-5, 1-5, 1-6 V d.c.</th>
<th>0-10 V d.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage [Un], polarity protected</td>
<td>9 → 32 V d.c.</td>
<td>9 → 30 V d.c.</td>
</tr>
<tr>
<td>Supply - current consumption</td>
<td>≤ 5 mA</td>
<td>≤ 8 mA</td>
</tr>
<tr>
<td>Supply voltage dependency</td>
<td>≤ ±0.05% FS/10 V</td>
<td></td>
</tr>
<tr>
<td>Current limitation (linear output up to 1.5x nom. range)</td>
<td>34 mA (typ.)</td>
<td>-</td>
</tr>
<tr>
<td>Output impedance</td>
<td>≤ 25Ω</td>
<td></td>
</tr>
<tr>
<td>Load [R] (load connected to 0V)</td>
<td>R_L ≤ (U_p-0V)/0.02</td>
<td>R_L ≥ 10 kΩ</td>
</tr>
</tbody>
</table>

**Environmental conditions**

<table>
<thead>
<tr>
<th>Medium temperature range</th>
<th>-40 → +85°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range (depending on electrical connection)</td>
<td>see page 3</td>
</tr>
<tr>
<td>Compensated temperature range</td>
<td>0 → +80°C</td>
</tr>
<tr>
<td>Transport temperature range</td>
<td>-50 → +85°C</td>
</tr>
<tr>
<td>EMC - Emission</td>
<td>EN 61000-6-3</td>
</tr>
<tr>
<td>EMC - Immunity</td>
<td></td>
</tr>
<tr>
<td>Electrostatic discharge</td>
<td>Air mode</td>
</tr>
<tr>
<td></td>
<td>Contact mode</td>
</tr>
<tr>
<td>RF field</td>
<td>10 V/m, 26 MHz - 1 GHz</td>
</tr>
<tr>
<td>Conducted</td>
<td>10 V_peak, 150 kHz - 30 MHz</td>
</tr>
<tr>
<td>Transient burst surge</td>
<td>4 kV (CM), Clamp</td>
</tr>
<tr>
<td></td>
<td>1 kV (CM, DM), Rg = 42Ω</td>
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<tr>
<td>Insulation resistance</td>
<td>&gt; 100 MQ at 100 V d.c.</td>
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<tr>
<td>Mains frequency test</td>
<td>500 V, 50 Hz</td>
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<tr>
<td>Vibration stability</td>
<td>Sinusoidal</td>
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<td></td>
<td>Random</td>
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<tr>
<td>Shock resistance</td>
<td>Shock</td>
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<td></td>
<td>Free fall</td>
</tr>
<tr>
<td>Enclosure (depending on electrical connection)</td>
<td>see page 3</td>
</tr>
</tbody>
</table>

**Mechanical characteristics**

| Wetted parts                  | DIN 17440-1.4404 (AISI 316 L) |
| Enclosure                     | DIN 17440-1.4404 (AISI 316 L) |
| Electrical connections        | see page 3                     |
| Weight (depending on pressure connection and electrical connection) | 0.2-0.3 kg |
## Electrical connections

<table>
<thead>
<tr>
<th>Type code</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>8</th>
<th>3</th>
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<tbody>
<tr>
<td>N</td>
<td>M12x1 M12x1</td>
<td>1.5 series (male)</td>
<td>1.5 series (male)</td>
<td>1.5 series (male)</td>
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### Ambient temperature

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<tr>
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<th>-40 → +85 °C</th>
<th>-40 → +85 °C</th>
<th>-25 → +85 °C</th>
<th>-40 → +85 °C</th>
<th>-40 → +85 °C</th>
<th>-30 → +85 °C</th>
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### Enclosure

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<tr>
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<th>IP 65</th>
<th>IP 67</th>
<th>IP 67</th>
<th>IP 67 / IP 69K</th>
<th>IP 67</th>
<th>IP67</th>
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### Materials

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<tr>
<th>Glass filled</th>
<th>Glass filled</th>
<th>Nickel plated brass, CuZnNi</th>
<th>Glass filled polyester, PBT</th>
<th>Glass filled polyamid, PA 6.6</th>
<th>Polyolifin cable with PE shrinkage tubing</th>
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<tbody>
<tr>
<td>polyamid, PA 6.6</td>
<td>polyamid, PA 6.6</td>
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### Electrical connection, 4-20 mA output (2 wire)

<table>
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<tr>
<th>Pin 1:</th>
<th>+supply</th>
<th>Pin 2:</th>
<th>+supply</th>
<th>Pin 3:</th>
<th>Not used</th>
<th>Earth: Connected to MBS housing</th>
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<tbody>
<tr>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 2:</td>
<td>Not used</td>
<td>Pin 3:</td>
<td>Not used</td>
<td>Pin 4:</td>
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<tr>
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<td>Not used</td>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 3:</td>
<td>Not used</td>
<td>Pin 4:</td>
</tr>
<tr>
<td>Pin 4:</td>
<td>+supply</td>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 3:</td>
<td>Not used</td>
<td>Pin 4:</td>
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<tr>
<td>Pin 3:</td>
<td>Not used</td>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 3:</td>
<td>Not used</td>
<td>Pin 4:</td>
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</table>

### Electrical connection, 0-5V, 1-5V, 1-6V, 0-10V output

<table>
<thead>
<tr>
<th>Pin 1:</th>
<th>+supply</th>
<th>Pin 2:</th>
<th>+supply</th>
<th>Pin 3:</th>
<th>Output</th>
<th>Earth: Connected to MBS housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 2:</td>
<td>Not used</td>
<td>Pin 3:</td>
<td>Output</td>
<td>Pin 4:</td>
</tr>
<tr>
<td>Pin 4:</td>
<td>+supply</td>
<td>Pin 2:</td>
<td>Output</td>
<td>Pin 3:</td>
<td>Ventilation</td>
<td>Pin 4:</td>
</tr>
<tr>
<td>Pin 3:</td>
<td>Output</td>
<td>Pin 2:</td>
<td>+supply</td>
<td>Pin 3:</td>
<td>Output</td>
<td>Pin 4:</td>
</tr>
</tbody>
</table>

### Notes

1) Female plug: Glass filled polyester, PBT
2) Wire: PETFE (teflon)
   Protection sleeve: PBT mesh (polyester)
Data sheet

Pressure transmitter for industrial application MBS 3000

Ordering of standard MBS 3000 with DIN 43650 plug Pg 9

<table>
<thead>
<tr>
<th>Pressure connection</th>
<th>Pressure range Pe</th>
<th>Type</th>
<th>Code no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1 bar</td>
<td>MBS 3000 1011-1 AB04</td>
<td>060G1113</td>
<td></td>
</tr>
<tr>
<td>0 - 1.6 bar</td>
<td>MBS 3000 1211-1 AB04</td>
<td>060G1429</td>
<td></td>
</tr>
<tr>
<td>0 - 2.5 bar</td>
<td>MBS 3000 1411-1 AB04</td>
<td>060G1122</td>
<td></td>
</tr>
<tr>
<td>0 - 4 bar</td>
<td>MBS 3000 1611-1 AB04</td>
<td>060G1123</td>
<td></td>
</tr>
<tr>
<td>0 - 6 bar</td>
<td>MBS 3000 1811-1 AB04</td>
<td>060G1124</td>
<td></td>
</tr>
<tr>
<td>0 - 10 bar</td>
<td>MBS 3000 2011-1 AB04</td>
<td>060G1125</td>
<td></td>
</tr>
<tr>
<td>0 - 16 bar</td>
<td>MBS 3000 2211-1 AB04</td>
<td>060G1133</td>
<td></td>
</tr>
<tr>
<td>0 - 25 bar</td>
<td>MBS 3000 2411-1 AB04</td>
<td>060G1430</td>
<td></td>
</tr>
<tr>
<td>0 - 40 bar</td>
<td>MBS 3000 2611-1 AB04</td>
<td>060G1105</td>
<td></td>
</tr>
<tr>
<td>0 - 60 bar</td>
<td>MBS 3000 2811-1 AB04</td>
<td>060G1106</td>
<td></td>
</tr>
<tr>
<td>0 - 100 bar</td>
<td>MBS 3000 3011-1 AB04</td>
<td>060G1107</td>
<td></td>
</tr>
<tr>
<td>0 - 160 bar</td>
<td>MBS 3000 3211-1 AB04</td>
<td>060G1112</td>
<td></td>
</tr>
<tr>
<td>0 - 250 bar</td>
<td>MBS 3000 3411-1 AB04</td>
<td>060G1111</td>
<td></td>
</tr>
<tr>
<td>0 - 400 bar</td>
<td>MBS 3000 3611-1 AB04</td>
<td>060G1109</td>
<td></td>
</tr>
<tr>
<td>0 - 600 bar</td>
<td>MBS 3000 3811-1 AB04</td>
<td>060G1110</td>
<td></td>
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</tbody>
</table>

Ordering of special versions

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Pressure connection (see page 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 1.6 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 2.5 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 4 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 6 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 10 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 16 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 25 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 40 bar</td>
<td>G 1/4 A (EN 837)</td>
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<tr>
<td>0 - 60 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 100 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 150 bar</td>
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<tr>
<td>0 - 250 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 400 bar</td>
<td>G 1/4 A (EN 837)</td>
</tr>
<tr>
<td>0 - 600 bar</td>
<td>G 1/4 A (EN 837)</td>
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</tbody>
</table>

Pressure reference

<table>
<thead>
<tr>
<th>Gauge (relative)</th>
<th>Absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Electrical connection (see pages 1 and 3)

- Plug, DIN 43650, Pg 9
- *)Plug, AMP Econoseal, J series, male, excl. female plug
- Screened cable, 2 m
- *)Plug, IEC 947-5-2, M12 x 1, male, excl. female plug
- Plug ISO 15170-A1-3.2-Sn, male, excl. female plug
- *) Plug, AMP Superseal 1.5 series male, excl. female plug
- *) Gauge versions only available as sealed gauge versions

Output signal

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 60 V</td>
<td>4 - 20 mA</td>
</tr>
<tr>
<td>0 - 5 V</td>
<td></td>
</tr>
<tr>
<td>0 - 6 V</td>
<td></td>
</tr>
<tr>
<td>0 - 10 V</td>
<td></td>
</tr>
</tbody>
</table>
Bourdon Tube Pressure Gauges
Stainless Steel Case / Copper Alloy Wetted Parts
Industrial Series Liquid Fillable • Type 21X.53

Pressure Gauges

Application
Suitable for environments compatible with copper alloy wetted parts where vibration or pressure pulsation occur and for gaseous or liquid media that will not obstruct the pressure system.

Sizes (All sizes not stocked)
2", 2½", 4" (50, 63, and 100 mm)

Accuracy
± 1.5% of span

Ranges (All ranges not stocked)
Vacuum / Compound to 30"HG / 0 / 200 PSI
Pressure from 15 PSI to 10,000 PSI - 2"
Pressure from 10 PSI to 15,000 PSI - 2½", 4"
or other equivalent units of pressure or vacuum

Working Range
2" & 2½" Steady: 3/4 of full scale value
Fluctuating: 2/3 of full scale value
Short time: full scale value

4" & 6" Steady: Full scale value
Fluctuating: 0.9 x full scale value
Short time: 1.3 x full scale value

Operating Temperature
Ambient: -40°F to 160°F (-40°C to 71°C) NOTE:
Media: max. 140°F (+60°C)

Temperature Error
Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Standard Features

Connection
Material: copper alloy
Lower mount (LM)
Center back mount (CBM) - 2" & 2½"
Lower back mount (LBM) - 4"
1/4" or 1/2" NPT limited to wrench flat area
(7/16"-20" SAE thread for Type 213.53S)

Bourdon Tube
Material: copper alloy
30"Hg (Vac) to 1000 PSI C-type - 2", 2½"
30"Hg (Vac) to 1000 PSI C-type - 4"
1500 PSI to 15,000 PSI helical type - 2", 2½"
1500 PSI to 15,000 PSI helical type - 4"

Movement
Copper alloy

Dial
White ABS with stop pin and black lettering

Pointer
Black aluminum (external "zero" adjust screw-optional)

Case
304 stainless steel with vent plug and stainless steel crimp ring.

O-ring (case/connection sealing):
EPDM for standard stocked glycerine filled gauges. Viton for standard stocked dry gauges, suitable for glycerine, silicone or fluorolube case filling

Weather Protection
Weather resistant (NEMA 3 / IP 54) - dry case
Weather tight (NEMA 4X / IP 65) - liquid-filled case

Standard Scale
PSI
PSI, PSI/KG/CM², PSI/BAR (2½")

Window Gasket
Buna-N

Window
Polycarbonate
Acrylic (4")

Case Filling
212.53 - None
213.53 - Glycerine

Order Options (min. order may apply)
Other pressure connections limited to wrench flat area
Stainless steel polished front flange
Stainless steel rear flange - 2½" & 4"
Brass threaded or press-fit restrictor
Pressure compensating membrane window for filled gauges
Dry case (212.53)
Steel zinc plated u-clamp bracket (field installable)
Stainless steel u-clamp bracket (field installable)
DIN standards
External zero adjustment (2½" only)
Externally adjustable red drag pointer (max. hand)
Externally adjustable red mark pointer (set pointer)
Other pressure scales available:
Bar, kPa, MPa, Kg/cm² and dual scale
Custom dial layout
Silicone or fluorolube case filling (Type 213.53)

Note 1 Temperature Ranges (Liquid filled gauges)
Glycerine: -4°F to 140°F (-20°C to 60°C)
Silicone: -40°F to 140°F (-40°C to 60°C)

APM 21X.53
(APM 02.12)
Dimensions:

<table>
<thead>
<tr>
<th>TYPE/ SIZE</th>
<th>A NOMINAL SIZE</th>
<th>WEIGHT</th>
<th>KEY</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>S</th>
<th>T</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>21X.53 2&quot;</td>
<td>0.27 lbs. + 0.06 lbs., if filled</td>
<td>mm 50 48 30 50 12 53 -- 3.6 6.5 71 60 5.5 -- 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>in 2 1.89 1.18 1.97 0.47 2.09 0.14 0.26 2.80 2.36 0.22 1/4&quot; 0.55</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21X.53 2.5&quot;</td>
<td>0.36 lbs. + 0.08 lbs., if filled</td>
<td>mm 63 54 32 62 13 54 -- 3.6 7.5 85 75 6.5 -- 14</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in 2.5 2.13 1.26 2.44 0.51 2.13 0.14 0.30 3.35 2.95 0.26 1/4&quot; 0.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21X.53 4&quot;</td>
<td>1.10 lbs. + 0.66 lbs., if filled</td>
<td>mm 100 87 48 100 15.5 79.5 30 4.8 9 132 116 8 -- 22</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in 4 3.43 1.89 3.94 0.61 3.13 1.18 0.19 0.35 5.20 4.57 0.31 1/2&quot; 0.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: For 1/4" NPT connections on 3" and 4" gauges, reduce B dimension by 5 mm / 0.2 in.

Recommended panel cut-out: D + 1 mm

Optional Type 213.53S- 7/16" - 20" SAE Connection

<table>
<thead>
<tr>
<th>TYPE/ SIZE</th>
<th>WEIGHT</th>
<th>KEY</th>
<th>A NOMINAL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>213.53S 2.5&quot;</td>
<td>0.51 lbs.</td>
<td>mm 63 61.2 31 13 6 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in 2.5 2.41 1.23 .51 .24 .55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T = 7/16-20" SAE Connection supplied with Nitrile o-ring, hex nut, and washer

THE MEASURE OF Total Performance™

Ordering Information:
State computer part number (if available) / type number / size / range / connection size and location / options required.

Specifications given in this price list represent the state of engineering at the time of printing. Modifications may take place and the specified materials may change without prior notice.

WIKAI
WIKAI Instrument Corporation
1000 Wieand Boulevard
Lawrenceville, Georgia 30043-5868
Tel: 770-513-8200 Fax: 770-338-5118
http://www.wika.com e-mail: info@wika.com

05/01
Check Valves

GNV Valves are designed for installation in pipe systems between two DIN or ANSI flanges. The valve is made of 300 series stainless steel.

Applications

GNV 50, 80 and 100 are used in Grundfos Booster systems in water supply systems and drainage systems in both dwelling-houses and in industry where a one-way water flow is required.

Maximum Operating Pressure: 362 psi (25 bar)

Liquid Temperature: 32°F to 250°F (0°C to 120°C)

Construction

The valve has a spring loaded valve cone and is only slightly sensitive to impurities. The choice of materials reduces wear and corrosion to a minimum and ensures long maintenance-free life.

The valve seat consists of a stainless steel ring on which synthetic rubber has been vulcanized. This construction means that at high pressures, the valve cone is seated directly on the stainless steel ring to relieve the pressure on the rubber.

Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials</th>
<th>DIN / ASTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Body</td>
<td>Stainless Steel</td>
<td>1.4408 / CF 8M</td>
</tr>
<tr>
<td>Valve Cone</td>
<td>Stainless Steel</td>
<td>1.4301 / 304</td>
</tr>
<tr>
<td>Spring</td>
<td>Stainless Steel</td>
<td>1.4310 / 301</td>
</tr>
<tr>
<td>Valve Seat, vulcanized</td>
<td>NBR</td>
<td></td>
</tr>
</tbody>
</table>

Installation

The GNV valve is fitted between two DIN/ANSI flanges (e.g. pump flange and companion flange) by means of bolts and nuts. The valve can be fitted in all positions required. An arrow on the valve body indicates direction of flow. Gaskets are included with each valve.

Dimensions and weights

<table>
<thead>
<tr>
<th>Type</th>
<th>D1 (mm)</th>
<th>D2 (in)</th>
<th>D3 (mm)</th>
<th>B (mm)</th>
<th>Weight (kg)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNV 50, 2&quot;</td>
<td>65</td>
<td>2.56</td>
<td>30</td>
<td>1.97</td>
<td>104</td>
<td>40.9</td>
</tr>
<tr>
<td>GNV 80, 3&quot;</td>
<td>80</td>
<td>3.15</td>
<td>3.0</td>
<td>2.76</td>
<td>76</td>
<td>26.6</td>
</tr>
<tr>
<td>GNV 100, 4&quot;</td>
<td>100</td>
<td>3.94</td>
<td>95</td>
<td>3.74</td>
<td>160</td>
<td>53.9</td>
</tr>
</tbody>
</table>

Head Loss

The GNV valve is fitted between two DIN/ANSI flanges (e.g. pump flange and companion flange) by means of bolts and nuts. The valve can be fitted in all positions required. An arrow on the valve body indicates direction of flow. Gaskets are included with each valve.
SYLAX SERIES 149G BUTTERFLY VALVES
Lug Type Butterfly Valve 2" through 12"
With 10 position lockable handle (2"-12") or Gear Box (2"-12")

Applications and features
Designed for water supply, HVAC and general industries.

- Body types: Lug style with drilled and tapped lugs per ANSI 125/150# bolt circle.
- Epoxy coating: internally and externally.
- Ease of maintenance: interchangeable parts including discs, shafts, and liners - simplifying service and reduces maintenance costs.
- Blow out proof shaft.
- Spline driven one piece shaft connected to spherically machined disc allows high torque transmission i.e. quick response with minimum back-lash.
- Floating disc design allows self centring - preventing wear on the liner.
- Tongue and groove seat design assuring long term tightness.
- Extended service life with upper and lower anti-friction bearings.
- Standard ISO top flange for direct mounting of actuator.
- Lockable 10 positions handle* or gear operation. (∗ for 8-12 inch sizes for pressures less than 100 psi only)

Technical features:

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Body</td>
<td>Cast iron, ASTM A126 Class GG25, Epoxy Coating</td>
</tr>
<tr>
<td>Valve Disc</td>
<td>Stainless Steel AISI 316 or. Nyloan coated Ductile Iron GGG40</td>
</tr>
<tr>
<td>Valve Seat</td>
<td>EPDM Standard or Buna-N and other seat material available</td>
</tr>
<tr>
<td>Valve Shaft</td>
<td>Stainless Steel AISI 420</td>
</tr>
<tr>
<td>Shaft Bushings</td>
<td>PTFE lubricated plated steel</td>
</tr>
<tr>
<td>Top Flange</td>
<td>ISO 5211 standards</td>
</tr>
<tr>
<td>Face to face</td>
<td>API 609 table 1 (ISO 5752 class 20, DIN 3202 part 3 K1 85 5155 listed on 4)</td>
</tr>
<tr>
<td>Pressure rating</td>
<td>200 PSI / 16 bar for ANSI 150 Flange</td>
</tr>
<tr>
<td>Temperature rating (EPDM Seat Liner)</td>
<td>Working temp: Min +36°F (+6°C) Max +230°F (+110°C)</td>
</tr>
<tr>
<td></td>
<td>Design temperature rating: Min -4°F (-20°C) Max +248°F (+120°C)</td>
</tr>
</tbody>
</table>

SYLAX Series 149G Part Numbers

<table>
<thead>
<tr>
<th>Size</th>
<th>Model 149D</th>
<th>Model 149D/B</th>
<th>Model 149SS</th>
<th>Model 149SSB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Ductile)</td>
<td>(Bare shaft)</td>
<td>(Stainless)</td>
<td>(Bare shaft)</td>
</tr>
<tr>
<td>2&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>2 1/2&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>3&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>4&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>5&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>6&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>8&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
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<tr>
<td>10&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
<tr>
<td>12&quot;</td>
<td>149G037299</td>
<td>149G037299B</td>
<td>149G037300B</td>
<td>149G037300B</td>
</tr>
</tbody>
</table>

www.flomatic.com 15 Pughs Island, Glens Falls, New York 12801
Phone: 518-761-9797  Fax: 518-791-9798
SYLAX Model 149G Butterfly Valve

Dimensions

<table>
<thead>
<tr>
<th>Size</th>
<th>DN mm</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>M</th>
<th>N</th>
<th>WEIGHT Lbs*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wafer Type</td>
<td></td>
<td>Lug type</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>50</td>
<td>2.44</td>
<td>6.77</td>
<td>1.69</td>
<td>7.87</td>
<td>4.80</td>
<td>5.00</td>
<td>.12</td>
<td>.91</td>
<td>7.5</td>
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<tr>
<td>2 1/4&quot;</td>
<td>65</td>
<td>2.75</td>
<td>7.13</td>
<td>1.81</td>
<td>7.87</td>
<td>5.39</td>
<td>5.51</td>
<td>.35</td>
<td>1.77</td>
<td>8.4</td>
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<tr>
<td>3&quot;</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11.1</td>
</tr>
<tr>
<td>4&quot;</td>
<td>100</td>
<td>4.17</td>
<td>8.31</td>
<td>2.05</td>
<td>11.42</td>
<td>5.98</td>
<td>8.19</td>
<td>1.10</td>
<td>3.31</td>
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<tr>
<td>5&quot;</td>
<td>125</td>
<td>4.72</td>
<td>8.90</td>
<td>2.20</td>
<td>11.42</td>
<td>7.17</td>
<td>9.53</td>
<td>1.30</td>
<td>4.37</td>
<td>17.2</td>
</tr>
<tr>
<td>6&quot;</td>
<td>150</td>
<td>5.5</td>
<td>9.41</td>
<td>2.20</td>
<td>11.42</td>
<td>8.11</td>
<td>10.63</td>
<td>1.79</td>
<td>5.43</td>
<td>18.1</td>
</tr>
<tr>
<td>8&quot;</td>
<td>200</td>
<td>6.46</td>
<td>11.54</td>
<td>2.36</td>
<td>17.72</td>
<td>10.43</td>
<td>13.19</td>
<td>2.71</td>
<td>7.54</td>
<td>36.6</td>
</tr>
<tr>
<td>10&quot;</td>
<td>250</td>
<td>7.87</td>
<td>12.56</td>
<td>2.68</td>
<td>17.72</td>
<td>12.52</td>
<td>15.75</td>
<td>3.66</td>
<td>9.76</td>
<td>51.2</td>
</tr>
<tr>
<td>12&quot;</td>
<td>300</td>
<td>9.37</td>
<td>13.50</td>
<td>3.07</td>
<td>17.72</td>
<td>14.61</td>
<td>17.95</td>
<td>4.37</td>
<td>11.54</td>
<td>68.4</td>
</tr>
</tbody>
</table>

*Note: Cast iron body - ductile iron disc - EPDM liner. See other specification sheets for different types of SYLAX butterfly valve actuators.

Material specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Qt</th>
<th>Description</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Body</td>
<td>Cast Iron ASTM A126 Class GG25 Epoxy coated</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Disc</td>
<td>Stainless Steel A1/316 or Nylon/Ductile Iron GGG40</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Shaft</td>
<td>Stainless Steel A1/420</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Liner (Standard)</td>
<td>EPDM standard, Buna-N Optional and other material</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Spring clip</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>&quot;O&quot;-Ring</td>
<td>Nitrile</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Bushing</td>
<td>Glass filled Acetal</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Metal tag</td>
<td>Aluminium</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Safety bushing</td>
<td>SS 304 L</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Upper guide bushing</td>
<td>PTFE on plated steel</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Lower guide bushing</td>
<td>PTFE on plated steel</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Cap</td>
<td>Cast Iron ASTM A126 Class B FG25</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>Hand lever</td>
<td>Cast Iron ASTM A126 Class B FG25</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>Lever</td>
<td>Cast Iron ASTM A126 Class B FG25</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>Cap screw</td>
<td>Plated steel, SHCS</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>Stop washer</td>
<td>Plated steel</td>
</tr>
<tr>
<td>17</td>
<td>2</td>
<td>Nut</td>
<td>Plated steel</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>Pin</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>Spring</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

Installation

Recommended Possible Possible Not recommended

FLOMATIC VALVES
PUMP DATA SHEET  Turbine 60 Hz

Company: ITT Goulds Southaven
Customer:
Date: 02/26/10  Order No:

Pump:
Size: 7WALC (9 stages)
Type: Lineshaft
Synch speed: 3600 rpm
Curve: E6207WBPCO
Specific Speeds:

Pump Notes for Standard Sizes:
Suction Size-4" Discharge Sizes-4",5",6". Curves are certified for water at 60°F only. Consult factory for performance with any other fluid.

Vertical Turbine:
Bowl size: 7.1 3 in
Max lateral: 0.5 in
Thrust K factor: 2.63 lb/ft

Pump Limits for Standard Construction:
Temperature: 120 °F
Sphere size: 0.29 in
Pressure: 365 psi g

Search Criteria:
Flow: 200 US gpm  Head: 830 ft

Fluid:
Water
Density: 62.25 lb/ft³
Viscosity: 1.105 cP
NPSHa: --- ft

Motor:
Standard: NEMA
Size: 60 hp
Speed: 3600

Sizing criteria: Max Power on Design Curve

Pump Selection Warnings:
Pump shutoff dP exceeds limit for the pump.

--- Data Point ---
Flow: 200 US gpm  Head: 834 ft
Eff: 77.7%
Power: 54.1 hp
NPSHr: 11.9 ft

-- Design Curve --
Shutoff Head: 1065 ft
Shutoff dP: 460 psi
Min Flow: --- US gpm
BEP: 78.1% eff
  @ 217 US gpm
NOL Pwr: 58.6 hp
  @ 289 US gpm

-- Max Curve --
Max Pwr: 67.9 hp
  @ 295 US gpm

Performance Evaluation:

<table>
<thead>
<tr>
<th>Flow US gpm</th>
<th>Speed rpm</th>
<th>Head ft</th>
<th>Efficiency %</th>
<th>Power hp</th>
<th>NPSHr ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>3450</td>
<td>735</td>
<td>77.3</td>
<td>57.5</td>
<td>14</td>
</tr>
<tr>
<td>200</td>
<td>3450</td>
<td>834</td>
<td>77.7</td>
<td>54.1</td>
<td>11.9</td>
</tr>
<tr>
<td>160</td>
<td>3450</td>
<td>901</td>
<td>72.4</td>
<td>50.1</td>
<td>10.4</td>
</tr>
<tr>
<td>120</td>
<td>3450</td>
<td>952</td>
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<td>80</td>
<td>3450</td>
<td>992</td>
<td>44.3</td>
<td>45.1</td>
<td>10</td>
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</tbody>
</table>

Turbine V9
Selected from catalog: Goulds Lineshaft 60HZ Vers: 3.34
Hydraulic Data

Flow (gpm): 200
Pump Head (ft): 833.9
TDH (ft): 834.0
Speed (rpm): 3450
Fluid: Water
Temperature (F): 60
Viscosity: 1.105
Spec.Grav: 1

Miscellaneous

Thrust At Design (lb): 2250
Thrust At Shutoff (lb): 2858
Pumping Level (in): 0

Weight

Pump (lb): 1295
Motor (lb): 675
Total (lb): 1970

Motor Data

Model: HO60S1SLG
Make: Goulds Choice
HP: 60
RPM: 3600
Type: RU
Efficiency: 89.5
Frame: 326TP
Ratchet: NRR

Version: 4.10P
Customer: Date: 02-26-2010
### Overall Pump Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size and Model</td>
<td>7WALC</td>
</tr>
<tr>
<td>Capacity, GPM</td>
<td>200</td>
</tr>
<tr>
<td>Total Pump Length, In.</td>
<td>68.5</td>
</tr>
<tr>
<td>Pump Type</td>
<td>Canned</td>
</tr>
<tr>
<td>Pump K-Factor</td>
<td>2.63</td>
</tr>
<tr>
<td>Pump Operating Speed, RPM</td>
<td>3450</td>
</tr>
<tr>
<td>Total Dynamic Head, Ft.</td>
<td>834.0</td>
</tr>
<tr>
<td>Impeller Trim, In.</td>
<td>5.3</td>
</tr>
<tr>
<td>Head Type</td>
<td>T:VIC</td>
</tr>
<tr>
<td>Number of Stages</td>
<td>9</td>
</tr>
</tbody>
</table>

### Line Shaft-Related Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Diameter, In.</td>
<td>1.19</td>
</tr>
<tr>
<td>Shaft Material</td>
<td>416SS</td>
</tr>
<tr>
<td>Line Shaft Length, In.</td>
<td>12.00</td>
</tr>
<tr>
<td>Line Shaft Type</td>
<td>Open</td>
</tr>
<tr>
<td>Shaft Limit, HP</td>
<td>244</td>
</tr>
<tr>
<td>Matl Correction Fact</td>
<td>1.18</td>
</tr>
<tr>
<td>Shaft Elongation, w/o Adder</td>
<td>0.00</td>
</tr>
<tr>
<td>Impeller Running Clearance</td>
<td>0.13</td>
</tr>
</tbody>
</table>

### Bow Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total Bowl Length, In.</td>
<td>56.50</td>
</tr>
<tr>
<td>Bowl Shaft Dia, In.</td>
<td>1.19</td>
</tr>
<tr>
<td>Bowl Diameter, In.</td>
<td>7.125</td>
</tr>
<tr>
<td>Bowl Shaft Limit, HP</td>
<td>243</td>
</tr>
<tr>
<td>Bowl Shaft Material</td>
<td>416SS</td>
</tr>
</tbody>
</table>

### Column Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Column Diameter, In.</td>
<td>6</td>
</tr>
<tr>
<td>Wall Thickness, In.</td>
<td>0.280</td>
</tr>
<tr>
<td>Column Load, Lb.</td>
<td>4739.3</td>
</tr>
<tr>
<td>Column Elongation, In.</td>
<td>0.00</td>
</tr>
<tr>
<td>Shutoff Column Elongation, In.</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Horse Power Data

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Shaft Friction Loss, Hp.</td>
<td>0.01</td>
</tr>
<tr>
<td>Bowl HP At Design, Hp.</td>
<td>54.1</td>
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<tr>
<td>Thrust Load Loss, Hp.</td>
<td>0.58</td>
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<tr>
<td>Motor HorsePower, Hp.</td>
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</table>

### Other Data

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<thead>
<tr>
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<th>Value</th>
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<tbody>
<tr>
<td>Hydraulic Thrust, Lb.</td>
<td>2193.4</td>
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<tr>
<td>Thrust at Shutoff, Lb.</td>
<td>2857.5</td>
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<tr>
<td>Available Lateral, In.</td>
<td>0.50</td>
</tr>
<tr>
<td>Shutoff Lateral, In.</td>
<td>0.13</td>
</tr>
<tr>
<td>Suction Pressure, psi</td>
<td>0.0</td>
</tr>
<tr>
<td>Column Loss, Ft.</td>
<td>0.01</td>
</tr>
<tr>
<td>Head Loss (including can), Ft.</td>
<td>0.14</td>
</tr>
<tr>
<td>Total Loss, Ft.</td>
<td>0.15</td>
</tr>
<tr>
<td>Thrust at Design, Lb.</td>
<td>2250.0</td>
</tr>
<tr>
<td>Actual Head above Grade, Ft.</td>
<td>833.85</td>
</tr>
<tr>
<td>Design Lateral, In.</td>
<td>0.13</td>
</tr>
<tr>
<td>Shutoff Disc Pressure, psi</td>
<td>461.0</td>
</tr>
<tr>
<td>NPSHa, Ft.</td>
<td>39.41</td>
</tr>
<tr>
<td>NPSHr, Ft.</td>
<td>11.90</td>
</tr>
<tr>
<td>NPSH margin, Ft.</td>
<td>27.51</td>
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### Efficiency Data (Efficiencies estimated not guaranteed)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl Efficiency</td>
<td>77.70</td>
</tr>
<tr>
<td>Motor Efficiency</td>
<td>89.50</td>
</tr>
<tr>
<td>Pump Efficiency</td>
<td>76.84</td>
</tr>
<tr>
<td>Overall Efficiency</td>
<td>68.77</td>
</tr>
<tr>
<td>KWH/1000 gallons</td>
<td>3.81</td>
</tr>
</tbody>
</table>

### Component Weights

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl Weight, Lbs.</td>
<td>294</td>
</tr>
<tr>
<td>Head Weight, Lbs.</td>
<td>497</td>
</tr>
<tr>
<td>Motor Weight, Lbs.</td>
<td>675</td>
</tr>
<tr>
<td>Column Weight, Lbs.</td>
<td>33</td>
</tr>
<tr>
<td>Can Weight, Lbs.</td>
<td>471</td>
</tr>
<tr>
<td>Total Pump Weight, Lbs.</td>
<td>1970</td>
</tr>
</tbody>
</table>

Version: 4.10P

Customer:

Date: 02-26-2010
ADDITIONAL PUMP COMPONENTS

The following is a list of the additional components you ordered. Consult factory for any other components or services.

Component
Bowl SS Bolting
Ductile Iron Bowl
416SS Collets
300# Discharge
300# Suction

Version: 4.10P
Customer:
Date: 02-26-2010
Model 90-01/690-01
- Sensitive and Accurate Pressure Control
- Easy Adjustment and Maintenance
- Tamper Resistant
- Optional Check Feature
- Fully Supported Frictionless Diaphragm

The Cla-Val Model 90-01/690-01 Pressure Reducing Valve automatically reduces a higher inlet pressure to a steady lower downstream pressure, regardless of changing flow rate and/or varying inlet pressure. This valve is an accurate, pilot-operated regulator capable of holding downstream pressure to a predetermined limit. When downstream pressure exceeds the pressure setting of the control pilot, the main valve and pilot valve close drip-tight.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted in the main valve cover chamber, closing the valve to prevent return flow.

Typical Applications

Typical applications include pressure reducing valve station using Model 90-01BY/690-01BY and Model 90-01AS/690-01AS in parallel to handle wide range of flow rates. Larger Model 90-01BY/690-01BY valve meets requirements of peak loads and smaller Model 90-01AS/690-01AS handles low flows.

Cla-Val Model 90-01KO/690-01KO Pressure Reducing Valve with Anti-Cavitation Trim provides for optimum downstream pressure control while reducing noise and eliminating damage associated with cavitation.

See Cavitation Guide to determine if the valve is a candidate for the KO Anti-Cavitation Trim.
<table>
<thead>
<tr>
<th>Valve Selection</th>
<th>These Symbols (%) and ($ indicate Available Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 90 Series</strong></td>
<td><strong>Basic Valve 100-01</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Globe</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Max. Continuous</strong>: 93</td>
</tr>
<tr>
<td></td>
<td><strong>Max. Intermittent</strong>: 120</td>
</tr>
<tr>
<td></td>
<td><strong>Min. Continuous</strong>: 10</td>
</tr>
<tr>
<td></td>
<td><strong>Max. Continuous</strong>: 93</td>
</tr>
<tr>
<td></td>
<td><strong>Max. Intermittent</strong>: 120</td>
</tr>
<tr>
<td></td>
<td><strong>Min. Continuous</strong>: 10</td>
</tr>
</tbody>
</table>

690 Series is the reduced internal port size version of the 90 Series. For 100-01 basic valves, suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft/sec (6.1 meters/sec) and maximum intermittent is approx. 25 ft/sec (7.6 meters/sec). For 100-20 basic valves, suggested flow calculations were based on flow through the valve seat. Approx. 26 ft/sec (7.9 meters/sec) was used for maximum continuous flow & 1 ft/sec (.3 meters/sec) is used for minimum continuous flow. Maximum continuous flow through the valve seat for the 30-100-20 is approx. 20 ft/sec (6.1 meters/sec). Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates. For sizing questions or calculation analysis, consult Cla-Val with system details.

**Flanged End Details Only**

---

### Pressure Ratings

(Recommended Maximum Pressure - psi)

<table>
<thead>
<tr>
<th>Valve Body &amp; Cover</th>
<th>Pressure Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Material</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTM A536</td>
<td>Ductile Iron</td>
</tr>
<tr>
<td>ASTM A216-WCB</td>
<td>Cast Steel</td>
</tr>
<tr>
<td>ASTM B62</td>
<td>Bronze</td>
</tr>
</tbody>
</table>

* ANSI standards are for flange dimensions only. Flanged pipes are available faced but not drilled. **End Details machined to ANSI B2.1 specifications.

---

### Materials

**Component**

**Standard Material Combinations**

- **Body & Cover**
  - Ductile Iron
  - Cast Steel
  - Bronze

**Available Sizes**

- 100-01 Series Hytrol
  - 1¼" - 3¼" (1/2" - 2"")
  - 1½" - 1½" (1¼" - 1¼"")

**690 Series Hytrol**

- 3" - 8" (3" - 6"")
  - 3" - 8" (3" - 6"")

**Disc Retainer & Diaphragm Washer**

- Cast Iron
- Cast Steel
- Bronze

**Trim & Seat Cover Bearing**

- Stainless Steel
- Buna-N® Rubber

**Diaphragm**

- Nylon Reinforced Buna-N® Rubber
- Stainless Steel

For material options on sizes not listed, consult factory.

Cla-Val manufactures valves in more than 50 different alloys.

---

### Pilot System Adjustment Ranges

**Model 90-01/690-01**

- **CRD Pilot**
  - 2 to 30 psi
  - 15 to 75 psi
  - 30 to 300 psi

**Model 90-04/690-48**

- **CRD Pilot**
  - 2 to 30 psi
  - 15 to 75 psi
  - 30 to 300 psi

**Model 92-01/692-01**

- **CRD Pilot**
  - 2 to 30 psi
  - 15 to 75 psi
  - 30 to 300 psi

**Model 93-01/693-01**

- **CRD Pilot**
  - 2 to 30 psi
  - 15 to 75 psi
  - 30 to 300 psi

**Model 94-01/694-01**

- **CRD Pilot**
  - 2 to 30 psi
  - 15 to 75 psi
  - 30 to 300 psi

---

### Temperature Range, and Materials Apply to all

**90 Series/690 Series**

**Temperature Range**

- **Water**: to 180°F

**Materials**

- **Standard Pilot System Materials**
  - Pilot Control: Bronze ASTM B62
  - Trim: Stainless Steel 303
  - Rubber: Buna-N® Synthetic Rubber

- **Optional Pilot System Materials**
  - Pilot systems are available with optional Aluminum, Stainless Steel or Monel materials at additional cost.
  - Note: Available with remote sensing control.

---

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CLA-VAL EUROPE • CH- 1032 Romanins/Lausanne • Switzerland • Phone: 41-21-643-1555 • Fax: 41-21-643-1550 • E-mail: cla-val@cla-val.ch • Website cla-val.ch

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## Model 50-01/650-01

- Accurate Pressure Control
- Optional Check Feature
- Fast Opening to Maintain Line Pressure
- Slow Closing to Prevent Surges
- Completely Automatic Operation

The Cla-Val Model 50-01/650-01 Pressure Relief Valve is a hydraulically operated, pilot controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system.

In operation, the valve is actuated by line pressure through a pilot control system, opening fast to maintain steady line pressure but closing gradually to prevent surges. Operation is completely automatic and pressure settings may be easily changed.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted in the main valve cover chamber, closing the valve to prevent return flow.

### Schematic Diagram

**Item** | **Description**
--- | ---
1 | Hytrol (Main Valve)
2 | X42N-2 Strainer & Needle Valve
3 | CRL Pressure Relief Control

### Optional Features

**Item** | **Description**
--- | ---
B | CK2 (Isolation Valve)
D | Check Valves with Isolation Valve
F | Remote Pilot Sensing
H | Drain to Atmosphere
S | CV Speed Control (Opening)

### Typical Applications

**Pressure Relief Service**

To provide protection for the system against high pressure surges when pumps are shut down, this fast opening, slow closing relief valve dissipates the excess pressure.

**Pressure Sustaining Service**

When installed in a line between an upper zone and a lower area of heavy demand, the valve acts to maintain desired upstream pressure to prevent "robbing" of the upper zone. Water in excess of pressure setting flows to area of heavy demand, control is smooth, and pressure regulation is positive.
## Valve Selection

<table>
<thead>
<tr>
<th>Basic Valve 100-01</th>
<th>Globe</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Continuous</td>
<td>93</td>
<td>125</td>
</tr>
<tr>
<td>Max. Surge</td>
<td>120</td>
<td>280</td>
</tr>
<tr>
<td>Suggested Flow (gpm)</td>
<td>300</td>
<td>460</td>
</tr>
<tr>
<td>Suggested Flow (Liters/Sec)</td>
<td>800</td>
<td>1800</td>
</tr>
</tbody>
</table>

| Max. Continuous   | 6     | 8     |
| Max. Surge        | 13    | 18    |

### Model 50 Series

<table>
<thead>
<tr>
<th>Basic Valve 100-01</th>
<th>Globe</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Continuous</td>
<td>260</td>
<td>580</td>
</tr>
<tr>
<td>Max. Surge</td>
<td>440</td>
<td>990</td>
</tr>
<tr>
<td>Suggested Flow (gpm)</td>
<td>1025</td>
<td>2025</td>
</tr>
<tr>
<td>Suggested Flow (Liters/Sec)</td>
<td>2300</td>
<td>4600</td>
</tr>
</tbody>
</table>

### Model 650 Series

| Max. Continuous   | 16    | 37    |
| Max. Surge        | 28    | 52    |
| Suggested Flow (gpm) | 65    | 145   |
| Suggested Flow (Liters/Sec) | 258   | 403   |

### Pilot System Specifications

#### Temperature Range, and Materials Apply to all 50 Series/650 Series

**Temperature Range**
- Water: to 180°F

**Materials**
- **Standard Pilot System Materials**
  - Pilot Control: Bronze ASTM B62
  - Trim: Stainless Steel 303
  - Rubber: Buna-N® Synthetic Rubber
- **Tubing & Fittings**: Copper and Bronze
- **Optional Pilot System Materials**
  - Pilot systems are available with optional Aluminum, Stainless Steel or Monel materials at additional cost.

**Note:** Available with remote sensing control.

---

### Pilot System Adjustment Ranges

#### Model 50-01/650-01

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model 50-01/650-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 200 psi*</td>
<td></td>
</tr>
<tr>
<td>100 to 300 psi</td>
<td></td>
</tr>
<tr>
<td>250 to 600 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### Model 52-03/652-03

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model 52-03/652-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 200 psi*</td>
<td></td>
</tr>
<tr>
<td>100 to 300 psi</td>
<td></td>
</tr>
<tr>
<td>250 to 600 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### Model 58-01/658-01

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model 58-01/658-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 200 psi*</td>
<td></td>
</tr>
<tr>
<td>100 to 300 psi</td>
<td></td>
</tr>
<tr>
<td>250 to 600 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### Model C63-1/652-01

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model C63-1/652-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 200 psi*</td>
<td></td>
</tr>
<tr>
<td>100 to 300 psi</td>
<td></td>
</tr>
<tr>
<td>250 to 600 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### Model C63-1/652-01

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model C63-1/652-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 200 psi*</td>
<td></td>
</tr>
<tr>
<td>100 to 300 psi</td>
<td></td>
</tr>
<tr>
<td>250 to 600 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### Model 250-01/605-01

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>Model 250-01/605-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 75 psi</td>
<td></td>
</tr>
<tr>
<td>5 to 25 psi</td>
<td></td>
</tr>
<tr>
<td>10 to 60 psi</td>
<td></td>
</tr>
<tr>
<td>20 to 80 psi</td>
<td></td>
</tr>
<tr>
<td>50 to 150 psi</td>
<td></td>
</tr>
<tr>
<td>65 to 180 psi</td>
<td></td>
</tr>
</tbody>
</table>

#### CS3 Solenoid Control

- 24, 48, 120, 240, 480 - 60 Hz AC
- 6, 12, 24, 120, 240 DC

---

650 Series is the reduced internal port size version of the 50 Series.

For 100-20 basic valves, suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 W/sec (6.1 meter/sec) & maximum intermittent approx. 25 W/sec (7.9 meter/sec) was used for maximum continuous flow & 1 fr/sec (3 meters/sec) is used for minimum continuous flow. Maximum continuous flow through the valve seat for the 30" 100-20 is approx. 20 W/sec (6.1 meter/sec).

**Flanged End Detail Only**

---

E-50 Series/650 Series 6Copyright Cla-Val 2005 Printed in USA Specifications subject to change without notice.
### Typical Applications

Typical applications include pressure reducing valve station using Model 90-01BY/690-01BY and Model 90-01AS/690-01AS in parallel to handle wide range of flow rates. Larger Model 90-01BY/690-01BY valve meets requirements of peak loads and smaller Model 90-01AS/690-01AS handles low flows.

Cla-Val Model 90-01KO/690-01KO Pressure Reducing Valve with Anti-Cavitation Trim provides for optimum downstream pressure control while reducing noise and eliminating damage associated with cavitation. See Cavitation Guide to determine if the valve is a candidate for the KO Anti-Cavitation Trim.
**Valve Selection**

<table>
<thead>
<tr>
<th>Basic Valve</th>
<th>Globe</th>
<th>Angle</th>
<th>Max. Continuous</th>
<th>Max. Intermittent</th>
<th>Min. Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-01</td>
<td>1/4</td>
<td>1/4</td>
<td>93</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>1/2</td>
<td>120</td>
<td>160</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>200</td>
<td>260</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2 1/2</td>
<td>2 1/2</td>
<td>300</td>
<td>370</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>400</td>
<td>500</td>
<td>25</td>
</tr>
</tbody>
</table>

*Flanged End Only*

**Model 90 Series**

<table>
<thead>
<tr>
<th>Basic Valve</th>
<th>Angle</th>
<th>Max. Continuous</th>
<th>Max. Intermittent</th>
<th>Min. Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-01/690-01</td>
<td>1/4</td>
<td>93</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>120</td>
<td>160</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>260</td>
<td>370</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2 1/2</td>
<td>400</td>
<td>500</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggested Flow (gpm)</th>
<th>Max. Continuous</th>
<th>Max. Intermittent</th>
<th>Min. Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-01</td>
<td>6</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>90-01/690-01</td>
<td>6</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

**Model 690 Series**

<table>
<thead>
<tr>
<th>Basic Valve</th>
<th>Angle</th>
<th>Max. Continuous</th>
<th>Max. Intermittent</th>
<th>Min. Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>690-01</td>
<td>1/4</td>
<td>200</td>
<td>260</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>300</td>
<td>370</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>400</td>
<td>500</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggested Flow (gpm)</th>
<th>Max. Continuous</th>
<th>Max. Intermittent</th>
<th>Min. Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-20</td>
<td>6</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>90-01/690-01</td>
<td>6</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

**Pressure Ratings**

<table>
<thead>
<tr>
<th>Valve Body &amp; Cover</th>
<th>Pressure Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Material</td>
</tr>
<tr>
<td></td>
<td>ANSI Standards</td>
</tr>
<tr>
<td></td>
<td>150 lb</td>
</tr>
<tr>
<td></td>
<td>300 lb</td>
</tr>
<tr>
<td></td>
<td>End Details</td>
</tr>
<tr>
<td>ASTMA536</td>
<td>Ductile Iron</td>
</tr>
<tr>
<td>B16.42</td>
<td>250</td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>ASTMA216-WCB</td>
<td>Cast Steel</td>
</tr>
<tr>
<td>B16.5</td>
<td>285</td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>ASTMB62</td>
<td>Bronze</td>
</tr>
<tr>
<td>B16.24</td>
<td>225</td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>

| Note: *ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled. **End Details machined to ANSI B2.1 specifications. |

**90 Series/690 Series**

**Pilot System Specifications**

**Temperature Range, and Materials Apply to all**

**90 Series/690 Series**

**Temperature Range**

Water: to 180°F

**Materials**

<table>
<thead>
<tr>
<th>Standard Pilot System Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Control: Bronze ASTM B62</td>
</tr>
<tr>
<td>Trim: Stainless Steel 303</td>
</tr>
<tr>
<td>Rubber: Buna-N® Synthetic Rubber</td>
</tr>
</tbody>
</table>

**Optional Pilot System Materials**

Pilot systems are available with optional Aluminum, Stainless Steel or Monel materials at additional cost. Note: Available with remote sensing control.

**Materials**

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Material Combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body &amp; Cover</td>
<td>Ductile Iron, Cast Steel, Bronze</td>
</tr>
<tr>
<td>Available Sizes</td>
<td>100-01 Series Hytrol</td>
</tr>
<tr>
<td>1/4 - 3/8&quot;</td>
<td>1/4 - 16&quot;</td>
</tr>
<tr>
<td>1/8 - 16&quot;</td>
<td>1/8 - 16&quot;</td>
</tr>
<tr>
<td>3/8 - 16&quot;</td>
<td>3/8 - 16&quot;</td>
</tr>
<tr>
<td>1/2 - 16&quot;</td>
<td>1/2 - 16&quot;</td>
</tr>
<tr>
<td>Disc Retainer &amp;</td>
<td>Cast Iron, Cast Steel, Bronze</td>
</tr>
<tr>
<td>Diaphragm Washer</td>
<td></td>
</tr>
<tr>
<td>Trim: Disc Guide,</td>
<td>Bronze is Standard</td>
</tr>
<tr>
<td>Seat &amp; Cover Bearing</td>
<td>Stainless Steel is optional</td>
</tr>
<tr>
<td>Disc: Buna-N® Rubber</td>
<td></td>
</tr>
<tr>
<td>Diaphragm: Nylon Reinforced Buna-N® Rubber</td>
<td></td>
</tr>
<tr>
<td>Stem, Nut &amp; Spring: Stainless Steel</td>
<td></td>
</tr>
</tbody>
</table>

For material options on sizes not listed, consult factory. Cla-Val manufactures valves in more than 50 different alloys.

**Pilot System Adjustment Ranges**

<table>
<thead>
<tr>
<th>CRD Pilot</th>
<th>2 to 30 psi</th>
<th>15 to 75 psi</th>
<th>30 to 300 psi</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CRD Pilot</th>
<th>2 to 30 psi</th>
<th>15 to 75 psi</th>
<th>30 to 300 psi</th>
</tr>
</thead>
</table>

<table>
<thead>
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<th>CRD Pilot</th>
<th>2 to 30 psi</th>
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</tr>
</thead>
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</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CRD Pilot</th>
<th>2 to 30 psi</th>
<th>15 to 75 psi</th>
<th>30 to 300 psi</th>
</tr>
</thead>
</table>

| Solenoid Pilot | 24, 48, 120, 240, 480 - 60 Hz VAC | 6, 12, 24, 120, 240 VDC |

<table>
<thead>
<tr>
<th>CRL Pilot</th>
<th>0 to 75 psi</th>
<th>20 to 200 psi</th>
<th>100 to 300 psi</th>
<th>250 to 600 psi</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CRD Pilot</th>
<th>0 to 75 psi</th>
<th>20 to 200 psi</th>
<th>100 to 300 psi</th>
<th>250 to 600 psi</th>
</tr>
</thead>
</table>

**90-01/690-01**

Model 90-01/690-01

Model 90-04/690-48

Model 90-02/690-02

Model 90-03/690-03

Model 90-04/690-44

Model 90-04/690-01

*Supplied unless otherwise specified. Other ranges available, please consult factory.

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**E-90 Series/690 Series**
Accurate Pressure Control
- Optional Check Feature
- Fast Opening to Maintain Line Pressure
- Slow Closing to Prevent Surges
- Completely Automatic Operation

The Cla-Val Model 50-01/650-01 Pressure Relief Valve is a hydraulically operated, pilot controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system.

In operation, the valve is actuated by line pressure through a pilot control system, opening fast to maintain steady line pressure but closing gradually to prevent surges. Operation is completely automatic and pressure settings may be easily changed.

If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted in the main valve cover chamber, closing the valve to prevent return flow.

The "D" check feature on a vertically installed 6" and larger valves must be horizontally installed.

Pressure Relief Service
To provide protection for the system against high pressure surges when pumps are shut down, this fast opening, slow closing relief valve dissipates the excess pressure.

Pressure Sustaining Service
When installed in a line between an upper zone and a lower area of heavy demand, the valve acts to maintain desired upstream pressure to prevent "robbing" of the upper zone. Water in excess of pressure setting flows to area of heavy demand, control is smooth, and pressure regulation is positive.
### Valve Selection

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>End Detail</th>
<th>Threaded</th>
<th>Threaded &amp; Flanged</th>
<th>Flanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>50-01</td>
<td>Basic Valve</td>
<td>Globe</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>Suggested Flow (gpm)</td>
<td>Max. Continuous</td>
<td>93</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suggested Flow (gpm)</td>
<td>Max. Surge</td>
<td>120</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>Suggested Flow (Liters/Sec)</td>
<td>Max. Continuous</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**50 Series is the reduced internal port size version of the 50 Series.**

For 50-01 basic valves, suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft/sec (6.1 meters/sec). 5 Maximum intermittent is approx. 25 ft/sec (7.9 meters/sec) was used for maximum continuous flow. Approx. 2.5 ft/sec (0.76 meters/sec) is used for minimum continuous flow. Maximum continuous flow through the valve seat for the 30°-100-20 is approx. 20 ft/sec (6.1 meters/sec). **Flanged End Detail Only**

### 50 Series/650 Series

**Pilot System Specifications**

#### Temperature Range, and Materials Apply to all 50 Series/650 Series

**Temperature Range**

Water: to 180°F

**Materials**

- **Standard Pilot System Materials**
  - Pilot Control: Bronze ASTM B62
  - Trim: Stainless Steel 303
  - Rubber: Buna-N® Synthetic Rubber
- **Tubing & Fittings**: Copper and Bronze

- **Optional Pilot System Materials**
  - Pilot systems are available with optional Aluminum, Stainless Steel or Monel materials at additional cost.

**Note**: Available with remote sensing control.

### Pilot System Adjustment Ranges

#### Model 50-01/650-01

- **CRL Pilot**
  - 0 to 75 psi
  - 20 to 200 psi
  - 100 to 300 psi
  - 250 to 600 psi

#### Model 52-03/652-03

- **CRL Pilot**
  - 0 to 75 psi
  - 20 to 200 psi
  - 100 to 300 psi
  - 250 to 600 psi

#### Model 58-01/658-01

- **CRL Pilot**
  - 0 to 75 psi
  - 20 to 200 psi
  - 100 to 300 psi
  - 250 to 600 psi

#### Model 58-01/658-01

- **CS3 Solenoid Control**
  - 24, 48, 120, 240, 480 - 60 Hz AC
  - 6, 12, 24, 120, 240 DC

#### Model 250-01/695-01

- **CDB-7 Pilot**
  - 0 to 7 psi
  - 5 to 25 psi
  - 10 to 60 psi
  - 20 to 80 psi
  - 50 to 150 psi
  - 65 to 180 psi

---

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Project Manual

For

Mingo Central High School
Water and Sewer Extension Project

Contracts 1 and 2
Mingo Central High School Water and Sewer Extension Project

Mingo County Redevelopment Authority
P.O. Box 298
Williamson, WV 25661
304.235.0042

November, 2009

E.L. Robinson Engineering Co.
5088 Washington Street, West
Charleston, WV 25313
304.776.7473
# PROJECT MANUAL

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<th>PAGES</th>
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The Mingo County Redevelopment Authority, Mingo County, West Virginia will receive separate sealed bids for the construction of:

**Contract 1: Mingo Central High School- Water and Sewer Lines and Pump Stations**
Furnishing all materials, labor, and equipment necessary for the construction and installation of approximately 11,420 LF of 10” and smaller diameter water line, valves, fire hydrants, approximately 11,310 LF of 10” and smaller diameter gravity sewer pipe, manholes and other items and appurtenances as outlined in the Plans and Specifications.

**Contract 2: Mingo Central High School- Water Storage Tank**
Alternative A-Construct one 221,000-gallon and one 16,000-gallon glass lined bolted steel storage tank, together with valve vaults, fencing, access roads and culverts as outlined in the Plans and Specifications.
Alternative B-Construct one 221,000-gallon and one 16,000-gallon painted, welded steel storage tank, together with valve vaults, fencing, access roads and culverts as outlined in the Plans and Specifications.

Bids shall be submitted on the furnished Bid forms. Bids will be received by the Mingo County Redevelopment Authority at its offices at 1100 East 4th Avenue, Williamson, WV 25661 until 2:00 p.m., (Local Time) , 2010 and then at said office, publicly opened and read aloud. A pre-bid conference will be held at 10:00 a.m. on , 2010 at the Authority’s office.

The Contract Documents may be examined at the following locations:

- Mingo County Redevelopment Authority
  1100 East 4th Avenue
  Williamson, WV 25661

- Contractors Association of West Virginia
  2114 Kanawha Blvd., East
  Charleston, West Virginia 25311

- F. W. Dodge Company
  437 19th Street
  Dunbar, West Virginia 25177

- E. L. Robinson Engineering Co.
  5088 Washington St., West
  Charleston, West Virginia 25313

Copies of the Contract Documents may be obtained at the Issuing Office, E.L. Robinson Engineering Company, 304.776.7473, upon payment of $200 for each set.

A five percent (5%) Bid Bond or certified cashier’s check must accompany all Bids. The successful Bidder will be required to furnish a satisfactory Payment Bond and Performance Bond, each for 100% of the contract amount.

Bidders must comply with the requirements for Affirmative Action and Minority Business Enterprises participation as described in the Federal Specifications insert to the Contract Documents. Bidders much comply with Title VI of the Civil Rights Act of 1964, the Davis-Bacon Act, the Copeland Anti-Kickback Act, the Contract Work Hours and Safety Act, and the West Virginia Division of Labor Wages for Construction of Public Improvements pursuant to West Virginia Code § 21-5A-3.
No Bidder may withdraw their bid for a period of ninety (90) days after the time of the opening of the Bids. Any Contractor submitting a Bid on this project hereby certifies, indicates, and acknowledges that he has a license and meets all the qualifications required by the statutes of the State and subdivision in which the work is to be performed. The Contractor shall comply with the West Virginia Contractor Licensing Act and shall require all subcontractors to comply with that Act. A Contractor’s License Number is to be included on the bid submission.

The requirements stated in the advertisement for bids and the bid form may not be waived by any public entity.

Mingo County Redevelopment Authority
Mike Whitt, Executive Director
Instructions to Bidders

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<td>Article 2.02</td>
<td>Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.</td>
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ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Issuing Office--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids may be obtained from the Issuing Office. The deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 30 days after opening of Bids.

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.
ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.06 of the General Conditions has been identified and established in paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or
identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. Become familiar with and satisfy Bidder as to all Federal, State, and local Laws and Regulations that may affect cost, progress, or performance of the Work;

D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or accept consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A Pre-Bid conference will be held at the time and place specified in the Advertisement for Bids. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged, but not required, to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easement for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum Bid price and in the form of a certified check or a Bid bond (EJCDC No. C-430, 2002 Edition) issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award,
Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner and Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.
12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 6.06.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each unit price/lump sum item listed therein, or the words “No Bid,” “No Change,” or “Not Applicable” entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. If required by State where work is to be performed, the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporation business address and state of incorporation shall be provided on the Bid Form.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The business address of the partnership shall be provided on the Bid Form.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the business address of the firm must be provided on the Bid Form.

13.06 A Bid by an individual shall show the Bidder’s name and business address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The business address of the joint venture must be provided on the Bid Form.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers and dates of which shall be filled in on the Bid form.

13.10 The address and telephone number for communication regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder’s state contractor license number for the state of the Project, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all bid prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.
C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and the Bid bond form. The unbound copy of the Bid Form is to be completed and submitted with all the attachments outlined in Article 7 of the Bid Form.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation “BID ENCLOSED.” When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder’s errors in judgment in preparing the Bid.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form.

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsive. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid
for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner’s requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

21.02 This Contract is expected to be funded in part with funds provided by the United States Government through the Small Business Administration (SBA). Refer to Article 18 of the General Conditions for information on the Federal Requirements.

21.03 Concurrence by SBA in the award of the Contract is required before the Contract is effective.

END OF INSTRUCTIONS TO BIDDERS
Bid Form

Project Identification: Mingo County Redevelopment Authority
Mingo Central High School-Water and Sewer Extension Project

Contract Identification and Number: Contract 1 – Mingo Central High School-Water and Sewer Extension Project

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</tr>
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<td>9</td>
<td>Bid Submittal</td>
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</tr>
</tbody>
</table>

ARTICLE 1 - BID RECIPIENT

1.01 This Bid Is Submitted To: Mingo County Redevelopment Authority
1100 East 4th Avenue
P.O. Box 298
Williamson, WV 25661

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Addendum Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the State where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Attached Itemized Unit Price Sheets

<table>
<thead>
<tr>
<th>Total Base Bid Price</th>
<th>($___________)</th>
</tr>
</thead>
</table>

A. Unit Prices have been computed in accordance with paragraph 11.03.A of the General Conditions.

B. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the contract Documents.

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 - ATTACHEMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of the Bid:

A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);

B. If Bid amount exceeds $10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;

C. If Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);

D. If Bid amount exceeds $100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans. Refer to paragraph 18.11 of the General Conditions;

E. Copy of West Virginia Contractor’s License

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with the initial capitol letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.
ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by: ________________________________

If Bidder is:

An Individual
Name (typed or printed): ________________________________

By: ________________________________________________

(Individual's signature)

Doing business as: ____________________________________

A Partnership
Partnership Name: ________________________________

By: ________________________________________________

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): ________________________________

A Corporation
Corporation Name: ________________________________

State of Incorporation: ________________________________

Type (General Business, Profession, Service, Limited Liability): ________________________________

By: ________________________________________________

(Signature -- attach evidence of authority to sign)

Name (typed or printed): ________________________________

Title: ________________________________________________

Attest ________________________________________________

(Signature of Corporate Secretary)

Date of Qualification to do business in __________ [State where Project is located] is __ / __ / ____

A Joint Venture
Name of Joint Venture: ________________________________

First Joint Venture Name: ________________________________

By: ________________________________________________

(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): ________________________________

Title: ________________________________________________

Second Joint Venture Name: ________________________________

00300-4
C. Bidder is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in SC-4.06.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the State where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.
ARTICLE 5 - BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Unit</th>
<th>Estimated Quantity</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Alternate A- 221,000 gallon glass lined bolted steel water storage tank</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1B</td>
<td>Alternate B- 221,000 gallon painted welded steel water storage tank</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternate A- 16,000 gallon glass lined bolted steel water storage tank</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2A</td>
<td>Alternate B- 16,000 gallon painted welded steel water storage tank</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Access Road &amp; Culverts</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total of All Bid Prices, Alternate A: ($ ______________________)

Total of All Bid Prices, Alternate B: ($ ______________________)

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of the Bid:

   A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);

   B. Signed Certification of Receipt of All Addenda

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with the initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

310-3
(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder’s Business address: ____________________________________________________________

Business Phone No. (___)__________________________

Business FAX No. (___)__________________________

Business E-Mail Address ____________________________________________________________

State Contractor License No. ________________________________

Employer’s Tax ID No. ____________________________________________

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

_______________________________________________________________________________

_______________________________________________________________________________

9.02 Bid submitted on ________________________________, 2009.
BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
Mingo County Redevelopment Authority
P.O. Box 298
Williamson, WV 25661

BID
Bid Due Date:
Project (Brief Description Including Location):

BOND
Bond Number:
Date (Not later than Bid due date):
Penal sum (Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER
Bidder's Name and Corporate Seal (Seal)
By: ____________________________
Signature and Title
Attest: ____________________________
Signature and Title

SURETY
Surety's Name and Corporate Seal (Seal)
By: ____________________________
Signature and Title
(Attach Power of Attorney)
Attest: ____________________________
Signature and Title

Note: Above addresses are to be used for giving required notice.
1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:
   3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents; or
   3.2. All Bids are rejected by Owner; or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.
This statement relates to a proposed contract with

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. □ I have ___ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, □ I have, ___ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. □ I have ___ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, □ I have, ___ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).
NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32 F.R. 7439, May 19, 1967) on
Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract
exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be
submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date ____________________________

(Signature of Bidder or Prospective Contractor)

Address (including Zip Code)
CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Form AD-1048 (1/92)
Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms “covered transactions,” “debarred,” “suspended,” “ineligible,” “lower tier covered transactions,” “participant,” “person,” “primary covered transaction,” “principal,” “proposal,” and “voluntarily excluded,” as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Form AD-1048
CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

______________  ________________
(name)          (date)

______________
(title)

oOo

(08-21-91) PN 171
Notice of Award

Dated __________

Project: Mingo Central High School-Water and Sewer Extension

Owner: Mingo County Redevelopment Authority

Owner's Contract No.: __________

Contract: Mingo Central High School-Water and Sewer Extension Project

Engineer's Project No.: 1009050

Bidder: __________

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for __________

__________ (Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is __________ Dollars ($__________).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

________ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

________ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.

2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]

3. Other conditions precedent:

   __________

   __________

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner: __________

By: __________

Authorized Signature: __________

Title: __________

Copy to Engineer
FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION

THIS AGREEMENT is by and between Mingo County Redevelopment Authority, Williamson, WV 25661 ("Owner") and _____________ ("Contractor").

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Contract 1 – Mingo Central High School, Water and Sewer Extension Project

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Mingo Central High School, Water and Sewer Extension Project

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by E.L. Robinson Engineering Co. (Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

The Work will be substantially completed within 270 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions.

4.03 Liquidated Damages

Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof,
ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 6, inclusive).

2. Performance bond (pages 1 to 2, inclusive).

3. Payment bond (pages 1 to 2, inclusive).

4. Other bonds (pages N/A to ______, inclusive).
   a. ______ (pages _____ to _____, inclusive).
   b. ______ (pages _____ to _____, inclusive).
   c. ______ (pages _____ to _____, inclusive).

5. General Conditions (pages 1 to 60, inclusive).

6. Supplementary Conditions (pages 1 to 4, inclusive).

7. Specifications as listed in the table of contents of the Project Manual.

8. Drawings consisting of ______ sheets with each sheet bearing the following general title: ______.

9. Addenda (numbers _____ to _____, inclusive).

10. Exhibits to this Agreement (enumerated as follows):
    a. Contractor’s Bid (pages _____ to _____, inclusive).

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    a. Notice to Proceed (pages 1 to 1, inclusive).
    b. Work Change Directives.
    c. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.
ARTICLE 10 – MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK
IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, Engineer, and Agency. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

This Agreement is dated ______. This Agreement shall not be effective unless and until Agency’s designated representative concurs.

OWNER: ____________________________

By: ________________________________

Title: ______________________________

[CORPORATE SEAL]

Attest: ______________________________

Title: ______________________________

Address for giving notices: Mingo County Redevelopment Authority

P.O. Box 298

Williamson, WV 25661

CONTRACTOR

By: ________________________________

Title: ______________________________

[CORPORATE SEAL]

Attest: ______________________________

Title: ______________________________

Address for giving notices:

Agent for service of process:

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: ____________________________

By: ________________________________

Date: ______________________________

Title: ______________________________
FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION

THIS AGREEMENT is by and between Mingo County Redevelopment Authority, WV 25661 (“Owner”) and ______________ (“Contractor”).

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Contract 2 – Mingo Central High School, Water and Sewer Extension Project

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Mingo Central High School, Water and Sewer Extension Project

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by E.L. Robinson Engineering Co. (Engineer), who is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

The Work will be substantially completed within 270 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions.

4.03 Liquidated Damages

Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof,
Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $1,000 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. For all Work, a Lump Sum of: $______________, Bid Form attached hereto as an exhibit.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 10th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

   a. 95 percent of Work completed (with the balance being retainage); and

   b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

6.03 Final Payment

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.
ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
ARTICLE 9 - CONTRACT DOCUMENTS

9.01  Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 6, inclusive).

2. Performance bond (pages 1 to 2, inclusive).

3. Payment bond (pages 1 to 2, inclusive).

4. Other bonds (pages N/A to _____, inclusive).
   a. (pages _____ to _____, inclusive).
   b. (pages _____ to _____, inclusive).
   c. (pages _____ to _____, inclusive).

5. General Conditions (pages 1 to 60, inclusive).

6. Supplementary Conditions (pages 1 to 4, inclusive).

7. Specifications as listed in the table of contents of the Project Manual.

8. Drawings consisting of _____ sheets with each sheet bearing the following general title: _____.

9. Addenda (numbers _____ to _____, inclusive).

10. Exhibits to this Agreement (enumerated as follows):
   a. Contractor's Bid (pages _____ to _____, inclusive).

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
   a. Notice to Proceed (pages 1 to 1, inclusive).
   b. Work Change Directives.
   c. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.
ARTICLE 10 – MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK
IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, Engineer, and Agency. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

This Agreement is dated ___. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

________________________________________
By: ________________________________
Title: ________________________________

[CORPORATE SEAL]

Attest:

________________________________________
Title: ________________________________

Address for giving notices:

Mingo County Redevelopment Authority

P.O. Box 298

Williamson, WV 25661

CONTRACTOR

________________________________________
By: ________________________________
Title: ________________________________

[CORPORATE SEAL]

Attest:

________________________________________
Title: ________________________________

Address for giving notices:

Agent for service of process:

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: ________________________________

By: ________________________________

Date: ________________________________

Title: ________________________________
Notice to Proceed

Dated ____

Project: Mingo Central High School Water and Sewer Extension
Owner: Mingo County Redevelopment Authority
Owner’s Contract No.: 

Contract: Mingo Central High School Water and Sewer Extension Project
Engineer’s Project No.: 1009050

Contractor:

Contractor’s Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____. (or the number of days to achieve Substantial Completion is ___, and the number of days to achieve readiness for final payment is _____.)

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

_____

_____

_____

Owner

Given by: 

Authorized Signature

Title

Date

Copy to Engineer

Prepared by the Engineers’ Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
Mingo County Redevelopment Authority
P.O. Box 298, Williamson, WV 25661

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:
Signature: ____________________________ (Seal)
Name and Title: ________________________

(Space is provided below for signatures of additional parties, if required.)

SURETY

By:
Signature and Title
(Attach Power of Attorney)

Attest: ____________________________
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:
Signature: ____________________________ (Seal)
Name and Title: ________________________

SURETY

By:
Signature and Title
(Attach Power of Attorney)

Attest: ____________________________
Signature and Title:

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default. Surety's obligation under this Bond shall arise after:

3.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3 Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3. Surety shall promptly and at Surety's expense take one of the following actions:

4.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subjects to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract.

6.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming with such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.
PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):
Mingo County Redevelopment Authority
P.O. Box 298, Williamson, WV 25661
CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:
Signature: ___________________________ (Seal)
Name and Title:

(Space is provided below for signatures of additional parties, if required.)

SURETY

By:
Signature and Title
(Attach Power of Attorney)

Attest: ___________________________
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:
Signature: ___________________________ (Seal)
Name and Title:

SURETY

By:
Signature and Title
(Attach Power of Attorney)

Attest: ___________________________
Signature and Title:

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:
   2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
   2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:
   4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
   4.2. Claimants who do not have a direct contract with Contractor:
      4.2.1. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
      4.2.2. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
   6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
   6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner. Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

---

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other party):
### Contractor's Application For Payment No.____

**Application Period:**

**Application Date:**

To (Owner):

From (Contractor):

Via (Engineer)

Project:

Contract:

Owner's Contract No.:

Contractor's Project No.:

Engineer's Project No.:

#### Application for Payment

**Change Order Summary**

<table>
<thead>
<tr>
<th>Number</th>
<th>Additions</th>
<th>Deductions</th>
</tr>
</thead>
</table>

1. ORIGINAL CONTRACT PRICE .......................................................... $________________________

2. Net change by Change Orders ........................................................ $________________________

3. CURRENT CONTRACT PRICE (Line 1 + 2)........................................ $________________________

4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate) ........................................ $________________________

5. RETAINAGE:
   a. ______% x $____________ Work Completed ........................................ $________________________
   b. ______% x $____________ Stored Material ......................................... $________________________
   c. Total Retainage (Line 5a + Line 5b) ........................................ $________________________

   **TOTALS**

   **NET CHANGE BY CHANGE ORDERS**

6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)................................. $________________________

7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)................ $________________________

8. AMOUNT DUE THIS APPLICATION .................................................. $________________________

9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above) .................................................. $________________________

#### Contractor's Certification

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Payment of: $________________________

(Line 8 or other - attach explanation of other amount)

is recommended by: ____________________________

(Engineer) (Date)

Payment of: $________________________

(Line 8 or other - attach explanation of other amount)

is approved by: ____________________________

(Owner) (Date)

Approved by: ____________________________

Funding Agency (if applicable) (Date)
## Progress Estimate

### Contractor's Application

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specification Section No.</td>
<td>Description</td>
<td>Scheduled Value</td>
<td>Work Completed</td>
<td>Materials Presently Stored (not in C or D)</td>
<td>Total Completed and Stored to Date</td>
<td>Balance to Finish</td>
</tr>
<tr>
<td>Item</td>
<td></td>
<td></td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Totals</th>
</tr>
</thead>
</table>

---

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
### Stored Material Summary

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoice No.</td>
<td>Shop Drawing Transmittal No.</td>
<td>Materials Description</td>
<td>Stored Previously</td>
<td>Stored this Month</td>
<td>Incorporated in Work</td>
<td>Materials Remaining in Storage ($)</td>
</tr>
<tr>
<td>Date (Month/Year)</td>
<td>Amount ($)</td>
<td>Date (Month/Year)</td>
<td>Amount ($)</td>
<td>Subtotal</td>
<td>Amount ($)</td>
<td>($D + $E - $F)</td>
</tr>
</tbody>
</table>

### Contractor's Application

For (contract):

Application Period:

Application Number:

Application Date:

Invoice No.

Shop Drawing Transmittal No.

Materials Description

Stored Previously

Date (Month/Year) | Amount ($) | Subtotal

Stored this Month

Date (Month/Year) | Amount ($) |

Incorporated in Work

Date (Month/Year) | Amount ($) |

Materials Remaining in Storage ($) ($D + $E - $F)
# Certificate of Substantial Completion

<table>
<thead>
<tr>
<th>Project: Mingo Central High School Water and Sewer Extension</th>
<th>Owner: Mingo County Redevelopment Authority</th>
<th>Owner's Contract No.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract: Mingo Central High School-Water and Sewer Extension Project</td>
<td>Date of Contract:</td>
<td></td>
</tr>
<tr>
<td>Contractor:</td>
<td>Engineer's Project No.: 1009050</td>
<td></td>
</tr>
</tbody>
</table>

This definitive Certificate of Substantial Completion applies to:

- [x] All Work under the Contract Documents:
- [ ] The following specified portions:

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- [x] Not Amended
- [ ] Amended Responsibilities

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer

Accepted by Contractor

Accepted by Owner

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
# Work Change Directive

**Date of Issuance:**

**Effective Date:**

**Project:** Mingo Central High School-Water and Sewer Extension

**Owner:** Mingo County Redevelopment Authority

**Owner's Contract No.:**

**Contract:** Mingo Central High School-Water and Sewer Extension Project

**Date of Contract:**

**Contractor:**

**Engineer's Project No.:** 1009050

---

**You are directed to proceed promptly with the following change(s):**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attachments (list documents supporting change):**

---

**Purpose for Work Change Directive:**

- [ ] Authorization for Work described herein to proceed on the basis of Cost of the Work due to:
  - [ ] Nonagreement on pricing of proposed change.
  - [ ] Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

**Estimated change in Contract Price and Contract Times:**

<table>
<thead>
<tr>
<th>Contract Price</th>
<th>Contract Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ (increase/decrease)</td>
<td>(increase/decrease) days</td>
</tr>
</tbody>
</table>

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

**Recommended for Approval by Engineer:**

**Authorized for Owner by:**

**Accepted for Contractor by:**

**Approved by Funding Agency (if applicable):**

---


Prepared by the Engineers' Joint Contract Documents Committee and endorsed by the Associated General Contractors of America and the Construction Specifications Institute.
The Contract Documents are modified as follows upon execution of this Change Order:

**Description:**

**Attachments:** (List documents supporting change):

<table>
<thead>
<tr>
<th>CHANGE IN CONTRACT PRICE:</th>
<th>CHANGE IN CONTRACT TIMES:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original Contract Price:</strong></td>
<td><strong>Original Contract Times:</strong></td>
</tr>
<tr>
<td>$________________________________</td>
<td>Substantial completion (days or date):</td>
</tr>
<tr>
<td>[Increase] [Decrease] from previously approved Change Orders No.________ to No.________:</td>
<td>Ready for final payment (days or date):</td>
</tr>
<tr>
<td>$________________________________</td>
<td></td>
</tr>
<tr>
<td><strong>Contract Price prior to this Change Order:</strong></td>
<td><strong>Contract Times prior to this Change Order:</strong></td>
</tr>
<tr>
<td>$________________________________</td>
<td>Substantial completion (days or date):</td>
</tr>
<tr>
<td></td>
<td>Ready for final payment (days or date):</td>
</tr>
<tr>
<td><strong>Increase of this Change Order:</strong></td>
<td><strong>[Increase] [Decrease] of this Change Order:</strong></td>
</tr>
<tr>
<td>$________________________________</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Substantial completion (days or date):</td>
</tr>
<tr>
<td></td>
<td>Ready for final payment (days or date):</td>
</tr>
<tr>
<td><strong>Contract Price incorporating this Change Order:</strong></td>
<td><strong>Contract Times with all approved Change Orders:</strong></td>
</tr>
<tr>
<td>$________________________________</td>
<td>Substantial completion (days or date):</td>
</tr>
<tr>
<td></td>
<td>Ready for final payment (days or date):</td>
</tr>
</tbody>
</table>

**RECOMMENDED:**

By: [engineer's name] (Authorized Signature)

Date: [signature date]

**ACCEPTED:**

By: [owner's name] (Authorized Signature)

Date: [signature date]

**ACCEPTED:**

By: [contractor's name] (Authorized Signature)

Date: [signature date]
This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT
FUNDING AGENCY EDITION

Prepared by
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America

and the

Construction Specification Institute

EJCDC C-710 Standard General Conditions of the Construction Contract, Funding Agency Edition
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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Funding Agency Edition No. C-521 (2002 Edition). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001, 2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800, 2002 Edition).
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<td>Project Representative</td>
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<td>Authorized Variations in Work</td>
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<td>Limitations on Engineer’s Authority and Responsibilities</td>
<td>38</td>
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<td>10.01</td>
<td>Authorized Changes in the Work</td>
<td>38</td>
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<tr>
<td>10.02</td>
<td>Unauthorized Changes in the Work</td>
<td>38</td>
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<tr>
<td>10.03</td>
<td>Execution of Change Orders</td>
<td>39</td>
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<td>10.04</td>
<td>Notification to Surety</td>
<td>39</td>
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<tr>
<td>10.05</td>
<td>Claims</td>
<td>39</td>
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<tr>
<td></td>
<td>Article 11 – Cost of the Work; Allowances; Unit Price Work</td>
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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. Agency - The Federal or state agency named as such in the Agreement.

3. Agreement - The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

4. Application for Payment - The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

5. Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

6. Bid - The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

7. Bidder - The individual or entity who submits a Bid directly to Owner.

8. Bidding Documents - The Bidding Requirements and the proposed Contract Documents (including all Addenda).

9. Bidding Requirements - The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

10. Change Order - A document recommended by Engineer which is signed by Contractor and Owner and Agency and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

11. Claim - A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

12. Contract - The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

13. Contract Documents - Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's
14. **Contract Price** – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

15. **Contract Times** – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer’s written recommendation of final payment.

16. **Contractor** – The individual or entity with whom Owner has entered into the Agreement.

17. **Cost of the Work** – See Paragraph 11.01.A for definition.

18. **Drawings** – That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

19. **Effective Date of the Agreement** – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

20. **Engineer** – The individual or entity named as such in the Agreement.

21. **Field Order** – A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. **General Requirements** – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. **Hazardous Environmental Condition** – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. **Hazardous Waste** – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. **Laws and Regulations; Laws or Regulations** – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. **Liens** – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. **Milestone** – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. **Notice of Award** – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

29. **Notice to Proceed** – A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
30. **Owner** – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

31. **PCBs** – Polychlorinated biphenyls.

32. **Petroleum** – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

33. **Progress Schedule** – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.

34. **Project** – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

35. **Project Manual** – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. **Radioactive Material** – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. **Related Entity** – An officer, director, partner, employee, agent, consultant, or subcontractor.

38. **Resident Project Representative** – The authorized representative of Engineer who may be assigned to the Site or any part thereof.

39. **Samples** – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

40. **Schedule of Submittals** – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

41. **Schedule of Values** – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.

42. **Shop Drawings** – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

43. **Site** – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

44. **Specifications** – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

45. **Subcontractor** – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
46. **Substantial Completion** – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

47. **Successful Bidder** – The Bidder submitting a responsive Bid to whom Owner makes an award.

48. **Supplementary Conditions** – That part of the Contract Documents which amends or supplements these General Conditions.

49. **Supplier** – A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

50. **Underground Facilities** – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

51. **Unit Price Work** – Work to be paid for on the basis of unit prices.

52. **Work** – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

53. **Work Change Directive** – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 **Terminology**

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. **Intent of Certain Terms or Adjectives**

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered”, “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
C. Day

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that if:
   a. does not conform to the Contract Documents, or
   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
   c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. Evidence of Insurance: Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.
2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

2.04 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. Preliminary Schedules: Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule;
2. a preliminary Schedule of Submittals; and
3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Agency, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.
ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 Reference Standards

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

1. Contractor’s Review of Contract Documents Before Starting Work: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. Contractor’s Review of Contract Documents During Performance of Work: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies
1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
   a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

   A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

   B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

      1. A Field Order;
      2. Engineer’s approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3) or
      3. Engineer’s written interpretation or clarification.

3.05 Reuse of Documents

   A. Contractor and any Subcontractor or Supplier shall not:

      1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer’s consultants, including electronic media editions; or
      2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

   B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 Electronic Data

   A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user’s sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

   B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data’s creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 Subsurface and Physical Conditions

A. Reports and Drawings: The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the general accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.
4.03 Differing Subsurface or Physical Conditions

A. Notice: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. Engineer's Review: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of
engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 Underground Facilities

A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
   a. reviewing and checking all such information and data,
   b. locating all Underground Facilities shown or indicated in the Contract Documents,
   c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
   d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 Reference Points

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer’s judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because
of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

A. Reports and Drawings: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

E. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5—BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent’s authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.
5.03 Certificates of Insurance

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 Contractor's Liability Insurance

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;
include contractual liability insurance covering Contractor’s indemnity obligations under Paragraphs 6.11 and 6.20;

contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 Owner’s Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner’s option, may purchase and maintain at Owner’s expense Owner’s own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 Property Insurance

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder’s Risk “all-risk” or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and
7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 Waiver of Rights

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Contractor shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof.

B. Contractor as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of this power. If such objection be made, Contractor as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance; Option to Replace

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 Partial Utilization, Acknowledgment of Property Insurer

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the
design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 Labor; Working Hours

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 Progress Schedule

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 Substitutes and "Or-Equals"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to
establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. "Or-Equal" Items: If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

   a. in the exercise of reasonable judgment Engineer determines that:

   1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

   2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

   3) it has a proven record of performance and availability of responsive service; and

   b. Contractor certifies that, if approved and incorporated into the Work:

   1) there will be no increase in cost to the Owner or increase in Contract Times, and

   2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

   a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

   b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

   c. The procedure requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

   d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

   1) shall certify that the proposed substitute item will:

   a) will perform adequately the functions and achieve the results called for by the general design,

   b) be similar in substance to that specified, and

   c) be suited to the same use as that specified;
2) will state:
   a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
   b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
   c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:
   a) all variations of the proposed substitute item from that specified, and
   b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner
may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner’s acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor’s own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.
6.07 Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 Laws and Regulations

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. Removal of Debris During Performance of the Work: During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. Cleaning: Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. Loading Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 Related Work at Site

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 Coordination

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.
7.03 Legal Relationships

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor’s actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor’s action or inactions.

ARTICLE 8 – OWNER’S RESPONSIBILITIES

8.01 Communications to Contractor

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 Replacement of Engineer

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 Furnish Data

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 Pay When Due

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 Lands and Easements; Reports and Tests

A. Owner’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 Insurance

A. Owner’s responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 Change Orders

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 Inspections, Tests, and Approvals

A. Owner’s responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.
8.09 Limitations on Owner's Responsibilities

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 Evidence of Financial Arrangements

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 Owner's Representative

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 Visits to Site

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 Project Representative

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities...
and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 Authorized Variations in Work

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 Rejecting Defective Work

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 Shop Drawings, Change Orders and Payments

A. In connection with Engineer’s authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer’s authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer’s authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer’s authority as to Applications for Payment, see Article 14.

9.07 Determinations for Unit Price Work

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer’s preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer’s written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer’s decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 Limitations on Engineer's Authority and Responsibilities

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, subject to written approval by Agency at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.
10.03 Execution of Change Orders

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner’s correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor’s responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 Claims

A. Engineer’s Decision Required: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. Notice: Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant’s written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant’s last submittal (unless Engineer allows additional time).

C. Engineer’s Action: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer’s sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

A. Costs Included: The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressages, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of
defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

1. Contractor agrees that:
   a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
   b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

   a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

   b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor.
under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor’s fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor’s fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor’s ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor’s sole and exclusive remedy for the delays described in this Paragraph 12.03.B.

1. delays caused by or within the control of Contractor; or

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.
13.04 Uncovering Work

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner’s written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor’s obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer’s recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner’s evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer’s recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site,
take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor
indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;
c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer’s recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

   a. claims have been made against Owner on account of Contractor’s performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. the Contractor’s performance or furnishing of the Work is inconsistent with funding Agency requirements;

   d. there are other items entitling Owner to a set-off against the amount recommended; or

   e. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner’s satisfaction the reasons for such action.

3. If it is subsequently determined that Owner’s refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor’s Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor’s notification, Owner, Agency, Contractor, and Engineer shall make a prefinal inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 Partial Utilization

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner, Agency, and Contractor and will notify Contractor in writing of all
particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner’s property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer’s Review of Application and Acceptance

1. If, on the basis of Engineer’s observation of the Work during construction and final inspection, and Engineer’s review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor’s other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer’s recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer’s recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.
Final Completion Delayed

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so
confirms, Owner shall, upon receipt of Contractor’s final Application for Payment (for Work fully completed and
accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance
due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for
Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have
been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due
for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the
Application for such payment. Such payment shall be made under the terms and conditions governing final
payment, except that it shall not constitute a waiver of Claims. The remaining balance of any sum included in the
final Application for Payment but held by OWNER for Work not fully completed and accepted will become due
when the Work is fully completed and accepted.

Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from
defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the
Contract Documents or the terms of any special guarantees specified therein, or from Contractor’s
continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the
requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more
than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work
will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an
adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such
suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents (including,
but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to
adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to
Paragraph 6.04);

2. Contractor’s disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor’s disregard of the authority of Engineer; or


B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and
surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 Owner May Terminate For Convenience

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.
15.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 Methods and Procedures

A. Owner and Contractor may mutually request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.
17.02 Computation of Times

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

ARTICLE 18 - FEDERAL REQUIREMENTS

18.01 Agency Not a Party

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

18.02 Contract Approval

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 Conflict of Interest

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.

B. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee,
officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner’s officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 Gratuities

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor’s agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.05 Audit and Access to Records

A. For all negotiated contracts and negotiated modifications (except those of $10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

18.06 Small, Minority and Women’s Businesses

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women’s businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women’s businesses on solicitation lists; (2) assuring that small, minority and women’s businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women’s businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women’s businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

18.07 Anti-Kickback

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States”). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.
18.08 Clean Air and Pollution Control Acts

A. If this Contract exceeds $100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 et seq.) and the Federal Water Pollution Control Act as amended (33 USC 1251 et seq.). Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 State Energy Policy

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 Equal Opportunity Requirements


B. Contractor’s compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor’s goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 Restrictions on Lobbying

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. CERTIFICATIONS and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.
Environmental Requirements

A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:

1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.

3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.
Certificate of Owner's Attorney

I, the undersigned, ____________________________, the duly authorized and acting legal representative of ____________________________, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

________________________________________

Date: ________________________________
Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-710, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

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SC-1.01.A.2. Add the following language to the end of Paragraph 1.01.A.2:

The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices, therefore, the Agency for these documents is USDA Rural Development. Additional funding provided by a grant from the Appalachian Regional Commission (ARC).

SC-1.01.A.4. Add the following language to the end of Paragraph 1.01.A.4:

The Application for Payment form to be used on this Project is EJCDC No. C-620. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.10. Add the following language to the end of Paragraph 1.01.A.10:

The Change Order form to be used on this Project is EJCDC No. C-941. Agency approval is required before Change Orders are effective.
SC-1.01.A.20. Add the following language to the end of Paragraph 1.01.A.20:

The Engineer’s Consultants on this project are: none.

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

SC-4.02. Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

A. No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.

SC-4.06. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

A. No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.

B. Not used.

SC-5.03. Add the following new paragraph immediately after Paragraph 5.03.B:

C. Failure of the Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of the Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

SC-5.04. Add the following new paragraph immediately after Paragraph 5.04.B:

C. The limits of liability for insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers’ Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
   a. State: Statutory
   b. Applicable Federal (e.g., Longshoremen’s) Statutory
   c. Employer’s Liability $500,000

2. Contractor’s General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:
   a. General Aggregate $2,000,000
   b. Products - Completed Operations Aggregate $1,000,000
   c. Personal and Advertising Injury $1,000,000
   d. Each Occurrence (Bodily Injury and Property Damage) $1,000,000
   e. Property Damage liability insurance will provide Explosion, Collapse, and

00800-2
Underground coverages where applicable.

f. Excess or Umbrella Liability
   1) General Aggregate $3,000,000
   2) Each Occurrence $3,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
   a. Bodily Injury:
      Each Person $1,000,000
      Each Accident $1,000,000
   b. Property Damage:
      Each Accident $1,000,000
   c. Combined Single Limit of $1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
   a. Bodily Injury:
      Each Person $2,000,000
      Each Accident $2,000,000
   b. Property Damage:
      Each Accident $2,000,000
      Annual Aggregate $2,000,000

SC-6.05.C. Amend the paragraph by making two subparagraphs under the title C. Engineer’s Evaluation. The paragraph text is retitled, 6.05.C.2 After Effective Date of Agreement. A new paragraph is added before this paragraph to read as follows:

1. During Bidding. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or “or-equal” materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or “or-equal” item. Request for Engineer’s clarification of materials and equipment considered “or-equal” prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

H. The Contractor shall not award work valued at more than fifty (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-6.10. Add a new paragraph immediately after Paragraph 6.10.A:

B. Owner is exempt from payment of sales taxes of West Virginia on all materials to be incorporated into the Work.
1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-9.03.A. Add the following language at the end of paragraph 9.03.A:

The Engineer will provide Resident Project Representative services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific Project. [If anyone other than the Engineer is providing the Resident Project Representative, this language must be modified.]

SC-14.02.A.3 Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due ten days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-18.08 Delete paragraph 18.08.A in its entirety and insert the following in its place:

A. If this Contract exceeds $100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).
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PART 1 - GENERAL

1.01 DESCRIPTION

A. This work involves construction of the Mingo Central High School Water and Sewer Extension Project for the Mingo County Redevelopment Authority. This project includes the extension of water distribution and sewage collection systems to serve the Mingo Central High School and a section of the King Coal Highway in the Matewan/Red Jacket area of Mingo County. The project involves the construction of 10 inch and smaller water mains, 10 inch and smaller gravity sewer lines and includes all work designated in these specifications and as shown on the contract drawings. The project is being bid as two (2) contracts.

In cases where a work conflict exists between contract plans and specifications, the Contractor shall request a determination from the Engineer as to which shall govern. In cases where work has not been exactly detailed or specified, the Contractor will be required to use materials and workmanship equal to and comparable to other work and materials specified, for the project. In all cases, material and workmanship shall meet or exceed all established codes or standards listed in Section 01090, Reference Standards.

B. Addenda issued prior to the opening of the bid shall be incorporated and become part of the Contract Documents. The contract documents shall include copy of the “Certification of Receipt of Addenda” signed by the contractor.

C. The work shall be done in full conformance with all acceptable codes, rules and regulations of the State of West Virginia and the municipalities in which the work is being performed and all applicable federal and local regulations pertaining to health and safety, to wages, hours, and unemployment compensation; minority business enterprises; and to liability, liens and claims.

D. Time of Beginning, Completion and Schedule of Operations:

1. The construction times shall be as set forth in the agreement.

2. The Contractor shall revise the construction schedule (Section 01300) on a monthly basis and submit it to the Engineer for outlay management. The Contractor shall also revise the construction schedule as necessary if conditions beyond the control of the Contractor justify, and the Owner approves an extension of the contract time.

3. If the Contractor, for his convenience and at his own expense, should desire to carry on his work at night or outside regular hours (in excess of 40 hours per week), he shall submit an application to the Engineer and he shall allow ample time for satisfactory arrangements to be made for inspecting the work in progress. If permission is granted for such work, the Contractor shall light the different parts of the project as required and in a manner satisfactory to
SECTION 01010
SUMMARY OF WORK

the Engineer and comply with all applicable regulations. The Contractor shall reimburse the Owner for any additional expenses for inspection of the Contractor's work performed outside regular hours. These expenses include, but are not restricted to, direct labor costs, overhead, and profit related to the Inspector's activities.

4. The Contractor's attention is directed to the fact that he will have to accept the risk of any delays caused by the rate of progress of the work to be performed by others under sections of this contract or other contracts, and that in the event he is delayed in prosecution and completion of his work because of such conditions, he shall have no claim for damages or contract adjustment, other than an extension of time and waiving of liquidated damages during the period of time occasioned by such delay.

5. The Contractor shall be responsible for providing the water, heat, and power required for performance of work.

E. Site Conditions:

1. All contractors shall be held to have examined the site and gained full knowledge of conditions under which the work is to be executed.

2. The Contractor shall acquaint himself with location of underground services, utilities, structures, etc., which may be encountered or be affected by his work, and shall be responsible for any damage caused by neglecting to provide proper precautions or protection.

3. Where, water, gas, electricity, storm sewers, telephone or other services are encountered which interfere with the execution of the work, the treatment of which is not otherwise indicated or specified under appropriate division of the specifications, the Engineer and the agency having jurisdiction over the utility shall be notified. Inactive services shall be removed, capped, plugged, or otherwise discontinued; and active services shall be protected and/or relocated as necessary for proper execution of the work in accordance with the agency's requirements and upon written decision of the Engineer. Total cost for relocation and protection shall be included in the bid prices stated on the Form of Proposal.

F. No attempt has been made to separate the work between different trades, subcontracts or otherwise. Any such agreement shall be between the Contractor and his subcontractors and employees.

G. Estimated Quantities

1. All estimated quantities stipulated in the Form of Proposal or other contract documents are approximate and are to be used only (a) as a basis for
estimating the probable cost of the work and (b) for purpose of comparing the proposals submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The Contractor agrees that he will make no claim for damages, anticipated profits or otherwise on account of any difference between the amount of work actually performed and materials actually furnished and the estimated amounts therefore.

H. Coordination

1. The Contractor is responsible for coordination of the work performed on the project with the Owner, Engineer, Coal Company and other interested parties.

2. The Contractor is responsible for notifying the police department (local, county and state), fire department and ambulance services in advance of any work which in any way may affect the response or route of these services to the general public.

1.02 ITEMS PROVIDED BY OWNER

No labor or materials will be furnished by Owner. The Town of Matewan will provide water to the Contractor for flushing/testing at the cost determined by the following formula:

\[(\text{current tariff rate}) \times (\text{volume of pipe installed}) \times 3\]

Contractors may supply temporary metering facilities to measure water used or rely upon Matewan's estimates of net water used by Contractor.

1.03 FIELD MEASUREMENTS AND INSPECTION OF SURFACES

The Contractor and all of his subcontractors shall obtain complete data at the site and inspect surfaces that are to receive his work before proceeding with fabrication, assembling, fitting or erecting his work. He shall be solely responsible for the accuracy of measurements and laying out of the work, and shall make good any errors, defects, layout or failure to report discrepancies.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01010
PART 1 - GENERAL

1.01 DESCRIPTION

A. Division 1 - Non Payable Sections

1. The cost of all work described under Division 1 except mobilization and video taping shall be included in the various unit or lump sum prices bid for other items of work.

B. Division 1 - Payable Section

1. Section 01030 - Mobilization

This item includes the movement of equipment and personnel to the property site and related startup costs. Payment shall be made at the lump sum bid for mobilization, but is not to exceed 5% of the total contract amount. Note that if the bid price for mobilization exceeds the amount listed above, Bidder's price will be reduced to the amount shown and the base bid adjusted accordingly.

2. Section 01651 - Audio-Video Taping

The cost of all work required for video taping the project shall be paid for as a lump sum bid item.

C. Division 2 - Non-Payable Sections

1. Section 02110 Clearing and Grubbing

The cost of this work shall be included in the various unit prices bid for other items. Contractor shall anticipate the requirement for this work.

2. Section 02120 - Erosion and Sediment Control

The cost of this work shall be included in the various unit prices bid for other items. The Contractor shall anticipate the requirement for this work.

3. Section 02150 - Shoring and Bracing

The cost of this work shall be included in the various unit prices bid for other items. The Contractor shall anticipate the requirement for this work.

4. Section 2200 - Earthwork

The cost of this work shall be included in the various unit prices bid for other items. The Contractor shall anticipate the requirement for this work.

5. Section 02220 - Structure Excavation and Backfill
The cost of this work shall be included in the various prices bid for pertinent items. The Contractor shall anticipate the requirement for this work.

6. Section 02221 - Trench Excavation and Backfill for Sewer Lines
   a. Payment for trench excavation shall be included at Contract unit price per linear foot for each of the various pipeline diameter sizes, completed as specified and acceptable to the Engineer. (Sections 02732 and 02733)
   b. Miscellaneous work such as blocking, concrete anchors, bedding, select fill required for over-excavation, backfilling, compacting, tamping, disposal of surplus material, supplying fill material to replace unsuitable material, providing temporary services, and all other work not provided elsewhere in these specifications to give a complete installation shall be included in the Contract unit price per linear foot for each of the various pipeline diameter sizes.
   c. Prior to final approval, pavement, berm, sidewalk, drives and lawns which have been disturbed by the construction shall be replaced or restored to original condition and the cost included in the unit price per linear foot for each of these items as specified elsewhere.

7. Section 02222 - Trench Excavation and Backfill for Water Lines
   a. Payment for trench excavation shall be included at Contract unit price per linear foot for each of the various pipeline diameter sizes, completed as specified and acceptable to the Engineer. (Section 02510)
   b. Miscellaneous work such as blocking, concrete anchors, bedding, select fill required for over-excavation, backfilling, compacting, tamping, disposal of surplus material, supplying fill material to replace unsuitable material, providing temporary services, and all other work not provided elsewhere in these specifications to give a complete installation shall be included in the Contract unit price per linear foot for each of the various pipeline diameter sizes.
   c. Prior to final approval, pavement, berm, sidewalk, drives and lawns which have been disturbed by the construction shall be replaced or restored to original condition and the cost included in the unit price per linear foot for each of these items as specified elsewhere.

8. Section 02227 - Special Fill Material
   The cost of this work shall be included in the various unit prices bid for other items. The Contractor shall anticipate the requirement for this work.

9. Section 02546 - Stone Resurfacing Material
The cost of this work shall be included in the various unit prices bid for other items. The Contractor shall anticipate the requirement for this work.

10. Section 02830 – Fencing

Provision of a new fence, with gate as shown, around the new Pressure reducing stations, shall be included in the lump sum cost for the respective bid item.

11. Section 02930 – Lawn Seeding

The cost of this work shall be included in the various unit lump sum prices bid for other items. The Contractor shall anticipate the requirement for this work.

12. Section 02956 – Sewer Cleaning

The cost of this work shall be included in the various unit lump sum prices bid for other items. The Contractor shall anticipate the requirement for this work.

D. Division 2 - Payable Sections

1. Section 02229 and 02230 – Highway and Stream Crossings
   a. Highway Crossings with steel casing pipe - bored and jacked shall be measured and paid for at the Contract unit price per linear foot for each of the sizes of steel casing pipe installed by boring under paved roads and streets, including all labor and materials for a complete installation.
   b. Highway or Stream Crossing with steel casing pipe-open cut shall be measured and paid for at the contract unit price per linear foot for each of the sizes of steel casing pipe installed, including replacement of original surfaces to standards required by the WV Department of Highways or these specifications whichever may be required.
   c. Carrier pipes installed inside casing pipes shall be paid for under the item of water lines for the appropriate type, size and class installed and no deduction shall be made in the length of waterline where casing pipe is installed.
   d. Miscellaneous work including excavation of pits, backfilling, bracing, dewatering, grouting, restoration of the area, replacement of pavement where applicable and all other items to give a complete installation is included in the unit price for highway or creek crossing.
   e. Length of casing pipe required is to be determined by the Owner's
field representative prior to the beginning of any work not withstanding what may be shown on the drawings. Quantities installed in excess of those deemed necessary by the Engineer shall be at no cost to the Owner.

f. Where copper service line is used for a road crossing and no casing is required, the pay quantity for “Service Line (road crossing)” shall be from face of pit to face of pit.

2. Section 02510 - Water Distribution System

a. Water pipelines.

1. Shall be paid for at the Contract price per linear foot for each size, type and class of pipe installed complete in place including trench excavation, bedding and backfill acceptable to the Engineer.

2. Measurement of pipe shall be made along the pipe centerline to the nearest foot. Deductions shall not be made for the space occupied by fittings and valves in measuring the length of pipe installed.

3. Fittings shall be included in the cost per linear foot of pipe, except as noted below.

4. Miscellaneous work including placement of marking tape, testing, disinfection, and all other necessary work not provided elsewhere in these specifications to give a complete installation shall be included in the unit price.

b. Valves

1. Valves shall be paid for at the contract price per each for the various sizes including valve, valve box, marker post, concrete pad and all other items for a complete installation.

2. Blow-off Valves shall be paid for at the contract unit price per each and shall be as shown on the Drawings.

3. Automatic Air Release Valves shall be paid for at the contract unit price per each and shall be as shown on the Drawings.

c. Service Materials

1. Service Connection shall be paid for at the contract price per each and shall include the service saddle, corporation stop,
2. Meter Assembly shall be paid for at the contract price per each and shall include the meter box, cover, coppersetter, meter, pressure reducing valve as required, and expansion tank provided to customer with signed receipt given to Owner. Also included in this work is providing the Owner with all meter test slips, connecting the service line to the coppersetter and necessary excavation and backfill for a complete installation. Installation of meter and radio pad transmitter to be done by owner.

d. Fire Hydrants

1. Fire hydrants shall be paid for at the contract unit price per each including the connection to the mainline, the gate valve and box, concrete pad, hydrant, up to five feet of six-inch waterline, restraint, stone, excavation, backfill and all related items for a complete installation.

2. Hydrant guard posts shall be paid for at the contract unit price per each post installed as shown on plans.

3. Section 02514 - Asphaltic Concrete Paving

a. Type "C" Trench Repair- Payment shall be made for this item, complete in-place and acceptable to the Engineer, at a contract unit price per linear foot. Measurement shall be made along the pipeline centerline. Contractor should anticipate width of area disturbed. No additional payment will be made for varying widths of disturbed area.

Unit price will include total pavement replacement (asphaltic concrete, base course and sub-base). This pay item will apply to asphaltic concrete replacement on state highways or privately owned asphaltic concrete pavement as described below.

b. Pavement Overlay – Where required, the item shall be used to pay for overlaying areas where the existing pavement has been destroyed by placement of the waterline. Pay item is per ton for machine placed, compacted, asphalt overlay.

4. Section 02576 - Concrete Curbing, Paved Sidewalks and Driveways

Pavement Replacement-Payment for this item will be made only once for each area disturbed. Additional payment will not be made for stone used for maintenance during construction.
SECTION 01025

MEASUREMENT AND PAYMENT

Payment shall be made for this item, complete in-place and acceptable to the Engineer, at a contract unit price per linear foot. Measurement shall be made along the pipeline centerline. Contractor should anticipate width of area disturbed. No additional payment will be made for varying widths of disturbed area. Unit price will include total asphalt (surface and base course) replacement. Also included in this price shall be all costs required to provide additional backfill and compaction requirements as specified in Section 02222.

Sidewalk Replacement-Payment for this item shall include all costs, labor and materials, for replacing sidewalks which must be removed for construction of the waterline. Payment shall be at the contract unit price per square yard and shall include stone base, formed concrete and wire mesh reinforcing.

5. Section 02731 – Manholes and Cleanouts

a. Manholes shall be paid for on a per each basis according to height of manhole and is to include concrete manhole base, pre-cast cone section, concrete grade rings, concrete grout, mastic jointing, concrete invert, manhole steps, cast iron frame and cover, and equipment and labor for excavation, bedding, backfill, and testing of the completed manhole.

b. Cleanouts shall be paid for on a per each basis to include cast iron frame and cover, concrete cap, concrete cradle, fittings, pipe sections and equipment and labor for excavation, bedding, and backfill of the completed cleanout.

6. Section 02732/02733 – Ductile Iron Sewer Pipe/PVC Sewer Pipe

a. Sewer pipelines.

1. Shall be paid for at the Contract price per linear foot for each size, type and class of pipe installed complete in place including trench excavation, bedding and backfill acceptable to the Engineer.

2. Measurement of pipe shall be made along the pipe centerline to the nearest foot. Deductions shall not be made for the space occupied by fittings and valves in measuring the length of pipe installed. Deductions shall be made for space occupied by manholes and cleanouts (Section 02731).

3. Fittings shall be included in the cost per linear foot of pipe, except as noted below.
4. Miscellaneous work including placement of marking tape, testing, disinfection, and all other necessary work not provided elsewhere in these specifications to give a complete installation shall be included in the unit price.

E. Division 3 - Non-Payable Sections

1. Section 03200 - Concrete Formwork
   a. All concrete formwork costs shall be included in the item for which the concrete is being constructed.

2. Section 03200 - Concrete Reinforcement
   a. All concrete reinforcing costs shall be included in the item for which the concrete is being constructed.

2. Section 03300 - Concrete Work
   a. Concrete for footings, walls, lintels, and thrust blocking shall be included at the contract unit price and lump sum for each of the various bid prices for other items, completed as specified and acceptable to the Engineer with the exception noted below.

H. Division 11 - Payable Sections

1. Section 11020 – Pressure Reducing Station
   Payment for each pressure reducing station shall be made per each station installed in accordance with the plans and specifications and accepted by the engineer. Payment is to include excavation, backfill, enclosure, piping pressure reducing valves and all other items necessary to complete the installation.

2. Section 15190 – Air Release Valve
   Payment for each air release valve shall be made per each valve installed in accordance with the specifications and accepted by the engineer. Payment is to include the valve pit, piping and automatic air release valve.
PART 1 - GENERAL

1.01 DESCRIPTION

Related work specified elsewhere:

Method of Measurement and Payment, Section 01025.

PART 2 - PRODUCTS  (Not Applicable)

PART 3 - EXECUTION

3.01 APPLICATION

A. Mobilization

1. Mobilization. This item includes the movement of equipment and personnel to the property site and related startup costs.

2. Payment may be billed at 50 percent of the bid amount on the first pay estimate, 25 percent on the second pay estimate and 25 percent at the first pay estimate after substantial completion.

3. No deduction will be made, nor will any increase be made, in the lump sum mobilization item amount regardless of decreases or increases in the final total contract amount or for any other cause.

END OF SECTION 01030
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Special Conditions and other Division 1 to Division 16 Specifications sections and contract drawings as prepared by E. L. Robinson Engineering Company, apply to work of this section.

1.02 DESCRIPTION OF WORK

Minimum administrative and supervisory requirements necessary for coordination of work on the project include but are not necessarily limited to the following:

Coordination and Meetings.
Surveys and records or reports.
General installation provisions.
Cleaning and protection.

1.03 COORDINATION AND MEETINGS

Regular monthly project meetings will be held for each Contract and attended by every party currently involved in coordination or planning for the work of the project. One item on the agenda of each meeting will be discussion to resolve coordination problems. The Engineer will prepare and distribute minutes of these meetings to everyone in attendance. Others affected by actions taken at these meetings will be provided necessary information.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. At regular monthly project meetings, have a pre-installation discussion of each unit of work which requires coordination with other work. All parties involved or affected by the unit of work's coordination or integration with other work should attend this meeting.

1. Discuss progress of other work and preparations for the particular work under consideration.

2. Note agreements and disagreements, along with the final plan of action. Discussion will be recorded in the minutes of the meeting for distribution.
B. Manufacturer's Instructions: Where installation includes manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the contract documents.

C. Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items. Rejected items shall be immediately removed from the project.

D. Recheck measurements and dimensions of the work, as an integral step of starting each installation.

E. Install each unit of work during weather conditions and project status which will ensure the best possible results in coordination with the entire work.

3.02 CLEANING AND PROTECTION

A. General: During handling and installation of work at the project site, clean and protect work in progress and adjoining work on the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration.

B. Limiting Exposures of Work: Supervise performance of the work to ensure none of the work will be subjected to deleterious exposure during the construction period.

C. Cleanup shall be performed on site each day.

END OF SECTION 01040
SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:

1. Establishing and maintaining lines and levels;
2. Structural design of shores, forms and similar items provided by the Contractor as part of his means and methods of construction.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to: General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Additional requirements for field engineering also may be described in other Sections of these Specifications.
3. As described in the General Conditions, the Owner/Engineer will furnish survey data describing the physical characteristics, legal limitations, utility locations, and legal description of the site.

1.2 SUBMITTALS

A. Comply with pertinent provisions of applicable Sections.

B. Upon request of the Engineer, submit:

1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
2. Documentation verifying accuracy of field engineering work.
3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 PROCEDURES

A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:

1. Locate and protect control points during progress of the Work.
2. Preserve permanent reference points during progress of the Work.
3. Do not change or relocate reference points or items of the Work without specific approval from the Engineer.
4. Promptly advise the Engineer when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
   a. Upon direction of the Engineer, require the field engineer to replace reference stakes or markers.
   b. Locate such replacements according to the original survey control.
   c. Restore by survey any private property corners or markers damaged or destroyed by the Contractors construction activities.

END OF SECTION
**PART 1 - GENERAL**

**1.01 DESCRIPTION**

Referenced Specifications, Standard and Publications

The following referenced specifications, standards and publications are listed as source information:

**Specification, Standard or Publication May Be Obtained From**

<table>
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<tr>
<th>Organization</th>
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<tbody>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
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<tr>
<td></td>
<td>1916 Place Street</td>
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<td>Philadelphia, PA 19103</td>
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<td>SSPC</td>
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<td>4400 Fifth Avenue</td>
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<td>Pittsburgh, PA 15231</td>
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<tr>
<td>IEEE Standards</td>
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<td>Engineers, Inc.</td>
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<tr>
<td></td>
<td>Box A, Lenox Hill Station</td>
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<td></td>
<td>New York, New York 30747</td>
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<td>AISC</td>
<td>American Institute of Steel Construction,</td>
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<td>Inc.</td>
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<td>101 Park Avenue</td>
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<td>35 East Wacker Drive</td>
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<td>ACI Standards</td>
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| ANSI  | American National Standards Institute  
1819 L. Street, NW, 6th Floor  
Washington, DC 20036 |
| NSF   | NSF International  
P.O. Box 130140  
789 N. Dixbord Road  
Ann Arbor, Michigan 48113-0140 |
| AISI  | American Iron & Steel Institute  
Engineering Divisions Publications  
633 Third Avenue  
New York, New York |
| NBFU  | National Board of Fire (National Electrical Code)  
Underwriter  
85 John Street  
New York, New York 10038 |
| ASA   | American Standards Association  
10 East 40th Street  
New York, New York 10016 |
| ASHRAE| American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc.  
United Engineering Center  
345 East 47th Street  
New York, New York 10017 |
| SMACCNA| Sheet Metal and Air Conditioning Contractors National Assoc., Inc.  
101 Center Street  
Elgin, Illinois |
| AWS   | American Welding Society, Inc.  
10 East 40th Street  
New York, New York 10016 |
| ASHRAE| American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc.  
United Engineering Center  
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| SMACCNA| Sheet Metal and Air Conditioning Contractors National Assoc., Inc.  
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<td>228 North LaSalle Street</td>
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<td>Chicago, Illinois 60601</td>
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**PART 2 - PRODUCT** (Not Applicable)

**PART 3 - EXECUTION** (Not Applicable)

END OF SECTION 01090
SECTION 01300

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

- Construction Schedule
- Manufacturer's Directions
- Shop Drawings
- Certificates of Compliance
- Record of Test Results
- Record Drawings
- Maintenance Manuals
- Samples
- Construction Photographs

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 APPLICATION

A. Construction Schedule and Chart

1. The General Contractor shall develop a construction schedule and chart showing his proposed time schedule for the various work components required under this contract.

2. Room shall be provided on the original schedule and chart whereby the Contractor can plot actual progress of the work against that initially proposed.

3. The construction schedule and chart should be of a type and quality that will aid both the Contractor and Engineer in checking the rate of accomplishment of the work.

4. The construction schedule and chart shall be submitted to the Engineer for approval one week prior to a pre-construction meeting. The General Schedule shall be discussed at the Pre-Construction meeting and copies made available to all interested parties. No construction shall be permitted until the construction schedule is approved by the Engineer.

5. The approved schedules shall be posted in a location readily noticeable on the project site.

6. The Contractor shall also estimate the dollar amounts of money to be
expended on a month to month basis over the life of the project, and include these figures on the construction schedule.

7. The Construction Schedule, including projected expenditures, shall be updated monthly and submitted to the Engineer with the monthly estimate for payment.

8. Monthly estimate of payment will not be paid without the contractor's full compliance with Section 3.01.A.7 of this Section. The Contractor will be required to resubmit the rejected payment request as part of the next monthly estimate of payment.

B. Manufacturer's Directions

1. Each Contractor shall apply, install, connect, erect, use, clean and condition manufactured articles, materials, and equipment as directed by the manufacturer, unless specified to the contrary.

2. Wherever specifications call for work to be performed or materials to be furnished in accordance with manufacturer's printed instructions or directions, the Contractor shall furnish three (3) copies of those instructions or directions to the Engineer before installing materials or performing work.

C. Shop Drawings

1. The Contractor shall furnish the Engineer with six (6) copies of all shop and erection drawings, and manufacturer's descriptive data for review.

2. Shop and erection drawings shall include reference to the applicable section of the specifications.

3. The Contractor shall check and verify all field dimension requirements and shall check and approve all such shop and erection drawings and manufacturer's descriptive data, and affix approval stamp, prior to transmitting to Engineer. The Engineer will return any submittals not stamped by the General Contractor. Whenever the elements of construction or the details of their installation, so described by such, deviate from the requirements of the plans and/or specifications, then the Contractor shall point out such deviation in the letter of transmittal. This procedure must be followed and such deviations must be specifically accepted by the Engineer in writing.

4. Three (3) copies will be returned to the Contractor (for correction if required) and three (3) copies retained by the Engineer for office reference. Should corrections be required, the Contractor shall resubmit six (6) copies for final review by Engineer and distribution to Owner (1) copy and Engineer's Field Representative (1) copy and Contractor (3) copies.

5. No materials or equipment shall be used or installed until approval is
received by the Contractor.

6. The purposes of having shop and erection drawings and manufacturer's descriptive data reviewed by the Engineer are two-fold:

a. To assure the compliance with the purpose and intent of the plans and specifications.

b. To assist the Contractor in interpreting the plans and specifications so as to eliminate mistakes in the material or equipment before it is actually shipped to the site of the work.

7. The formal review given to shop drawings and other items submitted by the Contractor is to be considered as in conformance with these purposes and in no manner shall be construed so as to relieve the Contractor from any liability or responsibility for proper construction or compliance with the plans and specifications.

8. All shop drawings shall be submitted prior to 50% of contract completion. Failure to submit all required shop drawings prior to 50% completion will result in withholding of payment until such submittals are received.

D. Certificates of Compliance

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three (3) copies. Each certificate shall be signed by an authorized officer of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

E. Record of Test Results

1. The Contractor shall maintain record of all testing performed during the life of the project.

2. Separate records shall be kept for each type of testing required.

3. Records should indicate the line or location, the date of testing, the persons involved in testing and the results.

4. At the end of the project, all testing records shall be turned over to the Engineer.

F. Record Drawings
1. At completion of work and prior to final payment, each Contractor shall provide Engineer with a marked-up set of blue or black line prints showing all changes or variations from contract drawings, and not specified on change order drawings therefore issued.

2. The marked-up set of prints will be acceptable providing they are in first class condition for record purposes. Each Contractor shall be responsible for accuracy of record drawings. No arbitrary mark-ups permitted.

3. To comply with above, Contractor shall make changes at the project site as they occur. During first week of each month each Contractor shall present, at the project site, a job copy showing variations and changes to date to Engineer or Owner's representative for their review. Engineer may withhold approval for payment until record drawings are brought up to date.

4. If above data is not available at the close of the contract for record drawing resolution, the cost of preparing such record drawings from the records accumulated by the Engineer will be deducted from the Contractor's contract at the cost of $50.00 per hour.

G. Operation and Maintenance Manual Submittals

1. The manufacturers or suppliers of those items of equipment selected to be utilized in the project will provide six (6) sets of complete operating and maintenance instruction manuals to the Engineer for incorporation into the overall manual to be prepared by the Engineer. Submittals shall be provided prior to the completion of 50% of the project construction by each Contractor. Failure to submit operation and maintenance manuals prior to 50% contract completion will result in withholding of payment until such submittals are received.

2. The manual shall be as follows:
   a. Manual shall include manufacturer's written instructions for maintenance and operation, including recommended lubricants and lubricating procedures.
   b. Manual shall be hard cover, three (3) ring binder(s) with index tabs indicating separations between equipment.
   c. For control equipment, manual shall contain narrative of the control cycle for the control equipment as well as descriptive diagrams.
   d. Manufacturers will submit a listing of parts and recommended spare parts.
   e. If the descriptive literature applies to more than one model, size, type, etc., it will be plainly marked to indicate those instructions and figures.
which describe the equipment supplied.

f. Complete wiring diagrams as applicable.
g. Equipment drawings as applicable.

H. Samples

The number and type of samples submitted shall be specified in the particular section to which they apply.

I. Construction Photographs

1. Direction of View/Vantage Points
   a. Exterior photographs shall be taken from vantage points to view each structure and show all work adequately.
   b. Interior photographs shall be taken from vantage points to show all work.

2. Times of Photography
   Photographs shall be taken at each of the following stages of construction:
   a. Before commencement of construction.
   b. At one (1) month intervals during construction of the facilities. Photographs of any month need only show new work for that month.
   c. Upon completion of construction.

3. Photographs shall be color, glossy and 3 in. x 5 in. All photographs shall be identified on the back by date, project name and location. Three (3) sets of photographs shall be delivered to the Engineer as soon as possible after they are taken.

4. Notification and Coordination

The Contractor shall notify the Engineer at least five (5) days before the taking of the construction photographs listed above.

END OF SECTION 01300
PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

Protection and Maintenance of Public and Private Property
Protection of Existing Fences
Protection of Trees and Plants
Protection of Work

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 Application

A. Protection and Maintenance of Public and Private Property:

1. The Contractor, insofar as his work is concerned, shall protect all property, including but not limited to, driveways, buildings, fences, utilities, trees, flowers, shrubbery, guard rails, retaining walls, railroad lines and/or roadbeds, other structures and for foundations and appurtenances along or adjacent to the line of work. All disturbed areas shall be returned to their original ground contour unless otherwise noted on the construction drawings.

2. The Contractor, insofar as his work is concerned, shall protect, shore, brace, support and maintain all underground structures, pipes, mains, sewers, culverts, conduits, drains and their appurtenances.

3. The Contractor shall indemnify, defend and save harmless the Owner and Engineer against all damages, actual or alleged, arising out of or incidental to the work.

4. All pavement, surfacing, driveway, curbs, walks, buildings, utility poles, guy wires, railroad lines and/or roadbeds, and other surface structures affected by the construction operation in connection with the performance of the contract shall be restored to their original condition thereof as determined and approved by the Engineer.

5. Any property corners and/or survey monuments disturbed or removed during construction shall be set back at their original location and certified by a registered land surveyor at the Contractor's expense.

6. All replacements of underground construction and surface structures or parts
thereof shall be made with new materials conforming to the requirements of these specifications or, if not specified, as approved by the Engineer.

7. The Contractor, under this contract, may be required to lay and place over, under or along underground installations the matters and things to be required under this contract. However, should it appear necessary or expedient in the judgment of the Engineer to raise, lower or shift an underground structure which was not shown on the plans, such work shall be performed by the owner of the structure. The Contractor, under this circumstance, shall uncover that portion of the structure which lays within the limits of the trench, and shall give the owner reasonable notice to perform the relocation.

8. The Contractor shall be responsible for all damage to streets, roads, highways, railroads, shoulders, ditches, embankments, culverts, telephone lines, waterlines, bridges, power transmission lines, oil lines, gas lines, or other public or private property or facility, regardless of location or character, which may be caused by moving, hauling, or otherwise transporting equipment, materials, or men to or from the work or any part of the site thereof, whether by him or his subcontractor or subcontractors. The Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, the damaged property or facility concerning its repair or replacement or payment of costs incurred in connection with said damage.

B. Protection of Existing Fences:

1. All existing fences which interfere with construction operations shall be maintained by the Contractor until the completion of the work affected thereby, unless written permission is obtained from the Owner thereof to leave an interfering fence dismantled for an agreed period of time. Where fences must be maintained across the right-of-way, adequate gates shall be installed therein. Gates shall be kept closed and locked at all times when not in use.

2. On completion of the work across any tract of land, the Contractor shall restore all fences to their original or to a better condition and quality, purchasing new material to replace all materials lost, damaged or destroyed. Temporary gates installed by the Contractor in any fence line may be left in place with permission of the Owner and tenant of the property. Should the Owner of the property not grant permission to leave the gates in place, the Contractor shall remove the gates and restore fence to original condition.

C. Protection of Trees and Plants:

1. It is the intent that, where possible, the trees within the construction limits
remain standing. The Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without special authority. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall first adequately wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.

2. Where, in the opinion of the Construction Representative, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor’s equipment or by his dumping, or other operations, he may direct the Contractor to protect adequately such trees by placing boards, planks, or poles around them. When earthwork operations are liable, in the opinion of the Project Representative, to cause spoil to roll or otherwise be displaced into uncleared areas, the Contractor shall construct barriers of heavy planking to protect the trees. Spoil that is displaced into uncleared areas shall be removed.

3. Any trees or other landscape features scarred or damaged by the Contractor’s equipment or operations shall be restored as nearly as possible to its original condition at the Contractor’s expense. The Engineer will determine what methods of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under requirements for clearing and grubbing.

4. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than one-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted. The use of climbing ropes will be required where deemed necessary for safety. Trees that are to remain that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Owner, shall be immediately removed and replaced with a nursery grown tree of the same species. The replacement tree shall be planted according to accepted practice of the American Association of Nurseryman during the proper season and be guaranteed to live for one full growing season.

D. Protection of Work:

1. Storage of Materials
   a. The Contractor shall confine his equipment, apparatus, storage of materials and operations to limits indicated by directions of the Engineer, and shall not bring materials onto the site until they are needed for the progress of the work.
   b. For materials delivered to the Contractor prior to the need for them in
the progress of the work, the Contractor shall at his own expense, provide off-site storage of materials and equipment as requires. All off-site storage areas and shed shall conform to the requirements of this section. The Contractor shall provide to the Owner or the Engineer the location of all off-site storage areas. The Owner and Engineer reserve the right to inspect all off-site storage areas.

c. The Contractor shall provide and maintain watertight storage sheds on the premises where directed, for storage of materials that might be damaged by weather. Sheds shall have wood floors raised at least six inches above the ground. Sheds shall be neat and well constructed, surfaced with plywood, drop siding, masonry or other similar material, well painted and void of advertisements.

d. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times. Pumps, motors, electrical equipment, and other equipment having anti-friction or sleeve bearings shall be stored in weather tight warehouses which are maintained at a temperature at least 60° F.

e. Electrical equipment controls, and insulation shall be protected against moisture or water damage. All space heaters provided in the equipment shall be kept connected and operating at all times until equipment is placed in service.

f. The Owner assumes no responsibility for materials stored in buildings or on the site. The Contractor assumes full responsibility for damage due to the storing of materials.

g. Repairing of areas used for placing of sheds, office, and for storage of materials shall be done by the Contractor using the area. The Contractor shall supervise the repair work and prepare the areas for final grading.

END OF SECTION 01545
SECTION 01570  TRAFFIC REGULATION AND CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

- Maintenance of Traffic
- Barricades and Lights
- Temporary Roads
- Employee Parking

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 APPLICATION

A. Maintenance of Traffic:

1. The Contractor shall conduct his work so as to interfere as little as possible with public travel, whether vehicular or pedestrian; whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, the Contractor shall at his own expense provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to property owners of private drives before interfering with them; provided however, that such maintenance of traffic will not be required at any point where the Contractor has obtained permission from the property owner and tenant of private property, or from the authority having jurisdiction over the public property involved, to obstruct traffic at any designated point thereon and for the duration of whatever period of time as may be agreed upon.

2. When crossing public roads, the maintenance of traffic shall be in conformance with all requirements of the West Virginia Department of Transportation (DOT).

3. Contractor shall provide plans for traffic control for work performed in the DOT right-of-way to the DOT prior to starting construction.

4. It shall be the responsibility of the Contractor to pay for any required bonds, permits and licenses from the DOT. The Contractor shall also pay for any additional inspection required by the DOT beyond that provided by the Engineers. Furthermore, the Contractor shall comply with all prior notification requirements before continuing work.
SECTION 01570  TRAFFIC REGULATION AND CONTROL

B. Barricades and Lights:

1. All streets, roads, highways and other public thoroughfares which are closed to traffic shall be protected by means of effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.

2. All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

3. All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sunset to sunrise. Materials stored upon or alongside public streets and highways shall be so placed, and the work at all times shall be so conducted, as to cause the minimum obstruction and inconvenience to the traveling public.

4. All barricades, signs, lights and other protective devices shall be installed and maintained in conformity with applicable statutory requirements, and where within highway rights-of-way, as required by the authority having jurisdiction thereof.

C. Temporary Roads:

1. If the Contractor proposes to construct temporary roads, embankments or excavations to project work areas, he shall submit for approval, at least 15 days prior to scheduled start of such temporary work, a layout of all temporary roads, excavations and embankments to be constructed within the work area. No unauthorized road construction, excavation or embankment construction will be permitted.

2. All temporary roads shall be subject to conformity to all applicable state and local laws and regulations.

3. All temporary roads shall be fully restored upon completion of the work. Roads shall be re-graded to their original contours then seeded and mulched as per these specifications, and if not specified, to the requirements of the Engineer.

4. There shall be no additional payments made to the Contractor for construction of temporary roads, nor their restoration.
D. Employee Parking:

1. The Contractor shall be responsible for providing adequate parking for his employees and the employees of his Subcontractors.

2. Parking areas must be approved by the Owner and Engineer.

END OF SECTION 01570
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:
   Field Office

B. Related Work Specified Elsewhere
   Measurement and Payment Section 01025
   No separate payment will be made for field office. Cost shall be included in mobilization.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 APPLICATION

A. Contractor's Field Office:
   1. The Contractor shall provide a field office at the work site. The office shall contain, as a minimum, a phone, a file for contract drawings, approved shop drawings and specifications and a work table.
   2. The office shall also provide a signboard for displaying employment posters and wage rates, safety signs and other documents as required by the federal, state or local government.
   3. If the Contractor is performing more than one Contract, the Engineer may approve the use of one field office to be used for both or all Contracts.

B. Contract No. 1 Contractor shall supply Engineer's Resident Project Representative with a minimum of 144 square feet of heated, air conditioned, lighted, secured working space in this or another onsite office trailer including providing sole access to a telephone with answering machine, fax machine, equipment to review pre-construction DVD, copier, file cabinet, desk, and two chairs. Telephone shall be long distance capable; however, Contractor shall not be responsible for long distance charges for individual calls made by E.L. Robinson personnel.
PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

- Scope
- Quality of Materials and Equipment
- Contractor's Responsibility for Materials
- Materials Tests

PART 2 - EXECUTION

2.01 QUALITY OF MATERIALS AND EQUIPMENT

Whenever in any of the contract documents an item of material or specified equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or equal" if not inserted, shall be implied. The specific item of material or equipment mentioned shall be understood as establishing a standard of type, function, efficiency, minimum basis of design and quality desired. Other manufacturer's products of comparable quality, design and efficiency, and suitable for the service intended, will be considered and approved by the Engineer if they meet the quality, performance, operation and maintenance, and energy use requirements of the items specified.

2.02 CONTRACTOR'S RESPONSIBILITY FOR MATERIALS

The Contractor shall be responsible for the condition of all materials furnished by him, and he shall replace at his own cost and expense any and all such material found to be defective in design or manufacture, or which has been damaged after delivery. This includes the furnishing of all materials and labor required for the replacement of any installed material which is found to be defective at any time prior to the expiration of one year from the date of final acceptance, or in accordance with the manufacturers' warranty, whichever is longer.

2.03 MATERIAL TESTS

A. All materials entering the project are subject to tests. Whenever the material manufacturer makes routine control tests on his products duplicate certified copies of such test reports shall be furnished the Engineer.

B. Representative test samples of all materials shall be furnished free of charge by the Contractor whenever requested by the Engineer. Such samples will be tested in a laboratory selected by the Owner. All laboratory charges will be paid by the Contractor unless specifically stated otherwise in the detailed specifications.
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to this Section.

1.02 DESCRIPTION OF WORK

The Contractor shall provide the labor, tools, equipment, and materials necessary to provide the audio-video taping in accordance with the drawings and as specified herein.

1.03 QUALITY ASSURANCE

Codes and Standards: Perform all work in providing the audio-video taping in compliance with applicable requirements of governing agencies having jurisdiction.

1.04 SUBMITTALS

Transmittals: Furnish samples, manufacturer's product data, test reports, and materials as required.

1.05 JOB CONDITIONS

A. Digital Video: Construction in any area shall not start until the area has been recorded and the digital video discs (DVD)s submitted.

B. Visual Inspection: Prior to recording, all areas to be recorded shall be investigated visually with notation made of features not readily visible by digital video recording method. This would include, but not be limited to, culverts (size, type, and condition) and manholes that may be partially buried. Record all measurements made during the inspection.

C. Approvals: All digital audio/video recording shall be conducted in the presence of the Engineer unless waived in writing by the Engineer. At the start of taping, the Contractor shall submit a sample DVD of a portion of this project for the Engineer to review. The sample DVD shall be approved before any other digital recording is allowed.

1.06 DELIVERY, STORAGE, AND HANDLING

Not used.

1.07 SPECIAL WARRANTY

Not used.
PART 2 - PRODUCTS

2.1 MATERIALS

Equipment

1. DVD - Audio-video digital video disc shall be original, previously unrecorded DVD-R as manufactured by Sony, TDK or approved equal. Two (2) copies are required by the Owner, copies shall be limited to direct copies of the original DVD and marked as such.

   a. Identification. All DVDs and cases shall be properly identified by disc number, location, and project name in a manner acceptable to the Engineer.

   b. Inventory. An index including date of video, subjects, and locations by disc and inventory of all DVDs completed, referenced by location and number, shall be furnished to the Engineer upon completion of the work and delivery of the DVDs. All DVDs and written records shall become the property of the Owner.

2. DVD Camcorder. The color camcorder shall be compatible with the DVD-R format. Equipment shall be Sony DCR-DVD205 digital camcorder or equal.

PART 3 - EXECUTION

3.1 VIDEO INFORMATION

A. Audio. Each DVD shall begin with the current date, project name, and municipality and be followed by the general location, i.e., name of the street or property owner, location of cross country line, viewing side, and direction of progress. The engineering stationing (where required) shall be noted on the audio track. Houses and buildings shall be identified audibly by an address, when available.

B. Date and Time. All video recordings shall, by electronic means, continuously display the month, day, year, hours, minutes, and seconds.

3.2 COVERAGE

A. General. Video coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches (drainage patterns are of particular concern), streets (including condition of paving for full width), landscaping, trees, culverts, catch basins, headwalls, fences, visible utilities, and all buildings (interior and exterior) located within the zone of influence of construction. Of particular concern are existing faults, fractures, defects, or other imperfections.
B. Streets. Streets and street areas shall be recorded by audio-video disc for full width of the zone of influence of construction, including both sides of the street. The term street shall be understood to mean street, highway, avenue, boulevard, road, alley, lane, driveway, parking lot, et cetera, and all adjacent areas within the possible zone of the influence of construction.

C. Easements. Easements shall be recorded by audio-video recording for the full width of the permanent and temporary easements and all other adjacent areas lying within the zone of influence of construction. Easements shall be understood to mean all areas not in streets that require disc coverage. Also included in this coverage should be any areas that are intended to be used for construction access, storage, or waste disposal.

3.3 RECORDING CONDITIONS

A. Visibility. All digital video recording shall be done during times of good visibility. No outside video recording shall be done during periods of visible precipitation or when the ground area is covered with snow, leaves, or debris, unless otherwise authorized by the Engineer/Architect.

B. Lighting. In order to produce the proper detail and perspective, adequate auxiliary lighting will be required to fill in shadow areas caused by trees, utility poles, road signs, and other such objects, as well as other conditions requiring artificial illumination.

C. Rate of Speed. The average rate of speed in the direction of travel during recording shall not exceed 50 feet per minute. Panning rates and zoom-in/zoom-out rates shall not exceed 10 percent over a 3 second interval.

D. Distance. When conventional wheeled vehicles are used for recording, the distance from the camera lens to the ground shall not be less than 8 feet.

END OF SECTION 01651
SECTION 01666 - TESTING SEWER SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section consists of furnishing all labor, equipment and material required to test sewer systems, and related work as described herein and/or shown on the Drawings.

B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS

A. Shop Drawing submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer's review of this submittal prior to fabrication.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TESTING GRAVITY SEWER SYSTEMS:

A. Leakage shall not exceed 200 gallons/inch diameter/mile of sewer/day for any completed gravity sewer.

B. Prior to testing, all sewer lines shall be cleaned and inspected for major defects. Pre-cleaning by high velocity jet or other method may be necessary.

C. Visual testing of all sewer lines shall be performed by the Engineer prior to final acceptance to verify accuracy of alignment and freedom from debris and obstructions. The full diameter of the pipe for straight alignments shall be visible when viewed between consecutive manholes. The method of test shall be photography, closed circuit television, or visually lamping with mirrors and lights.

D. The Contractor shall be required to conduct tests to determine the watertightness of the sewer when completed. The tests shall be observed by the Engineer, but the Contractor shall furnish all labor, equipment and materials required in connection therewith, including the necessary water.

E. As a demonstration of the workmanship and materials proposed to be used, the Contractor shall test the first section before proceeding with construction further than 100 feet. After the first section passes test, construction may resume. The testing operation shall be continuous throughout the construction of the project and at no time during construction shall there be more than 1000 feet not tested, if required by the Engineer.
F. The sewer shall be tested in sections, complete with laterals, each section extending between the two nearest manholes.

G. Air Test:

1. The sewer line shall be sealed at each end. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice at one end of the line. The air supply line will contain an on-off gas valve, a pressure gauge having a range of from 0 to 10 psi and a regulator or relief valve set no higher than 9.0 psi to avoid over-pressurizing and displacing temporary or permanent plugs. The gauge shall have minimum divisions of .10 psi and shall have an accuracy of plus or minus .04 psi. The seals at each manhole shall be properly blocked to prevent displacement while the line is under pressure.

2. The pipe line under test shall be pressurized to four (4) psig. The line will be allowed to stabilize between 4 psig and 3.5 psig for a period of not less than 5 minutes. If necessary, air should be added to the line to maintain the pressure above 3.5 psig. After the stabilization period, the gas valve shall be closed. When the line pressure drops to no less than 3.5 psig, commence timing with a stop watch. The stop watch should be allowed to run until such time as the line pressure drops 1.0 psig. Then the watch should be stopped and the time lapse compared for the 1.0 psig pressure drop with the allowable time lapse in these specifications for the designated pipe size and length specified by the Engineer. If the time lapse is greater than that specified, the section undergoing test shall have passed, and the test may be discontinued at that time. If the time is less than that specified, the line has not passed the test and the Contractor will be required to prepare the line for retest. The test may be discontinued once the prescribed time has elapsed even though the 1.0 psig drop has not occurred.

Allowable time lapse shall be as shown in the following Air Test Table.

3. If the pipe line to be tested is beneath the ground water level, the test pressure shall be increased 0.433 psig for each foot the ground water level is above the crown of the pipe, but not greater than 9.0 psig. If the average height of ground water above the pipe invert is greater than 12.7 feet, the section so submerged may be tested using 9.0 psig as the starting test pressure.

4. When the sewer line is tested by the Air Test Method, each and every manhole is subject to be tested by the Exfiltration Method described herein.
## AIR TEST TABLE FOR GRAVITY SEwers

**SPECIFICATIONS TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED WHEN TESTING ONE PIPE DIAMETER ONLY**

<table>
<thead>
<tr>
<th>Pipe Diameter (in.)</th>
<th>2 Minimum Time (min:sec)</th>
<th>3 Length For Minimum Time (ft)</th>
<th>4 Time For Longer Length (sec)</th>
<th>100 ft</th>
<th>150 ft</th>
<th>200 ft</th>
<th>250 ft</th>
<th>300 ft</th>
<th>350 ft</th>
<th>400 ft</th>
<th>450 ft</th>
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<tr>
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<td>298</td>
<td>1.520L</td>
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<td>7:34</td>
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<td>38:27</td>
<td>44:52</td>
<td>51:16</td>
<td>57:41</td>
</tr>
</tbody>
</table>

If the pipe line to be tested is of shorter length than that shown for length for Maximum Time, the Minimum Time lapse is required.

If the pipe line to be tested is beneath the ground water level, the test pressure shall be increased 0.433 psi for each foot the ground water level is above the crown of the pipe, but not greater than 9.0 psig.

---

E.L. Robinson Engineering Co. 01666-3
3.2 TESTING MANHOLES:

A. General

1. The Engineer may elect to test any or all manholes if the Engineer feels that construction is not adequate. The Contractor shall perform and bear all costs of the testing.

2. Manhole watertightness: All joints, inlets and outlets, joints between frame and manhole section, or any other crack or portal shall be watertight.

3. If, when tested, a manhole fails, the Contractor shall repair, reconstruct or otherwise make satisfactory the manhole, and repeat the tests until that manhole passes.

B. Test Procedure:

1. New manholes will be tested for water tightness by application of exfiltration test. This test shall consist of completely sealing all pipe openings into the manhole and filling manhole with water to the top of the casting frame. After the test period, exfiltration is defined as the amount of water required to refill the manhole. Exfiltration shall not exceed 50 gallons per manhole during 24 hour testing period.

2. A vacuum test may also be used to test manholes or wetwells, as follows:
   a. Plug the manhole.
   b. Place a vacuum of 10" Hg on the manhole.
   c. Measure the time for the vacuum to drop to 9" Hg.
   d. For a 48” I.D. manhole, if the vacuum has not dropped to 9" Hg within 60 seconds, the manhole will have passed the vacuum test. If the vacuum drops below 9” Hg in 60 seconds or less, the manhole will have failed the vacuum test.
   e. For a 60” I.D. manhole the test time is 75 seconds.
   f. For a 72” I.D. manhole the test time is 90 seconds.

3. Any infiltration discovered by physical inspection in any manhole during the one year warranty period shall be repaired by the Contractor at no additional cost to Owner.

3.3 TESTING FORCE MAINS AND RIVER CROSSINGS

A. General

1. The leakage test for force mains and river crossings shall be required for the entire length.

2. Before apply the specified test pressure, all air shall be expelled from the pipe and valves. If permanent vents are not located at all points, the Contractor shall install corporation cocks at such points so that the air can be expelled. After all air has been expelled, the corporation cocks shall be closed and the specified test
3. Pressure applied. At the conclusion of a successful pressure test, the corporation cocks shall be removed and plugged or left inplace at the discretion of the Engineer. The hydrostatic test shall be made by the Contractor at 150 psi pressure for a minimum of 2 hours or as directed otherwise by the Engineer. Leakage is defined as the quantity of water that must be supplied into the line section being tested in order to maintain the pressure within 5 psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. “Make Up” water shall be measured by a displacement meter or by the volumetric method.

3. Leakage shall not be measured by a drop in pressure in a test section over a period of time. Leakage in excess of the amount specified shall be caused for rejection of the pipe line, or any part thereof and will not be accepted until the leakage is brought within these limits. Any cracked or defective pipe, joints or fittings discovered in this test shall be removed and replaced by the Contractor at his own expense and with sound material furnished by the Contractor. Allowable leakage for a period of one hour shall be as shown in the following Allowable Leakage Table.

4. The Contractor shall perform and bear all costs of testing.

ALLOWABLE LEAKAGE TABLE
FOR FORCE MAINS AND RIVER CROSSINGS

LEAKAGE PER 1000 FT: GALLONS PER HOUR
HYDROSTATIC TEST PRESSURE 150 PSI

<table>
<thead>
<tr>
<th>Pipe Size (INCHES)</th>
<th>Allowable Leakage (GPH)</th>
<th>Pipe Size (INCHES)</th>
<th>Allowable Leakage (GPH)</th>
</tr>
</thead>
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<tr>
<td>3</td>
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</tr>
<tr>
<td>12</td>
<td>1.10</td>
<td>30</td>
<td>2.76</td>
</tr>
</tbody>
</table>

3.4 TESTING CONCRETE

A. General

1. The following field and related laboratory tests shall be made by the Contractor when required or upon the request of the Engineer and they shall be performed in strict accordance with the listed ASTM Specifications:
2. Slump shall be measured for each truckload of concrete and each time test cylinders are to be made and at any other time upon request of the Engineer. The slump shall be no more than 4 inches or less than 2 inches unless specifically excepted by the Engineer.

3. Air content shall be measured for each truckload of concrete and each time test cylinders are to be made and at any other time upon request of the Engineer.

4. Test cylinders shall be made in sets of four. One cylinder shall be field cured and broken at 7 days. Three cylinders shall be laboratory cured and broken at 28 days. Contractor shall be responsible for all handling and transportation to an approved testing laboratory. Contractor shall submit to the Engineer three copies of each testing laboratory report.

5. The average strength of Laboratory cured cylinders as well as the average of any 5 consecutive strength tests shall be equal to, or greater than, 3,000 lbs. per sq. in., and no strength test shall have a value less than 2,800 lbs. per sq. in. Where the quality of hardened concrete is questionable, the Engineer may require tests to be performed in accordance with A.S.T.M. C-42.

6. A set of test cylinders shall be taken for each 50 cubic yards of concrete placed or fraction thereof, or at any time as required by the Engineer.

7. The Contractor shall bear all costs of testing.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

Final Cleanup
Accessory Items
Responsibility of Contractor for Backfill Settlement
Guarantee, Bond & Affidavits
Operation and Maintenance Manuals
Record Drawings
Record of Testing
Final Inspection

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

A. Final Cleanup:

1. The Contractor shall remove from the Owner's property and from all public and private property, at his own expense, all temporary structures, rubbish, excess excavation and waste material resulting from his operations.

2. The Contractor shall clean all dirt from paved surfaces, not allowing same to pack on the roadway or to create a traffic nuisance. Insofar as practicable, he shall clean all dirt from gravel and aggregate surfaces or replace/add gravel as may be necessary to maintain original condition of the gravel surface.

3. All ditches shall be graded and properly sloped.

4. Shoulders where seeding or surfacing is not required shall be graded and shaped.

5. Should the Contractor not clean up to the satisfaction of the Owner and Engineer, the Owner reserves the right to have the work done at the Contractor's expense. The cost of the work may be deducted from money owed to the Contractor for work completed.

B. Accessory Items:

The Contractor furnishing and/or installing equipment on this project shall provide to the Owner, upon acceptance of the equipment, all special accessories required to place each item of equipment in full operation. These special accessory items
include adequate oil and grease as required for the first lubrication of the equipment and/or light bulbs, fuses, valve wrenches and other expendable items as required for initial start-up and operation of all equipment.

C. Responsibility of Contractor for Backfill Settlement:

The Contractor shall be responsible, financially and otherwise, for (a) all settlement of trench and other backfill which may occur from the time of original backfilling until the expiration of one year after the date of substantial completion for the entire contract under which the backfilling work was performed, (b) the refilling and repair of all backfill settlement and the repair or replacement to the original or a better condition of all pavement, top surfacing, driveways, walks, surface structures, utilities and drainage facilities which have been damaged as a result of backfill settlement or which have been removed or destroyed in connection with backfill replacement operations, and (c) all damage claims or court actions against the Owner for any damage directly or indirectly caused by backfill settlement. The Contractor will respond to repair work within 14 calendar days from notice of such repair. Notice may be given verbally or in writing.

D. Guarantee, Bond and Affidavits:

Contracts shall not be finalized until all guarantees, bonds and affidavits required for materials and equipment as hereinafter specified are satisfactorily filed with the Engineer and/or Owner.

E. Operation and Maintenance Manuals:

Contracts shall not be finalized until all operation and maintenance data as specified in Section 01300 "Submittals" are on file with the Engineer.

F. Record Drawings:

Contracts shall not be finalized until all record drawings as specified in Section 01300 "Submittals" are on file with the Engineer.

G. Record of Testing:

Contracts shall not be finalized until all testing records as specified in Section 01300 are on file with the Engineer.

H. Final Inspection:

1. Upon written notice from the Contractor that the project is completed, the Engineer will make a semifinal inspection with the Owner, any State or governmental agency having an interest in the project and the Contractor. Upon completion of this semifinal inspection, the Engineer will issue the Contractor a punch list of any work that is defective or incomplete. Engineer may issue a letter of substantial completion if he finds the contract to be substantially complete.
PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

Pipeline Construction

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 APPLICATION

A. Pipeline Construction:

1. All timber shall remain the property of the individual property owners.
   a) If the property owner wants the timber, then the contractor shall cut the timber to saw log or firewood lengths as desired by the owner and neatly stack it beside the right-of-way or easement.
   b) If the property owner does not want the cut timber, then the contractor can burn the timber if permissible by the West Virginia Department of Natural Resources and all other Federal, state, and local regulatory agencies which have jurisdiction.
   c) If burning is not permitted and the property owner does not want the cut timber, then the contractor must remove the timber from the site and dispose of it in a manner suitable to the engineer.

2. All brush shall be cut, chipped or burned, if permissible, in accordance with the regulations of the State of West Virginia. Chipped material will not be stock piled

3. All burning of brush and timber on site shall be confined to the right-of-way or easement. All debris left after burning shall be removed from the site by the contractor.

4. All stumps shall be grubbed and removed from the work area and disposed of in a suitable location offsite.

5. Topsoil shall be stripped and stockpiled for use in the reseeding work after completion of the pipeline.

END OF SECTION 02110
SECTION 02120 EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included:

Straw Bale Dike
Temporary Seeding
Final Seeding

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GENERAL

The contractor shall be responsible for implementing the Sediment Control Plan as outlined by the NPDES General Stormwater Permit indicated on the Drawings as required by the West Virginia Division of Environmental Protection (DEP) and directed by the Engineer. The contractor shall install, maintain and remove on a timely basis all required facilities.

The Contractor shall install sediment control devices before or concurrently with initial clearing and grubbing. Devices are not to be removed until site is stabilized. The Engineer will notify the Contractor when the sediment control can be removed.

3.02 SILT FENCE

A. Installation

1. Contractor shall dig a trench for fabric toe-in where the fence is to be installed (4 inches deep by 4 inches wide is adequate). If the alternate toe-in method is used, Contractor shall ensure a supply of soil is available.

2. Contractor shall set posts securely in the ground within a few inches of the trench and attach support material to posts. (The type and spacing of the materials should comply with project or regulatory specifications.) A fence constructed from light weight materials is adequate in areas where run-off is low in velocity and volume. High velocity or volume run-off areas will require a more substantial structure (i.e., metal posts, close pole spacing, and hog wire support).

3. Contractor shall attach fabric to fence structure allowing 6 inches to lay in the toe-in trench. Hog nose rings, nails and wire shall be used in attaching fabric to fence.

4. Contractor shall fill toe-in trench with soil and compact. If alternate method is used, lay 6 inches of fabric flat on the ground and cover with a minimum of 4 inches of soil and compact.
SEC\(TION\) 02120

EROSION AND SEDIMENT CONTROL

B. Location

1. Contractor should locate fence such that it will intercept all silt/water run-off from the site.

2. Sufficient extension of each fence section should be installed (preferably uphill) to ensure run-off will not go around the ends.

3. A series of silt fences may be required if there is a possibility that the volume of run-off could fill the retention area and flow over the fence.

C. Fabric Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Grab Tensile Strength</td>
<td>120 lb.</td>
</tr>
<tr>
<td>Trapezoid Tear Strength</td>
<td>65 lb.</td>
</tr>
<tr>
<td>Mullen Burst Strength</td>
<td>300 psi</td>
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<tr>
<td>Filtration Efficiency</td>
<td>75%</td>
</tr>
<tr>
<td>Slurry Flow Rate</td>
<td>0.3 g/ml/h</td>
</tr>
<tr>
<td>U.V. Stability (500 hrs.)</td>
<td>90%</td>
</tr>
</tbody>
</table>

D. Manufacturer

Silt fence fabric shall be TerraTex SC as manufactured by WEBTEC, Inc., Charlotte, North Carolina, or equal.

3.03 STRAW BALE DIKE (NOT ACCEPTABLE)

3.04 MATTING FOR EROSION CONTROL

A. The area to be covered shall be prepared as a fine seedbed, fertilized and seeded before the matting is applied. The erosion control mat shall be placed and anchored in accordance with the recommendations of the manufacture of the matting. The mat shall be adequately watered to firmly bond the mat to the soil and aid in the germination of the seed.

B. Contractor shall maintain the areas upon which the matting is placed work on the contract has been completed and accepted. Maintenance shall include the repair of areas damaged by erosion, wind, fire or other causes. Repair may include reestablishing the condition and grade of the soil, replacement of the matting, and refertilizing and reseeding.

C. Matting for erosion control shall be commercially designed and manufactured especially for the prevention of soil erosion. The matting used shall be recommended by the technical representative for the site conditions. The manufacture shall provide installation instructions and attest that the proposed matting is well suited to the particular site to be protected. The matting shall be stabilized or manufactured in such a way that the physical integrity of the product is maintained throughout the intended life expectancy. The matting shall not effect the germination of seed nor inhibit plant growth. Temporary matting shall gradually deteriorate with no adverse environmental effects.
SECTION 02120

EROSION AND SEDIMENT CONTROL

D. The matting shall consist of a machine produced mat of ultraviolet stabilized polymeric or other suitable fibers resistant to degradation and having a uniform weave distribution throughout. The mat shall conform to the following:

E. Matting shall conform to the requirements of ASTM D1777 and ASTM D4632.

3.05 TEMPORARY SEEDING

A. Any bare area where no construction activity is anticipated for a period of two weeks or longer is applicable.

B. Seed all topsoil piles, borrow areas cleared for construction, and all steep fill slopes where no further activity will occur until final grading.

C. Where seeding is not feasible, due to slope or time of year, protect site by spreading three tons of straw or hay mulch per acre.

D. Apply Annual Rye at a rate of 30 lbs. per acre from March 1 to October 15.

3.06 FINAL SEEDING

A. Lime shall be applied to the entire disturbed area at a rate of three tons per acre.

B. Kentucky Fescue #31 shall be applied at a rate of 50 lbs. per acre and fertilizer (20-20-20) shall be applied at a rate of 500 lbs. per acre on road banks and wooded areas. Lawns, hayfields and pastures shall be seeded with grasses equal to adjacent growth and as recommended by USDA Soil Conservation Service. Mulch area with hay or straw at a rate of one-two tons per acre to achieve 80% ground coverage.

3.07 STREAM BANK STABILIZATION

A. Project construction and operation of equipment in the streams of West Virginia is regulated by the Division of Environmental Protection. Permits to do this work may include a Public Land Corporation Permit and a NPDES General Stormwater Permit. Details relevant to erosion and sediment control measures including those applicable to stream crossings and parallel installation are included in the plans. All materials and methods the Contractor proposes to use in the stream shall be subject to approval by the Engineer and Division of Environmental Protection.

B. Equipment will not be allowed to travel the stream courses.

C. In accordance with DEP requirements, the contractor shall prevent turbid runoff from entering the stream. In addition to using silt fences and straw bale dikes detailed on the plans, the contractor may be required to build and maintain temporary sediment basins as required by the DEP and directed by the Engineer.

END OF SECTION 02120

E. L. ROBINSON ENGINEERING CO. 02120-3
SECTION 02150 - SHORING AND BRACING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section consists of furnishing all labor, equipment and material required to perform shoring and bracing in accordance with lines, elevations, cross-sections, and earth excavation and related work as described herein and/or shown on the Drawings.

B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS

A. Shop Drawings submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer’s review of this submittal prior to fabrication.

1.3 SUMMARY

1.4 QUALITY ASSURANCE

A. REGULATIONS

1. Comply with local codes and ordinances of governing authorities having jurisdiction.

2. All excavations shall be properly shored and braced and shall be designed and built to withstand all loads that may be caused by earth pressure or movement, hydrostatic pressure, and shall be rigid, maintaining its shape and position under all circumstances.

1.5 EXISTING UTILITIES

1. Protect existing active sewer, water, gas, electricity and other utility services and structures.
2. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

PART 2 - PRODUCTS

2.1 GENERAL

A. MATERIALS

1. Provide suitable shoring and bracing materials which will support all loads imposed. Materials need not be new, but must be in serviceable condition.

   a. If wood is part of shoring system near existing structures, use pressure preservative treated materials or remove before placement of backfill.

PART 3 - EXECUTION

3.1 SHORING

A. Wherever shoring is required, locate the system to clear permanent construction activities and to permit forming and finishing of concrete surfaces, if required. Provide shoring system adequately anchored and braced to resist all earth and hydrostatic pressures.

B. Shoring systems retaining earth on which the support or stability of existing structures is dependent, must be left in place at completion of work, and shall be constructed in an acceptable manner to the Engineer.

C. Where trench shoring is left in place, such shoring shall not be braced against the pipe, but shall be braced in a manner which will preclude the application of concentrated loads or horizontal thrusts on the pipe.

3.2 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Engineer.

C. Install internal bracing, as required, to prevent spreading or distortion to braced frames.

D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

E. Remove sheeting, shoring and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities and utilities.
PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of the Conditions of Contract and of Sections listed under General Requirements (Division 1) apply to work in this Section.

B. Work Included:

1. General Requirements
2. Site Preparation
3. Stripping Topsoil
4. Excavation
5. Blasting
6. Dewatering and Drainage
7. Stabilization
8. Stabilization Materials
9. Fill Materials
10. Filling
11. Fill Below Concrete Slabs and Structures
12. Standard Compaction and Field Density Tests
13. Rough Grading
14. Finish Grading
15. Deficiency of Backfill
16. Responsibility of Contractor for Backfill Settlement
17. Preservation of Trees, Shrubs, Flowers, etc.
18. Storm Drains
19. Drain Tile

C. Work of Other Sections:

1. Section 02930 Lawn Seeding
2. Section 02120 Erosion and Sediment Control
3. Section 02220 Structure Excavation and Backfill

PART 2 - PRODUCTS (Not Applicable)

A. Material: Contractor to submit to Engineer proposed backfill, bedding, sub-grade, base and fill material to be used for the project. Contractor to specify any borrow pits and proposed use of borrow material prior to placement.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. This part of the specifications covers the necessary clearing, grubbing, and preparation of site; removal and disposal of all debris; excavation as required; the handling, storage, transportation and disposal of all excavated materials; pumping and dewatering as necessary; preparation of sub-grades; backfilling; surfacing and grading; preservation of natural features; and other appurtenant earthwork required
for construction.

B. The Contractor shall protect, support and maintain all conduit, drains, sewers, pipes and wires that are to remain.

C. The Contractor shall satisfy himself as to the nature of the material to be excavated and amount of dewatering required. The Contractor shall include in his bid all costs in connection with excavation, dewatering and difficulties encountered and shall assume full risk in the matter.

3.02 SITE PREPARATION

Subgrades for fills and embankments shall be cleaned and stripped of all surface vegetation, sod and organic topsoil.

3.03 STRIPPING TOPSOIL

A. Before excavating is begun, the Contractor shall strip topsoil, if any, to its entire depth or a maximum of 12 inches. Stripped topsoil shall be stockpiled by the Contractor. Stockpiled topsoil shall be protected from intrusion of foreign matter.

B. Stripped topsoil shall be free from clay, stones, roots, excessive vegetation and debris and shall be used exclusively for finish grading by the Contractor.

3.04 EXCAVATION

A. No classification of excavated materials will be made. Excavation and trenching work shall include the removal and subsequent handling and disposal of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.

B. Excavation work shall be performed in a safe and proper manner, with suitable precautions being taken against hazards of every kind. Excavations shall provide adequate working space and clearances for the work to be performed therein.

C. Excavations shall be to elevations and dimensions indicated for footings, foundations, paving, drives, walks, indicated or necessary undercutting, and other work shown, plus sufficient space to permit erection and removal of forms, shoring, damp proofing and inspection of all structural work. Excavate at all building sites to new grades.

D. Excavations shall be to proper depths with minimum allowance of six (6) inches for compacted granular fill under concrete structures and floor slabs. Cut out soft or spongy spots. Excavate for other areas as shown or specified.

E. All trash, garbage, sludge, or other unsuitable material under structures is to be removed. Where this results in excess cut, this area is to be backfilled with suitable material compacted as subsequently specified, and the slab or foundation placed on this fill. There may be minor amounts of over-excavation required. These will be treated as field problems and recommendations made at that time.
of the Engineer, extra payment is justified for over-excavation, it will be approved. Pay limits for authorized over excavation shall be the foundation dimension plus two feet.

F. Work excavated through error to a greater extent than required by drawings or specifications, and which is within bearing area of walls and/or footings, shall be replaced at lower levels, at the Contractor's expense, with suitable material compacted as subsequently specified or with tamped granular fill.

G. Subgrade soils shall be firm and free from mud and muck. Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.

H. Excavation bottoms shall be protected from frost by installing straw in the bottom of the excavation to a depth of not less than 12 inches, or insulated by other approved means. Such insulating material, if used, will have to be removed prior to installing granular fill and/or concrete.

I. Deposit excavated materials approved for backfilling exterior walls where directed, on the site, except place no fill where trenches for sewer, water lines, or other services will be located until trench work is completed.

J. Excess excavated material, which is suitable for backfill, and excavated material not suitable for backfill shall be removed from the site promptly by the Contractor at his own expense.

3.05 BLASTING

Blasting will not be permitted.

3.06 DEWATERING AND DRAINAGE

A. The Contractor shall keep all excavations free from water at all times. Drainage systems and pumping equipment shall be provided, maintained and operated as necessary, and shall not be removed until directed. Ground water shall be controlled by properly pumped system of well points, wells, sumps or other suitable means as necessary to protect excavations from an inflow or upflow of ground water. Control ground water to sufficient depth below footing excavations and utilities so as to prevent any ground water head from acting against the soil on which foundations and utilities are placed. Soil under foundations which has been disturbed by pressure or flow of ground water shall be removed and foundations shall be lowered accordingly. Dewatering procedures will continue until the structures to be built are completed to the extent that no damage from hydrostatic pressure flotation or other causes will result.

B. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent properties.

C. No pipe or reinforcing steel shall be installed in water.
D. Dewatering, drainage and diversion of water from the excavation and work area shall not cause turbid runoff to enter the stream. In addition to using silt fences and straw bale dikes detailed on the plans, the contractor may be required to build and maintain temporary sediment basins required by the DEP and directed by the Engineer.

3.07 STABILIZATION

A. Granular fill for stabilization, pipe bedding and pipe embedment shall be clean river gravel, crushed stone, or creek gravel, free of cementitious, scaly, or flat and flaky particles in an amount which would cause the material to cake or pack. The material shall be bank run or crusher run with a top size between 1 in and 3 in. except if the material contains more than 5% finer than a #200 sieve, it shall be washed. Pipe Bedding Material size shall not exceed 1".

B. Bedding for Pipe backfill: Granular fill shall be placed on a suitably prepared subgrade in lifts not exceeding six inches and evenly on both sides of pipe. Fill shall not be dumped over side of trench in any manner that will bring earth into the granular fill area or displace the pipe. Compact, vibrate, or slice with shovel, in such manner that granular fill will take its final compaction and provide uniform and solid bearing under the pipe and its haunches. See Section 02222.

C. Subgrades for concrete structures shall be firm, dense and thoroughly compacted and consolidated, and shall be free from mud and muck.

D. Subgrades for concrete structures shall be reinforced with one or more layers of granular fill material or other crushed stone or gravel embedded thereon. Not more than ½-inch depth of mud or muck shall be allowed to remain on stabilized subgrade when the bedding material is placed thereon. The finished elevation of stabilized subgrades for concrete structures shall not be above the elevations shown on the plans.

E. If the subgrade for structures can be stabilized with a thickness of granular fill of six inches, such stabilization will be at Contractor's expense. Where additional stabilization is required and approved by the Engineer, due to unstable soil, payment shall be made at the unit price for granular fill as established in the contract.

F. All concrete structures and slabs shall be placed on granular fill that has been properly compacted. Depth or granular fill shall be as shown having a six-inch minimum.

3.08 EMBANKMENT

A. No frozen material, material subject to decomposition or cave-in, or cinders shall be used for backfill. Fill shall be as follows except as may be specified under Filling.

B. General Fill for filling all areas outside of the building lines or other structures, excluding backfilling, may be approved clean fill from site excavations, crushed stone or approved earth. All such fill shall be free from peat, wood, large stones or boulders, roots, cinders, trash or other similar objectionable material. Fill to bring
roadways and parking areas up to subgrade to be select fill as specified in item C below.

C. Select fill material for filling and backfilling all areas "inside" the building up to six inches beneath the underside of all concrete floor slabs, and for backfilling structures and outside of buildings, shall consist of approved clean fill from site excavations or a full uniform range of granular material (crusher run or bank run) free of loam, ash, wood or other foreign materials. Material for sub-beds six inches or less in thickness shall pass a one inch screen. For deeper fills the maximum size shall be three inches. Material containing aggregate four inches or larger shall not be used. Of that portion of the material passing No. 4 sieve, not more than 5% shall pass the No. 200 sieve.

D. Granular Drainage Fill for use as a base course under all concrete slabs on grade, interior floor slabs and exterior walks, steps, etc., shall be as shown, or six inches minimum thick bed of compacted granular free-draining fill material consisting of clean bank-run gravel, sand, or crushed stone of full range of sizes. Maximum size of aggregate to be one-inch of that portion, by weight, of fill passing the No. 4 mesh sieve, not more than 5% shall pass the No. 200 mesh sieve.

E. Approved gravel and sand subsoil or other suitable material from the excavations previously stockpiled may be used for any of the above fills.

F. Grades indicated on drawings are finished grades. Allow five inches for topsoil. Allow an additional one-inch for seeded lawns or in addition to the thickness of sod, if required. Allow for 12 inches of topsoil at ground cover beds. See drawings for other subgrades. Provide extra material for backfill if required.

G. The placing and compaction of fill under slabs after foundation walls are in place shall be coordinated with the backfilling against the other side of the walls. With basement structures, no exterior backfilling, other than for drain tile, shall be done until first floor is in place.

H. On exterior, backfill to within 12 inches of subgrade with General Fill, then to grade with clean earth, except for fill where concrete slabs or bituminous pavement about exterior wall, use Select Fill or sand to subgrade.

I. Remove debris from excavations before backfilling. Backfill as soon as this work can be safely accomplished and rough grade the area to divert storm water away from buildings or structures.

J. Protect damp proofing against which backfill is to be placed with single thickness of ½-inch fiberboard, 1/8-inch asphalt impregnated protection boards or other means approved by the Engineer. Board may be raised as backfill is placed.

K. Embankment shall be placed in 8-inch layers and compacted with tamping roller of at least 400 lbs., smooth wheel roller weight of 8 to 10 tons or equivalent vibratory roller. Areas inaccessible to rollers shall be placed in six-inch layers. Compact with jumping jack vibrator or approved alternative. All fill shall be compacted to a minimum of 98% maximum dry density. Notify Engineer during filling operations so
that density tests may be conducted.

L. Deposit fill on each side of piers, walls or free standing structures simultaneously to approximately same elevation. Make proper provisions to prevent wedging action against structure.

M. Excess backfill, if any, shall be removed from site.

N. Any material which pumps will not be acceptable regardless of the compaction test results.

3.09 FILL BELOW CONCRETE SLABS AND INFRASTRUCTURES

A. After completion of the subgrade preparation work and all required filling, compacting, and rough grading work to bring the subgrade to proper alignment and cross section at proper elevation, provide a layer of granular drainage fill, as shown or six inches thick, minimum, after compaction as a base course for all concrete paved areas outside building such as walks, approaches, etc. Compaction of material shall be to a minimum of 98% of maximum density.

B. Flush, tamp and level granular beds. Add water to obtain optimum moisture if necessary. Compact material as outlined in paragraph 3.08.K. above.

C. Compact bottom of all footing excavations with vibratory compactor with minimum of three passes over each area just prior to placing of reinforcing steel.

D. Under concrete structures bearing on other than flat subgrades (i.e., cone bottom of digesters) a ½-inch "skin coat" shall be applied to the top of the granular fill. This "skin coat" shall consist of a light sand-cement mixture. The purpose of the "skin coat" is to protect the sloped grade of the granular fill during placement of reinforcing.

3.10 STANDARD COMPACTION AND FIELD DENSITY TESTS

A. Wherever the terms "-----% of Maximum Density" or "Optimum Moisture", are used, Maximum Density and Optimum Moisture shall be determined by the Standard Compaction Test described below. Achievement of minimum density requirements shall not relieve the Contractor of his obligation under Paragraph 3.14.

B. Standard Compaction Test: The Standard Compaction Test shall be in accordance with ASTM-D698.

C. Field Density Test: Field density shall be obtained using the sand cone method (AASHO Design T 147), by the balloon method, by the nuclear density tester method, or by use of any satisfactory materials or equipment suitable to the conditions prevailing in the material being tested. The calculated density obtained in this test is divided by the Maximum Density as determined by the Standard Compaction Test to determine the percent compaction obtained. All test results will be submitted in writing to the Engineer.
D. Rock Correction: When the amount of material retained on the 3/4-inch sieve is different in the Field Density Test than that in the sample used in the Standard Compaction Test, the actual degree of compaction shall be determined by applying a correction factor that may be arrived at by any well established engineering procedure.

E. Testing Costs: Charges for the Standard Compaction and Field Density Tests will be paid by the Contractor. All testing will be conducted by an independent geotechnical firm approved by WVDOT Certification and approved by the Engineer.

3.11 ROUGH GRADING
A. Rough grading shall be accomplished over all areas within the grading limit lines and over all areas which are disturbed by any work for this project. Grades indicated on the drawings are finished grades. Rough grading shall consist of bringing grade to elevations as specified and thoroughly compacting by machine or by hand as necessary. Do grading to approved stakes.

B. Do not grade until sewers, water mains and other utilities are installed.

C. Later, if fill and/or backfill has settled, and when directed, fill shallow places to bring them up to grade. Include areas where trenches were backfilled by respective trades.

D. Rough grading of all areas within the project, including excavated and filled sections and adjacent transition areas shall be reasonably smooth, compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified.

E. Excess material, if any, shall be removed from site.

3.12 FINISH GRADING
A. Grade grounds within grading limits by cutting and fillings. Do not finish grade until sewers, water mains and other utilities are installed and earth has been properly compacted.

B. Where utilities have been installed and trenches backfilled, they shall also be graded to meet new established grades, even if they occur outside of grading limit lines.

C. Where drawings show that existing grades of lawns and planting areas are not to be changed, or if new grades are less than six inches above existing grades, then enough of material in place shall be removed to allow placing of six inches of new topsoil, unless existing topsoil to required depth is undisturbed and of equal or better quality than that specified. In latter case, existing topsoil may be left in place and only enough new topsoil shall be used so as to bring them up to grade.

D. Subgrade shall be scarified to depth of one-inch for bonding of subsoil with topsoil and then areas shall be brought up to finished grade by filling with five inches of
topsoil. Final one-inch will be provided under Section 02930 Lawn Seeding.

E. Topsoil removed and stockpiled, before excavating began, may be used provided it is free from stones, tree roots, branches, clay balls, hard lumps, gravel, cinders and other undesirable material. If additional topsoil is required, or if new topsoil is being used, it shall consist of fertile soil for growth of grass and plants. No topsoil is to be delivered or worked in frozen or muddy conditions.

G. Topsoil shall be graded, raked, rolled with roller weighing not more than 100 lbs. per lineal foot and not less than 25 lbs. per lineal foot and left in condition ready for work under Section 02930 Lawn Seeding.

H. Test grade for correct elevation. ½-inch variation from correct elevation is the maximum allowable.

3.13 RESPONSIBILITY OF CONTRACTOR FOR BACKFILL SETTLEMENT

A. The Contractor shall be responsible financially, and otherwise, for (a) all settlement of trench and other backfill which may occur from the time of original backfilling until the expiration of one year after the date of substantial completion for the entire contract, (b) the refilling and repair of all backfill settlement and the repair or replacement to the original or a better condition of all pavement, top surfacing, driveways, walks, surface structures, utilities, drainage facilities and sod which have been damaged as a result of backfill settlement or which have been removed or destroyed in connection with backfill replacement operation, and all damage claims or court actions against the Owner for any damage directly or indirectly caused by backfill settlement. Achievement of minimum density requirements shall not relieve the Contractor of this responsibility.

B. The Contractor shall make all necessary backfill replacements and repairs, or replacements appurtenant thereto, within 15 calendar days after notification by the Owner or Engineer. Upon the Contractor's failure to do so, the Owner may do, or make arrangements to have done, the necessary work and charge the cost to the Contractor.

END OF SECTION 02200
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:
   1. Excavation
   2. Bedding
   3. Backfill
   4. Compaction

B. Related Work Specified Elsewhere
   1. Method of Measurement and Payment Section 01025
   2. Trench Excavation and Backfill Section 02222
   3. Special Fill Material Section 02227

1.03 QUALITY ASSURANCE

A. Settlement of a structure shall not exceed 1/2 of 1% of total depth of the structure.

B. Backfill settlement shall not exceed the limits defined in Section 02222.

1.04 GUARANTEE

A. Contractor shall be responsible for settlement and all damage which may occur due to said settlement for a period of one year after the Final acceptance of the project.

B. Should settlement occur, the Contractor shall make or cause to be made, all necessary corrections, replacements or repairs within fourteen days after verbal or written notice.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Bedding - Refer to Section 02222
B. Backfill - Refer to Section 02222

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Excavation
   1. Excavation for structures shall be made to the depths shown on Construction Drawings or as staked by the Engineer.
   2. Excavation shall be held to the minimum required for satisfactory installation of the structure, and in no case shall exceed the overall dimensions plus two
feet.

3. Contractor shall remove water accumulating in the excavation by pumping or other means approved by the Engineer. Excavation shall be maintained in a relatively dry state while work is in progress.

4. If the material soil foundation at the structure base elevation is not suitable due to the presence of trash, debris or excessive moisture, the excavation shall continue until a firm natural soil foundation is achieved. The void shall then be backfilled with Special Fill Material, and compacted so that settlement shall be less than 1/2 of 1% of the depth of the additional excavation.

5. If the structure base is lowered due to a change in design in the field, the excavation shall be made to the new depth.

6. No blasting will be permitted.

7. Unauthorized over-excavation shall be replaced with Special Fill Material. No payment will be made for unauthorized over-excavation or for the Special Fill Material to correct the over-excavation.

8. All excavation shall be considered unclassified.

B. Backfill

1. Backfill shall be placed in six-inch to 12-inch layers thoroughly tamped by mechanical tampers or approved hand tampers. Compaction shall be equal to or greater than adjacent undisturbed soil.

2. Where water lines run adjacent to or from structure foundations, backfill shall be governed by Section 02222.

3. Backfill and cleanup shall be carried on expeditiously with structure and pipe installation. Negligence on the part of the Contractor to perform satisfactory cleanup shall be grounds for the Engineer to halt excavation until backfill and cleanup work is accomplished.

4. Excess material not needed for backfill and material unsuitable for backfill shall be removed from the site and disposed of as directed by the Engineers. Additional backfill material, as required to make up deficiencies or to replace unsuitable excavated material, shall be furnished by the Contractor from approved borrow pits. All material used from borrow pits must be approved by Engineer prior to placement of any such material.

END OF SECTION 02220
SECTION 02221 - TRENCH EXCAVATION AND BACKFILL FOR SEWER LINES

PART 1 - GENERAL

1.1 DESCRIPTION
A. The work covered by this Section consists of furnishing all labor, equipment and material required to perform trench excavation and backfill in accordance with lines, elevations, cross-sections, and related work as described herein and/or shown on the Drawings.
B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS
A. Shop Drawing submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer's review of this submittal prior to fabrication.

1.3 QUALITY ASSURANCE
A. CONTRACTOR'S RESPONSIBILITIES
1. The Contractor shall be responsible, financially and otherwise, for
   a. All settlement of trench and other backfill which may occur from the time of original backfilling until the expiration of one year after the date of final payment for the entire contract under which the backfilling work was performed.
   b. The refilling and repair of all backfill settlement and the repair or replacement to the original or a better condition of all pavement, top surfacings, driveways, walks, surface structures, utilities and drainage facilities which have been damaged as a result of backfill replacement operations.
   c. All damage claims or court actions against the Owner for any damage directly or indirectly caused by backfill settlement.
2. Should settlement occur, the Contractor shall make or cause to be made, all necessary corrections, replacements or repairs within thirty days after verbal or written notice.

PART 2 - PRODUCTS

2.1 MATERIALS
A. BEDDING
1. Bedding may be any of the following natural or man-made materials:
a. Gravel: ¾ inch crusher run, natural stone, or creek gravel or other Engineer approved material; free of shale, clay, friable materials and debris.

b. Pea Gravel: Natural stone, free of clay, shale, organic matter; ¾ inch minimum to 5/8 inch maximum size; graded in accordance with ANSI/ASTM C136.

c. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ANSI/ASTM C136.

2. Bedding shall have 95% passing a ¾” sieve, with no particles larger than 1 – ½” for rigid pipe, and 100% passing ¾” sieve for flexible pipe, and shall be well graded to prevent soil migration.

3. Bedding shall not contain debris, roots, sticks, timber, wood, trash or organic materials.

4. Bedding shall be placed on the pipe in such a way as to avoid damage to the pipe. Stone bedding material shall be placed into the trench from a height of no more than one (1) foot above existing grade.

B. HAUNCHING AND INITIAL BACKFILL

1. Rigid Pipe

   a. Any of the above listed bedding materials.
   b. Natural sandy-clay selected from excavation.
   c. Natural gravelly-clay selected from excavation.
   d. All material shall be less than 1-1/2” in size.

2. Flexible Pipe

   a. Any of the above listed bedding materials.
   b. Natural sandy-clay selected from excavation.
   c. Natural gravelly-clay selected from excavation.
   d. All material shall be less than ¾” in size.

3. Final Backfill: Suitable material removed from the excavation, containing no particles larger than 6” and free from all debris, sticks, timber, wood, trash or organic materials. Material shall not be excessively wet.

4. Concrete:


PART 3 - EXECUTION

3.1 TRENCH
A. GENERAL CONSTRUCTION

1. Excavation shall be made to the lines and grades shown on Construction Drawings.

2. Maintain minimum of 36 inches cover over all gravity sewer lines.

3. Maintain minimum of 36 inches cover over all force mains.

4. Open trench shall be sufficient in advance of pipe laying to expose any obstructions that might alter the alignment or grade but not more than that which can be backfilled at the end of a work day, or 200 feet, whichever is less.

5. Open trench shall not exceed 50 feet in length in a traveled street, roadway or driveway.

6. When working in the stabilized berm along the edge of pavement of a street, or directly through the pavement of a street, where traffic is to be maintained, material excavated from the trench, special fill material, embedment material, stabilizing material, stone, rock, gravel, sand and all other like materials shall not be stockpiled at the excavated area or in the streets. Contractor to secure a place near job site where these materials can be stockpiled. Excavation or backfilling of trench will not be permitted during inclement weather, or when existing moisture on the street could combine with any of the above materials and create mud and/or a traffic hazard. The Contractor shall exercise care and see that spills of these materials are quickly removed from the street and sidewalk.

7. Permits for working in State Department of Highway right-of-ways shall be obtained by the Owner, but the Contractor shall be responsible for conforming to all Department regulations. The Owner shall pay the necessary inspection fees in connection with the work of an inspector from the State Department of Highways. Backfill compaction testing required by the Department of Highways shall also be paid for by the Contractor.

8. Temporary bridges or crossings shall be built by the Contractor where required to maintain traffic or ingress and egress to adjoining property. Fences shall be restored to original condition at no extra cost. The Contractor shall conform to emergency vehicle requirements by maintaining traffic throughways for Ambulance, Fire and Police Departments. The Contractor shall provide access to adjacent property for the duration of the project.

9. All excavation shall be considered unclassified. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated and otherwise removed in performance of the Work, regardless of type, character, composition or conditions thereof.

10. Width:
a. Shall be minimum to provide adequate working space and pipe clearance for proper installation, jointing, and embedment. The minimum permissible clear distance between the installed pipe and either trench wall shall be 6 inches.

b. The maximum permissible trench width below an elevation of one foot above the top of the pipe shall be limited to nominal diameter of pipe plus 12 inches on each side of trench wall for depths to 14 feet, and nominal diameter of pipe plus 18 inches on each side of trench wall for depths over 14 feet.

c. Excessive trench widths will not be permitted. Where, for any reason, the width of the trench from bottom of excavation to a point one foot above the top of the pipe exceeds the maximum permitted, either pipe of adequate strength, special pipe embedment, or Class A concrete arch encasement, as required by loading conditions and as determined by the Engineer, shall be furnished and installed by the Contractor at no additional cost to the Owner.

11. Walls:

a. It is intended that trench walls shall be substantially vertical; however, the Engineer may grant permission for sloping trench walls. Prior written authorization must be secured by the Contractor before sloping any trench excavation and must be done without additional cost to the Owner or damage to adjacent property. Do not undercut trench walls.

12. Bottom:

a. Shall be excavated below pipe invert to provide for bedding material.

b. When rock is encountered, it shall be removed and replaced at the Contractor's expense with bedding material for a thickness of 6 inches under the pipe, or one-fourth the outside diameter of the pipe, whichever is greater.

c. Excavate bell or coupling holes at each joint to provide full length support of the pipe and to prevent joint loading at the bell or coupling.

d. Contractor shall remove water accumulating in the excavation by pumping or other means approved by the Engineer. Excavation shall be maintained in a relatively dry state while work is in progress.

e. When a firm foundation is not found at grade due to the presence of foreign material, trash, or in the opinion of the Engineer there is excessive moisture, the unsatisfactory material shall be removed for the width of the pipe plus 18 inches and replaced with suitable earth and compacted. The additional depth of excavation, measured in excess of one foot below the specified elevations, will be considered under Special Fill Material.

f. If excavation is carried below the depth shown on Construction Drawings for any other reason, the Contractor shall replace the overexcavation and compact at his expense to the required grade. Overexcavation of more than 6 inches below the bottom of required grade, but less than 12 inches below the bottom of required grade, the
Contractor shall replace and compact with acceptable embedment material. Over-excavation more than 12 inches below required grade, the Contractor shall replace and compact with Special Fill Material at no cost to the Owner.

13. Blasting

a. Blasting of rock shall be allowed on Owner's approval only.
b. Before approval is given, the Contractor shall furnish Certificate of Insurance showing that Public Liability and Property Damage insurance coverage is provided.
c. When allowed, blasting shall be done by licensed blasters, conforming to Federal, State and Local rules and regulations governing the transportation, storage and use of explosives.
d. Excessive blasting or over-shooting will not be permitted. Necessary precautions shall be taken to protect life and property from injury and damage.

4.2 PIPE EMBEDMENT

A. MATERIALS

1. Embedment materials both below and above the bottom of the pipe, the classes of embedment to be used, and the placement and compaction of embedment materials, shall conform to the requirements shown on the Drawings, and to the following requirements.

B. EMBEDMENT CLASSES

1. Class C Bedding: Unless otherwise indicated, Class C Bedding, in accordance with the detail shown on the Drawings, shall be used for all concrete pipe sewers, and ductile iron sewers, except when the actual trench width exceeds the maximum permitted. Where the maximum trench width is thus exceeded, the Contractor shall use Class B bedding, Class A bedding, or a higher strength of pipe as needed to meet the specified requirements.

2. Class B Bedding: Class B bedding, in accordance with the details shown on the Drawings, shall be used for all clay pipe sewers, and PVC sewers, except where the actual trench width is thus exceeded, the Contractor shall use Class A bedding, or a higher strength of pipe as needed to meet the specified requirements.

3. Class A Bedding – Concrete Cradle: Shall be used where specifically required by the Drawings or where actual trench width exceeds the maximum given for Class B or C bedding.

4. Class A Bedding – Concrete Arch: Shall be used where specifically required by the Drawings or where actual trench width exceeds the maximum given for Class B or Class C bedding.
5. Class A Bedding – Concrete Encasements: Shall be used wherever required by the Drawings, or where actual trench width exceeds the maximum given for Class B or Class C bedding.

C. BEDDING

1. Bedding shall be deposited and thoroughly tamped, prepared so that the pipe will be true to line and grade, and that uniform and continuous support will be provided. Bell holes shall be hand excavated.

2. After each joint of pipe has been brought to grade, aligned and placed in final position, deposit and densify sufficient bedding material under the pipe haunches and on each side of the pipe to hold the pipe in proper position during subsequent pipe jointing, bedding and backfilling operations. Deposit bedding material uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

3. Place pipe that is to be bedded in a concrete cradle or encased in concrete in proper position on temporary supports consisting of preshaped wood blocks or bricks with wood wedges. When necessary, rigidly anchor or weight the pipe to prevent flotation when the concrete is placed.

4. Place concrete for cradles, arches, or encasement uniformly on each side of the pipe and deposit at approximately its final position. Do not move concrete more than 5 ft. from its point of deposit. Concrete placed beneath the pipe shall be sufficiently workable so that the entire space beneath the pipe can be filled without excessive vibration.

D. HAUNCHING AND BACKFILL

1. Place haunching and initial backfill material on both sides and to a point one foot over the top of the pipe. Material shall be placed uniformly and simultaneously on both sides of the pipe in layers not to exceed 6 inches in depth and thoroughly tamped by mechanical tampers or approved hand tampers.

2. Final material shall be placed in layers approximately 12” in depth and shall be compacted as required by these Specifications.

3. Excess material not needed for backfill and material unsuitable for backfill shall be removed from the site and disposed of at the Contractor’s expense. Additional backfill material, as required to make up deficiencies or to replace unsuitable excavated material, shall be furnished by the Contractor.

4. Backfill and cleanup shall be carried on expeditiously with the sewer construction. Negligence on the part of the Contractor to perform satisfactory cleanup shall be grounds for the Engineer to halt further excavation until backfill and cleanup work is accomplished, and/or to withhold payment for work already completed.

4.3 COMPACTION
A. EACH LAYER

1. Compact each layer to required percentage of maximum dry density or relative dry density, in accordance with ASTM D 698: Standard Proctor Density.

B. EMBEDMENT MATERIALS (Bedding, Haunching, and Initial Backfill)

1. Each layer of embedment material shall be compacted to 95 percent of maximum density.

2. Initial testing and one other randomly selected test as directed by the Engineer for each 1,000 feet of pipe laid will be performed at the Contractor's expense to determine if compaction techniques being utilized are adequate and any additional testing will only be required as directed by the Engineer. If additional testing reveals inadequate compaction, the Contractor will bear the expense of the tests and any necessary corrective work. If additional testing reveals the compaction requirements of the Contract Documents have been satisfied, the Owner will bear the expense of the testing.

4.4 FINAL BACKFILL MATERIAL

A. GENERAL

1. All trench backfill above pipe embedment shall conform to one of the following specifications:

a. West Virginia Department of Highways Right-of-Ways – The work in, on, or along right-of-ways belonging to the West Virginia Department of Highways shall be governed by the rules and regulation of West Virginia Department of Highways relating to the laying of pipe or construction of other structures on their right-of-way. The Contractor shall be responsible for complying with said regulation and shall be fully responsible to the West Virginia Department of Highways for any work performed upon these right-of-ways. The Contractor shall bear all costs of any testing required by the Department of Highways. The cost of all such work shall be included in the unit price bid for each linear foot of pipe installed.

b. Street and Road Right-of-Ways – All backfill for pipe trenches between the ditch lines in street and road right-of-ways shall be made with an approved granular material and shall be compacted to 95 percent maximum density. If the Contractor elects to use excavated material for backfill he shall mechanically tamp the backfill in layers not exceeding the depth that can be properly compacted by the equipment in use. The Contractor shall demonstrate the compaction technique and provide compaction tests at his expense to determine the depth of layers to be placed.

c. Lawns and Unimproved Areas – All backfill for pipe trenches in lawns and unimproved areas may be placed by any method or combination of methods which will not impose excessive concentrated or unbalanced loads, shock, impact on or displacement of the installed pipe. Backfilling
shall be completed in a manner to prevent trench settlement. In fields and unimproved areas, the trench shall be compacted to 85 percent of maximum density, or equal to density of adjacent undisturbed material, whichever is greater, and may be mounded. The mounded area shall not impound water or otherwise damage the property through which the pipeline is constructed. The Contractor shall maintain and cleanup all work through private property and he shall be responsible for any damage. The trenches shall be maintained for a period of one year after acceptance of the entire contract.

END OF SECTION
SECTION 02222 TRENCH EXCAVATION AND BACKFILL FOR WATER LINES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:
   1. Excavation
   2. Bedding
   3. Backfill
   4. Compaction

B. Related Work Specified Elsewhere:
   1. Measurement and Payment Section 01025
   2. Traffic Regulation and Control Section 01570
   3. Erosion and Sediment Control Section 02120
   4. Structure Excavation and Backfill Section 02220
   5. Special Fill Material Section 02227
   6. Lawn Seeding Section 02930

1.02 QUALITY ASSURANCE

A. Contractor shall be responsible for settlement of backfill, and all damage which may occur due to said settlement for a period of one year after the final acceptance of the project.

B. Should backfill settlement occur, the contractor shall make, or cause to be made, all necessary backfill replacement or repairs within fourteen calendar days after verbal or written notice by the Engineer.

PART 2 - PRODUCTS

A. Select Aggregate Material

Select aggregate material to be used under these specifications and contract drawings shall be crushed stone or gravel meeting the gradation requirement of AASHTO No. 57 Coarse Aggregate. Crushed stone shall consist of particles of clean, hard, tough, durable rock, free from adherent coatings. No slag (whether crushed or uncrushed) shall be used as select aggregate material, nor shall any slag be considered as a substitute for acceptable stone or gravel.

C. Random Backfill Material

Suitable material removed from the excavation, containing no particles larger than 3 inches and free from all debris, sticks, timber, wood, trash or organic materials.

D. Concrete

1. 2500 PSI minimum - ASTM C94
PART 3 - EXECUTION

3.01 TRENCH

A. General Construction

1. Excavation shall be made to the lines and grades shown on Construction Drawings.

2. Open trench shall be sufficient in advance of pipe laying to expose any obstructions that might alter the alignment or grade but not more than that which can be backfilled at the end of a work day, or 200 feet, whichever is less.

3. All excavation shall be considered unclassified.

B. Width

1. Trench width shall be a minimum to permit the satisfactory installation of pipe and fittings. Excessive trench widths will not be permitted.

2. Trench width shall be limited to nominal diameter of pipe plus 12 inches on each side for depths to 14 feet and nominal diameter of pipe plus 18 inches on each side for depths over 14 feet. These widths may be carried down to one foot above the top of pipe.

3. Width of trench at top of pipe shall be the minimum required for installation and shall not exceed the nominal pipe diameter plus 18 inches.

C. Walls

It is intended that trench walls shall be substantially vertical, however, the Engineer may grant permission for sloping trench walls. Prior written authorization must be secured by the Contractor before sloping any trench excavation and, must be done without additional cost to the Owner or damage to adjacent structures. Undercut trench walls will not be allowed. Appropriate safety precautions are required on any trench depth in excess of five (5) feet.

D. Bottom

1. Shall be excavated below pipe invert to provide for bedding material in accordance with detail drawings.

3. Excavate bell or coupling holes at each joint to provide full length support of the pipe and to prevent joint loading at the bell or coupling.

4. Contractor shall remove water accumulating in the excavation by pumping or other means approved by the Engineer. Excavation shall be maintained in a relatively dry state while work is in progress in accordance with WVDEP "In
5. When a firm foundation is not found at grade due to the presence of foreign material, trash, or in the opinion of the Engineer there is excessive moisture, the unsatisfactory material shall be removed for the width of the pipe plus 24" and replaced with suitable earth selected from adjacent excavation and compacted or borrow material approved by the Engineer. The additional depth of excavation, measured in excess of 1 foot below the specified elevations, will be considered under Special Fill Material. Dewatering operations shall be in compliance with the Division of Environmental Protection for Stream Regulations and Permits.

6. When a suitable foundation is found at the depth shown on the construction drawings and if excavation is carried below the depth shown on Construction Drawings for any reason, the Contractor shall replace over-excavation and compact at his expense to the required grade. Over-excavation will be replaced with material specified in Section 2227 Special Fill Material.

3.02 BEDDING

A. Bedding shall be done as shown on the detail drawings. When rock or other unsuitable material is encountered, the trench shall be excavated six inches below pipe and replaced with select aggregate material.

3.03 BACKFILL

A. **Backfilling in developed areas, streets or roadways** - Random backfill material shall be deposited in the trench. This backfill material shall be tamped in six-inch layers and shall be sufficiently damp to permit thorough compaction under and on each side of the pipe to provide support free from voids to cover of 12-inch over the barrel of the pipe. After the pipe barrel has a 12-inch cover fully compacted, the backfill shall be placed in layers not exceeding eight inches until the entire trench is backfilled. No layer shall be placed until the prior layer is thoroughly and fully compacted. This procedure is required in any area which is to be paved.

B. **Backfilling in undeveloped areas** - After the pipe barrel has a 12-inch cover fully compacted, the remainder of the trench shall be filled with approved random backfill material in layers not exceeding 15 inch until the entire trench is backfilled. No layer shall be placed until the prior layer is fully compacted.

C. Where any governmental regulations require backfill to be mechanically compacted in specific layers, those regulations will be followed.

G. Backfill and cleanup shall be carried on expeditiously with construction. Cleanup shall be done on a daily basis. When the work is being done within city limits, local city ordinances for construction shall be in effect. Negligence on the part of the Contractor to perform satisfactory cleanup shall be grounds for the Engineer to halt further excavation until backfill and cleanup work is accomplished, and/or to withhold payment for work already completed.
PART 1 - GENERAL

1.01 DESCRIPTION

Related Work Specified Elsewhere:

Method of Measurement and Payment  Section 01025
Trench Excavation and Backfill  Section 02222

PART 2 - PRODUCTS

2.01 MATERIALS

AASHTO M 43, Size No. 57 Crushed Limestone
AASHTO M 43, Size No. 8 Crushed Limestone
Bank run gravel
Rock screenings
Plasticity Index shall be 6% or less

PART 3 - EXECUTION

3.01 INSTALLATION

A. All unsuitable material shall be excavated to the depth directed by the Engineer and for a width of the pipe plus 24 inches for pipelines and for the entire width of the excavation for structures.

B. The area excavated shall be backfilled in layers not exceeding six inches (15 cm) and compacted, and then shaped to conform to the lower quadrant of the pipe line to be laid, or in the case of structures, to provide a uniform bearing to the entire base of the structure.

C. The size and gradation of the materials shall be designated by the Engineer according to field conditions.

END OF SECTION 02227
PART 1 - GENERAL

1.01 DESCRIPTION-Steel Casing Pipes for Highway, Railroad and Creek Crossings.

A. Work Included:
   1. Boring and Jacking Method
   2. Open Trenching Method

B. Related Work Included Elsewhere:
   1. Method of Measurement and Payment
   2. Traffic Regulation and Control
   3. Trench Excavation and Backfill for Waterlines

1.02 QUALITY ASSURANCE

A. Casing pipe shall be watertight.

B. Leakage in carrier pipe shall be as specified elsewhere.

C. All steel casing, installed within railroad right-of-way, shall be installed in accordance with American Railroad Engineering and Maintenance-of-Way Association (AREMA) and CSX Transportation Design & Construction standard specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Casing Pipe - Welded Steel Pipe, ASTM A-53, Grade B with welded joints - Minimum Yield Strength - 35,000 psi - Diameter as shown on the plans. Minimum wall thickness is as indicated below:

   **Highway Crossings**

<table>
<thead>
<tr>
<th>Casing Outside Diameter Inches</th>
<th>Casing Wall Thickness Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.25</td>
</tr>
<tr>
<td>8</td>
<td>0.25</td>
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<tr>
<td>10</td>
<td>0.25</td>
</tr>
<tr>
<td>12</td>
<td>0.25</td>
</tr>
<tr>
<td>14</td>
<td>0.25</td>
</tr>
<tr>
<td>16</td>
<td>0.25</td>
</tr>
<tr>
<td>18</td>
<td>0.25</td>
</tr>
</tbody>
</table>
**Railroad Crossings**

<table>
<thead>
<tr>
<th>Casing Outside Diameter Inches</th>
<th>Casing Wall Thickness Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>0.188</td>
</tr>
<tr>
<td>12 &amp; 14</td>
<td>0.250</td>
</tr>
<tr>
<td>16</td>
<td>0.281</td>
</tr>
<tr>
<td>18</td>
<td>0.312</td>
</tr>
<tr>
<td>20 &amp; 22</td>
<td>0.344</td>
</tr>
<tr>
<td>24</td>
<td>0.375</td>
</tr>
<tr>
<td>26</td>
<td>0.406</td>
</tr>
<tr>
<td>28</td>
<td>0.438</td>
</tr>
<tr>
<td>30</td>
<td>0.469</td>
</tr>
</tbody>
</table>

The exterior of the pipe shall have a minimum 1 mil thick bituminous coating.

B. Casing Pipe End Seals – Shall be as shown on details of contract drawings. Seals shall be one piece rubber boot complete with stainless steel securing bands. These boots shall be as shown on the contract detail drawings. These boots shall be constricted and intended for the specific use of sealing underground casing pipe. The end seal shall be of a design to allow movement of the carrier pipe without detrimentally affecting the seal or its ability to prevent entrance of foreign material and water.

C. Pipe Spacer - Pipe spacer to be used inside the casing pipe shall be pre-molded high density polyethylene or polyester fiberglass and be of a type to facilitate easy installation of the carrier pipe. Runners shall be of a size to center the longitudinal axis of the carrier pipe within the casing insulators. Number, spacing and fastening methods shall be approved by the Owner.

D. Carrier Pipe - As shown on the plans and specified elsewhere.

**PART 3 - EXECUTION**

3.01 INSTALLATION:

**Boring and Jacking Method:**

A. When called for in the construction drawings or specifications or as directed by the Owner, the pipe shall be installed by auguring, boring, jacking, tunneling or a combination of these methods. Such methods and shall conform to the attached detail drawings, construction drawings and specifications contained herein.

B. The objective is to ensure no upheaval, settlement, cracking, movement or distortion of the existing or proposed ground surface, railroad tracks, roadway pavement, surface and underground utilities or structures of any type. The installer shall adapt all means in addition to those specified to meet this objective. The installer shall provide marking signs in accordance with railroad requirements.
C. Pipe installation under railroad facilities shall conform to the detail drawings, construction drawings and specifications contained herein and also to the current AREMA specifications 1-5 governing the work and materials used therein.

D. Pipe installations under highway or road facilities shall conform to the detail drawings, construction drawings and specifications contained herein and also to the current highway specification governing the work and materials used therein.

E. Boring will not be permitted for pipes larger than 27 inches in diameter. When boulders or other obstacles are encountered or when shown on the construction drawings or directed by the Owner, steel, reinforced concrete or corrugated metal casing pipe shall be jacked in-place and the water pipe placed inside the casing as shown on the detail sheets.

F. Jacking operations shall in no case be interrupted, but shall continue until the operation is completed. The direction of jacking shall be carefully aligned prior to the operation by erecting guide rails, or similar method, in the bottom of the jacking pit or shaft. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil behind the backstops.

G. Jacking or boring pits or shafts shall be adequately shored, braced, dewatered and barricaded. Backfilling of pits and shafts shall conform to the requirements of Section 02222 and backfilling contained elsewhere in these specifications. Boring pits shall be no closer than 12 feet (nearest edge to centerline) of railroad tracks.

H. Pipe being jacked shall be adequately cushioned to prevent crushing under jacking pressures. Any pipe damaged during jacking operations shall be withdrawn and replaced.

I. The casing pipe shall be installed reasonably close to the line and grade shown on the construction drawings. Maximum misalignment tolerance in any direction shall be no more than 2 inches for each 20 feet of casing pipe installed. Should misalignment of the casing pipe exceed the specifying tolerance, the installer shall abandon the bore, fill the casing pipe with 1/3 cement/sand grout and backfill the boring and receiving pit. The bore will be relocated to a new location as approved by the Owner.

J. The carrier pipe shall be supported and restrained from excessive movement within the casing pipe as shown on the attached details. The effective outside diameter of the carrier pipe supports used shall be sufficiently greater (0.5 inches or more) than the outside diameter of the carrier pipe bell or coupling to ensure that no part of the pipe touches the casing.

K. The bedding at each end of the casing pipe shall be thoroughly compacted to ensure adequate and support of the carrier pipe. The ends of the casing shall be adequately sealed to prevent the flowing of ground water through the casing. The seal should not prevent the future removal of the seal and carrier pipe without damage to either the carrier pipe or casing.
Open Trench Method:

A. Preparation of Trench and Bedding shall be as specified in Trench Excavation and Backfill for rigid pipe materials. Bedding shall be Class B unless otherwise shown on the drawings.

B. Casing of the pipe shall be laid using a laser beam placed inside the pipe. When the installation is complete, the carrier pipe is to be installed at the line and grade as shown on the drawings.

C. Joints in the casing pipe shall be welded and watertight.

D. Casing ends shall be sealed using a Model "W" wrap around seal as manufactured by Pipeline Seal and Insulator, Inc. of Houston, Texas, or equal. Lowest end of casing shall be fitted with a one-inch PVC drain line through the plug.

E. Backfill shall be as specified in Trench Excavation and Backfill for state highway crossings.

F. If any section of casing pipe is out of alignment or grade through improper laying or subsequent movement caused by the backfill operation, the Contractor, at his own expense, shall remove the section and place it in true alignment.
SECTION 2230 - STREAM CROSSING

PART 1 - GENERAL

1.1 SCOPE

The CONTRACTOR shall furnish all labor, materials, and equipment necessary to install the stream crossings as shown on the plans and described herein.

It is the intent of this Section to install the stream crossings in such a manner as to protect the mains from erosion and to restore, as much as practicable, the stream banks and bottom to their original condition.

1.2 PROFILES AND TOPOGRAPHY

Contours, topography and profiles of the ground shown on the Drawings are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation.

The CONTRACTOR shall accept the site with conditions the same as existed at the time of bidding.

1.3 RELATED WORK

Excavation, backfilling and compaction procedures shall conform to Section 2221.

PART 2 - PRODUCTS

2.1 MATERIALS

Excavation, fill and rip-rap materials shall be as specified in Related Work Sections and as shown on detail drawings.

PART 3 - EXECUTION

3.1 STREAM BANK RESTORATION

The stream banks will be restored by backfilling the main trench with mechanically compacted backfill of earth approved by the ENGINEER and placing a 2-foot layer of 12-inch diameter riprap approved by the ENGINEER to the original ground surface. The limits of compaction shall extend from the top of bank to top of bank on each side of the crossing as determined by the ENGINEER and as shown on the drawings.

Immediately following the completion of a stream crossing, silt-fence shall be placed along the stream bank on each side within two (2) feet of the edge of water and of sufficient length to extend beyond the limits of the excavated trench width. Silt-fence
shall remain in place until after the stream banks have been fine graded, fertilized and seeded, and until such time as the seeding has sufficiently grown to protect the stream banks from erosion.

3.2 STREAM BOTTOM RESTORATION

The stream bottom trench will be backfilled with mechanically compacted earth and 2 feet of 12-inch diameter riprap as indicated on the detail drawings.

3.3 CONSTRUCTION PROCEDURE

The CONTRACTOR shall use either of the following methods to install the stream crossings.

3.3.1 Method 1. The CONTRACTOR shall construct a temporary dam of sandbags or inflatable bags across the entire stream at a location upstream from the proposed waterline crossing. A layer of 6-mil polyethylene sheeting shall be placed on the upstream side of the temporary dam. Temporary pump(s) shall be installed to transfer the normal stream flow to a point down stream from the pipeline crossing until construction and restoration is completed. The temporary dam shall be carefully removed in order to prevent erosion of stream banks. All excess material from trench excavation shall be removed to an off-site disposal area.

3.3.2 Method 2. The CONTRACTOR shall construct a cofferdam of sandbags or inflatable bags from the stream bank to a point beyond the centerline of the stream. The main shall then be installed in a trench within the cofferdam. Any excess trench excavation shall be removed to an off-site disposal area. The cofferdam shall then be removed when the pipe is installed to a point beyond the centerline of the stream.

The same procedure shall be used to install the remainder of the stream crossing.

At the sole discretion of the ENGINEER, alternate methods in lieu of those described in the above options may be permitted. The CONTRACTOR shall adequately describe any proposed alternate method and submit the same to the ENGINEER and all Federal, State and local authorities having jurisdiction of the stream for their review and approval.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE OF WORK

The work covered under this item shall consist of furnishing all materials and supplies necessary to install water mains, hydrants, valves, air releases, services, etc. of the type, sizes and classes shown on detail sheets and specified herein. The work under this item shall be complete delivered on site. All ASTM, ANSI and/or AWWA references contained herein shall be subject to and include all applicable revisions.

1.02 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

A. This Section includes water distribution system piping, valves, connections, pressure reducing valves, services, meters and all appurtenances for the project.

1.04 DEFINITIONS

A. The following are industry abbreviations for plastic materials:

1. PA: Polyamide (nylon) plastic.
2. PE: Polyethylene plastic.
3. PVC: Polyvinyl chloride plastic.
4. RTRF: Reinforced thermosetting resin (fiberglass) fittings.
5. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.05 SUBMITTALS

A. Product Data/Shop Drawings: For the following:

1. Piping specialties.
2. Valves and accessories.
3. Water meters and accessories.
4. Fire hydrants.

B. Operation and Maintenance Data: To be provided per Section 1300 for the same items listed above.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements:

2. Piping materials shall bear label, stamp, or other markings of specified testing agency.
3. NSF Compliance:
   a. Comply with NSF 14 for plastic potable-water-service piping.
   b. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.
   4. During Storage: Use precautions for valves, including fire hydrants, according to the following:
      a. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
      b. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
   5. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
   6. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
   7. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
   8. Protect flanges, fittings, and specialties from moisture and dirt.

1.08 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Owner and Engineer not less than two days in advance of proposed utility interruptions.
1.09 COORDINATION

Coordinate connections to water mains with Logan County PSD.

PART 2-PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 PVC PIPE AND FITTINGS

A. All PVC pipes and couplings supplied and installed shall generally conform to ASTM D 2241-74 Type I for the distribution system. Pipe shall be coupled with O-ring joints. Distribution piping shall be in conformance with SC-256-63 for 315 psi pressure ratings (SDR-13.5). No pipe with a pressure rating of less than 315 psi shall be used. Pipe shall conform to all NSF standards and shall bear the NSF seal. All PVC pipes shall be compatible for use of ductile iron fittings.

B. All fitting, couplings and appurtenances installed shall have a pressure rating equal to or in excess of the PVC pipe. All fittings for PVC pipe shall be ductile iron with mechanical joints conforming to the standards cited in 2.03 below.

2.03 DUCTILE-IRON PIPE AND FITTINGS

Ductile iron pipe and fittings shall conform as applicable with the requirement of ANSI/AWWA C151/A21.51 Standard for Class 350 DIP.

A. Coatings - Exterior coating for pipe and fittings shall be standard bituminous coating of a minimum of 1 mil thick. Interior surface of pipe and fittings shall have a double thickness of cement mortar lining with seal coat in accordance with ANSI/WWA C104/A21.4.

B. Joints - Standard mechanical joints and/or push-on joints conforming to ANSI/WWA C151/A21.51 shall be used unless shown otherwise on the Construction Drawings. Where called for on the Construction Drawings, flanged joints conforming to ANSI/WWA C110/A21.10 shall be used. Also where noted
2.10 VALVE BOXES AND LIDS

A. Valve boxes shall be provided for all buried valves. Valve boxes and lids shall be cast iron, 5-1/4 inch diameter, and of extension type with flared base. Valve box and lid shall be capable of withstanding AASHTO H-20 highway loading. The boxes shall be of such length as can be adapted, without full extension, to the depth of cover over the pipe at all valve box lid. Boxes shall be equal to Mueller H-10357.

B. Valve box lids for valves exclusively for a hydrant are to be painted to reasonably match the color of the hydrant.

C. All valve boxes for buried valves shall be surrounded by a 6 inch deep concrete pad which shall have a radius of 12 inches. The top of the concrete pad shall be flush with the top of the valve box.

2.11 METER SETTINGS

A. All meters furnished shall conform to the "Standard Specifications for Cold Water Meters" – C700, latest revision issued by AWWA or as otherwise stated.

B. All meters shall be Magnetic Drive, Sealed Register, Positive Displacement Type Oscillating Piston only. All meters must be adaptable to a programmable encoder type register without interruption of the customer's service.

C. All meters shall have a Water Works bronze outer maincase with the serial number stamped between the outlet port of the maincase and the register. Meter bottoms shall be either bronze or cast iron. Maincase markings shall be raised and include the size, model, and "IN" on the top of the inlet port to indicate the maincase inlet. On the maincase outlet port an arrow shall be affixed on top of the maincase to indicate the outlet port.

D. Maincases for 5/8" x 3/4" meters shall be of the removable bottom cap type with the bottom cap secured by four (4) bolts on 5/8" x 3/4" size. All bronze maincases shall be guaranteed free from manufacturing defects in workmanship and materials for the life of the meter.

E. All meters must be adaptable to a programmable encoder type register without interruption of the customer's service.

F. The register shall be of the straight reading magnetic drive type; and shall contain six (6) numeral wheels. Registers must be roll sealed and dry. All direct reading register cups shall be copper to prevent corrosion and be covered with a high strength, impact resistant flat glass lens to prevent breakage. The lens shall be positioned above the register box to allow for run off of debris. The register lid shall overlap the register box to protect the lens. The register retaining ring shall be designed to absorb impact from the register. Register boxes and lids shall be of at least high strength synthetic polymer or approved equal. All registers shall have the size, model and date of manufacture stamped on the dial face. The dial
shall be red and of the center sweep pointer type and shall contain 100 equally
divided graduations at its periphery.

The register must contain a low flow indicator with a 1:1 disc notating ratio to
provide leak detection.

Registers shall be secured to the maincase by means of a plastic tamperproof
seal to allow for inline service replacement. Register seal screws are only
accepted when supplied with attached sealing wire to at least one bottom cap
bolt with seal wire holes of not less than 3/32" in diameter.

Registers shall be guaranteed for at least 10 years. All meters will be
guaranteed for one year on material and workmanship.

G. The measuring chamber shall be a 2-piece snap-fit with top and bottom inlet and
side output design. The measuring chamber shall include self-flushing sediment
well.

The chamber shall be warranted for 10 years against freeze damage if the meter
has been equipped with a frost proof cast iron or synthetic polymer bottom cap.

H. All meters shall contain removable polypropylene plastic strainer screens. The
strainer shall be located near the inlet maincase port, before the measuring
chamber and control block assembly. The strainer shall also function as the
device that holds the measuring chamber in place within the maincase, straps or
other types of fasteners shall not be accepted.

I. All meters shall be equipped with meter transceiver units which can be read with
a radio frequency hand held device.

J. To ensure accuracy, each meter must be accompanied by a factory test tag
certifying the accuracy at the flows required by AWWA C700 (low, intermediate,
and full flow). All meters shall be warranted as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>Low Flow</th>
<th>Length of Time</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot;</td>
<td>*1/4 gpm @ 97%</td>
<td>5 Yrs or 500 Kgal</td>
<td>5-10 Yr or 1.5 MGal</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>1/4 gpm @ 97%</td>
<td>5 Yrs or 750 Kgal</td>
<td>5-10 Yr or 2.3 MGal</td>
</tr>
<tr>
<td>1&quot;</td>
<td>3/8 gpm @ 95%</td>
<td>5 Yrs or 1 MGal</td>
<td>5-10 Yr or 3.0 MGal</td>
</tr>
<tr>
<td>1 ½&quot;</td>
<td>3/4 gpm @ 95%</td>
<td>Date of Shipment</td>
<td>1 Yr</td>
</tr>
<tr>
<td>2&quot;</td>
<td>1 gpm @ 95%</td>
<td>Date of Shipment</td>
<td>1 Yr</td>
</tr>
</tbody>
</table>

* Five year new meter low flow accuracy

Meter normal operating range shall be warranted the date of shipment as follows:
SECTION 02510  WATER DISTRIBUTION SYSTEM

<table>
<thead>
<tr>
<th>Size</th>
<th>Range 100 +/- 1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8&quot;</td>
<td>½ - 20 gpm</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>¾ - 30 gpm</td>
</tr>
<tr>
<td>1&quot;</td>
<td>1 - 50 gpm</td>
</tr>
<tr>
<td>1 - ½&quot;</td>
<td>2 - 100 gpm</td>
</tr>
<tr>
<td>2&quot;</td>
<td>2 ½&quot; - 160 gpm</td>
</tr>
</tbody>
</table>

K. Meter boxes and fittings shall be as shown on the detail sheets. Setters shall be as shown on detail sheets and must be provided with a bracing eye through which rigid PVC pipe will snugly fit. Inlet and outlet connections of the meter within the setter shall have an Angle Inverted Key Valve at the inlet end and a Cartridge Dual Check Valve at the outlet end.

2.12 MISCELLANEOUS FITTINGS AND SPECIALS

A. Services clamps and tapping saddles shall be constructed of corrosion resistant waterworks brass. Securing nuts, bolt, washers, etc. shall be of stainless steel. The service clamp shall have a neoprene rubber O-ring gasket to assure positive scaling under operating and testing pressures. Service clamps shall be those manufactured by the Ford Company, or approved equal.

B. Corporation stops shall be constructed of brass conforming to ASTM B-62. The inlet end shall be threaded for tapping in accordance with the AWWA C800 Standard. The outlet end shall be suitable for compression connection to the service lateral pipe. Corporation stops shall be those manufactured by the Ford Company or approved equal.

C. Reducers and wyes shall be brass with connections corresponding to the service line piping being installed.

D. Hot Taps include the labor to perform the Hot Tap, tapping valve, valve box, all stainless steel tapping sleeve, and all items necessary for a complete Hot Tap including testing in place under pressure.

2.13 MAGNETIC MARKING TAPE

A. Marking tape shall be a minimum of 2 inches wide, be a minimum of 5 mil thickness with one side being permanently printed with the message "Buried Waterline Below" or similar statement. This message will be repeated every ± 24 inches. The tape will be color coded blue. The tape will be specially designed for prolonged underground use and shall be easily detectable with a simple metal locator.

B. Tracing wire shall be coated 14 gage wire.

2.14 CONCRETE

All cement concrete utilized for thrust blocking, encasement and other uses shall have a compressive strength of not less than 2,500 psi.
2.15 SELECT AGGREGATE MATERIAL

Select aggregate material to be used under these specifications and contract drawings shall be crushed stone or gravel meeting the gradation requirement of AASHTO No. 57 Coarse Aggregate. Crushed stone shall consist of particles of clean, hard, tough, durable rock, free from adherent coatings. No slag (whether crushed or uncrushed) shall be used as select aggregate material, nor shall any slag be considered as a substitute for acceptable stone or gravel.

2.16 RANDOM BACKFILL MATERIAL

Random backfill material shall consist of in-place excavated material free of particles larger than three inches and shall be free from cinders, ashes, refuse, vegetation or other organic material. The backfill material shall not be wet or frozen.

PART 3- EXECUTION

3.01 CONSTRUCTION METHODS

The construction and installation of the waterline system shall be in accordance with the requirements of the applicable AWWA Standards and as specified below:

3.02 CARE AND HANDLING OF PIPE.

A. All pipe, fittings, valves, hydrants, rubber gaskets, PVC solvents, gasket lubricants and other appurtenances shall be stored and handled in accordance with the manufacturer's recommendations and the AWWA C600 Standard. Materials, if stored, shall be kept safe from damage.

B. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. All pipe and associated appurtenances shall be handled at all time in a manner that will prevent damage to the pipe and its coating or lining. Repair of damaged PVC pipe will not be permitted. All damaged pipe shall be clearly marked and removed from the job site.

3.03 PIPE INSTALLATION

A. Ductile Iron Pipe (DIP) - Shall be installed and the work incidental thereto performed in accordance with AWWA Standard C600-64 except as further defined or modified herein and on the Construction Drawings.

1. Push-on Joints - The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and the spigot end. With the spigot end centered in the bell, the spigot end is pushed home.

2. Mechanical Joints - The surfaces with which the rubber gasket comes in
contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and the spigot end. With the spigot end centered in the bell, the spigot end is pushed home. All components shall be cleaned and lubricated with soapy water prior to assembly. Slip the follower gland and gasket over the pipe plain end making sure the small side of the gasket and lip of the gland face the bell socket. Insert the plain end into socket. Push gasket into position with fingers, gasket should be evenly seated. Slide gland into position, insert bolts and tighten by hand. Bolts are then tightened alternately (across from one another) to the following normal torques:

<table>
<thead>
<tr>
<th>BOLT SIZE</th>
<th>TORQUE (Foot-Pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>40 to 60</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>60 to 90</td>
</tr>
<tr>
<td>1&quot;</td>
<td>70 to 100</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>90 to 120</td>
</tr>
</tbody>
</table>

C. Polyvinyl Chloride Pipe (PVC) - Shall be installed in accordance with the manufacturer's recommendations except as further defined or modified herein and on the Construction Drawings.

1. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. When gaskets are separate, use only gaskets which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

2. Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to the gaskets or the pipe, may be promoted by use of non-approved lubricants. Use only lubricant supplied by the pipe manufacturer.

3. To join field-cut pipe, it is necessary to first prepare the pipe end. A square cut is essential for proper assembly. The pipe shall be marked around its entire circumference prior to cutting to assure a square cut. Use a factory-finished beveled end as a guide for proper bevel angle, and depth of bevel plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp which will cut the correct taper. A portable sander or abrasive disc may also be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocket knife or a file.

3. If bell and spigot joint pipe is being installed the installer shall ensure the integrity of previous joints by securely restraining those joints to disallow insertion of the spigot into the bell beyond the manufacturer's recommended stop mark. Any joints which are over compressed shall be adjusted by having the spigot withdraw from the bell to the stop mark.

3.04 PIPE COVERING
Pipe covering shall be a minimum of 36 inches. When pipe is laid within five (5) feet of the edge of pavement along roadways, a minimum of 42 inches between the top of the pipe and finished grade shall be maintained. A minimum of 42 inches of cover shall be maintained when crossing creeks or rivers.

3.05 ALIGNMENT AND GRADE

Alignment and gradient shall be straight or shall follow true curves as nearly as practicable. Where curvature of pipe lines is required, deflections shall be less than 80% of the manufactures recommended maximum deflection, horizontal and vertical.

3.06 BACKFILLING

A. Backfilling in developed areas, streets or roadways - Random backfill material shall be deposited in the trench. This backfill material shall be tamped in six-inch layers and shall be sufficiently damp to permit thorough compaction under and on each side of the pipe to provide support free from voids to cover of 12-inch over the barrel of the pipe. After the pipe barrel has a 12-inch cover fully compacted, the backfill shall be placed in layers not exceeding eight inches until the entire trench is backfilled. No layer shall be placed until the prior layer is thoroughly and fully compacted. This procedure is required in any area which is to be paved.

B. Backfilling in undeveloped areas - After the pipe barrel has a 12-inch cover fully compacted, the remainder of the trench shall be filled with approved random backfill material in layers not exceeding 15 inch until the entire trench is backfilled. No layer shall be placed until the prior layer is fully compacted.

C. Where any governmental regulations require backfill to be mechanically compacted in specific layers, those regulations will be followed.

3.07 TRENCH EXCAVATION

Trench excavation shall be sufficiently wide to permit proper installation of the pipe, fittings and other materials, and not less than six inches clear of the barrel on any side at any point. Excavated material shall not be placed along highways, streets or roads in such a manner that it obstructs traffic. Scattered excavated material shall not be allowed to remain on the pavement. All side ditches, culverts and other drainage structures shall be kept clear of excavated material.

3.08 UNDERGROUND UTILITIES

Underground utilities, culverts and other pipelines encountered shall be protected from damage. The installer shall exercise all necessary precautions to ensure such utilities are not disturbed. Any damage to existing lines or pipes shall be promptly repaired. Certain existing pipelines, culverts, etc., are shown on the Construction Drawings, according to the best information available to the Owner. Where these or unforeseen underground utilities or obstructions are encountered, minimum depth of cover location and/or alignment may be modified by the Owner.
3.09 CONCRETE BLOCKING

Concrete blocking shall be installed whenever pressure causes thrust to be exerted on the pipe, such as changes in alignment, fittings, reducers, etc. Blocking shall conform to detail drawings and be done to the satisfaction of the Owner/Engineer.

3.10 MANUFACTURER’S SPECIFICATIONS

Manufacturers recommendations on the installation of pipe, valves, fittings, hydrants, etc. which are not in conflict with any provisions of these specifications shall be followed and considered to a part of these specifications.

3.11 MAGNETIC MARKING TAPE

Marking tape shall be centered over pipe, service lines, etc. The tape shall be placed approximately 12 inches below grade. The tape shall be orientated such that the printed message faces upward.

3.12 HYDRANTS AND VALVES

A. Installation of hydrants and valves shall be as shown on the attached details and on the Construction Drawings and conform to the applicable sections of AWWA Standards C603-64T and C600-64.

B. Hydrants shall be restrained as previously described or as approved by the Owner. Minimum cover shall be three feet. If the hydrant is located so as to require additional cover, the installer shall furnish and install required extension sections. Not less than 7 cubic feet of free draining broken stone or gravel shall be placed around and below the weep hole to insure proper drainage. Hydrants shall be set plumb with the streamer nozzle facing the road and the center of the lowest outlet shall be at least 18 inches above finished grade.

C. Location of valves and hydrants shall be coordinated with the Owner and the West Virginia Department of Highways. Tops of the valve boxes shall be brought to finish grade unless otherwise approved by the Owner. Valve markers shall be provided for all main line valves, air releases and blow-offs. Locations shall be as detailed in the Construction Drawings or otherwise specified by the Owner.

D. Hydrant guard posts shall be installed as shown on the detail and construction drawings. The number of guard posts at each hydrant shall be determined in the field by the Owner.

E. Air release valves shall be installed as shown on the detail and construction drawings. The valve shall be installed at the high point on the line as determined in the field.

F. Blow-offs shall be installed as shown on the detail and construction drawings on all dead end lines with diameters of 2 inches or larger unless otherwise directed by the owner.
3.13 SERVICE TAPS
   A. Service taps on the main line shall be made by bolting a saddle onto the main line and drilling a hole of appropriate size for the size of the tap with no cracking or splitting of the pipe. A corporation stop shall be provided at each saddle with a suitable connection for the service line being used.
   B. Auger boring or road mole will be used to install copper service lines under pavements, railroads, obstructions or where directed by the Owner.

3.14 METER SETTINGS
Meter settings shall be installed as shown on the detail and construction drawings. Actual locations of the meter settings shall be field determined by the Owner. Whenever possible, the location of the meter setting shall be coordinated with the customer to better suit the customer's needs. Boxes shall be firmly and consistently supported all around the bottom circumference so that uneven settlement will not occur. Boxes shall be so oriented so that the top of the lid reasonably matches the contour of the existing ground. The center of the lid shall be level with or slightly above the level of the existing ground or pavement. The setter within the box shall be so located that the meter face, when installed, will be parallel with the lid. Service lines entering and leaving the box shall be located in the slots provided in the box. The setter shall be restrained from leaning by means of an 16-inch (or 18-inch for the larger box) length of rigid schedule 80 PVC pipe inserted through the bracing eye. The Contractor is required to connect all customer service lines to new meters. All connections of PE pipe or tubing shall make use of stiffeners.

3.15 MARKING TAPE
Marking tape shall be centered over pipe, service lines, etc. The tape shall be placed approximately 12 inches below grade. The tape shall be orientated such that the printed massage faces upward.

3.16 PRESSURE AND LEAKAGE TESTING
   A. Hydrostatic testing shall be done on sections of the pipeline as determined adequate and ready for testing by the Owner. The installer shall furnish all labor, materials, water and equipment for these tests. Testing shall be in accordance with AWWA C600 Standards. A pressure test and leakage test shall be conducted concurrently. AH testing shall be witnessed and approved by the Owner.
   B. After the pipeline has been installed, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic test pressure equal to the working pressure plus 50 psi or working pressure times 1.5, whichever is greater for a minimum of two (2) hours. Pressure is not to exceed pressure rating of pipe.
C. The line section to be tested shall be slowly filled with water while expelling all air from the pipe, valves, etc. The test pressure shall then be applied to the line. When the pressure has stabilized, the installer may begin the two (2) hour test period during which the pressure may not vary by more than 5 psi. If the pressure drops 5 psi below the test pressure the installer shall again increase pressure to the test pressure and restart the two hour test. This procedure may be repeated up to four (4) times. If the test pressure cannot be maintained within 5 psi after four attempts the test will be deemed to have failed. Upon failure the installer shall determine and correct the cause of excessive leakage and repeat the test as required until the above test conditions have been met.

D. The leakage test shall be conducted for a minimum of two (2) hours by pumping water into the test section as required to maintain the test pressure within 5 psi. The amount of water pumped into the test section shall be measured by such means as approved by the Owner.

E. Leakage is defined as the quantity of water to be supplied into the newly laid pipe or section thereof necessary to maintain the pressure within 5 psi of the specified test pressure after the pipe section has been filled with water and the air expelled. No piping installation will be accepted if the maximum allowable leakage is greater than that determined by the following formula:

\[
L = \frac{S \cdot D \cdot (P)^{1/2}}{133,200}
\]

where \(L\) is the allowable leakage in gallons per hour, \(S\) equals the length of pipe in feet (1,000 foot maximum), \(D\) is the nominal pipe diameter in inches and \(P\) is the test pressure in PSIG.

F. No increase on allowable leakage will be accepted as a result of service lines within the length of main line being tested. When fire hydrants are in the test section, the test shall be made against closed hydrant valves while the 6-inch gate valves remain open. Service connections to the meter shall be tested with the main line.

G. Should any test section of the waterline disclose leakage greater than that specified, the installer shall determine and locate the point of leakage and make approved repairs as necessary, at no additional expense to the Owner. All visible leaks shall be repaired by the installer regardless of the amount of leakage.

3.17 PIGGING OF WATERLINE

A. Pigging of waterline shall be done by the CONTRACTOR prior to disinfection. The pigging of lines that are greater than 2 inches in diameter is required as part of the project and is considered incidental to the construction of the waterline.
B. Pigs shall be commercially manufactured for the specific purpose of cleaning pipes. They shall be made of polyurethane foam weighing 2 to 15 lb./cu.ft. Pigs are bullet shaped and come in various grades of flexibility and roughness.

C. Plug Installation and Removal - In general, the CONTRACTOR shall furnish all equipment, material, and labor to satisfactorily expose cleaning wyes, or other entry or exit points. Remove cleaning wye covers, etc., as required by the ENGINEER and to insert the plugs into the mains.

If approved by the ENGINEER, stripped fire hydrants, air valves and blow-offs may serve as entry and exit points for smaller sized mains. The ENGINEER will examine these appurtenances and the connecting laterals to ensure that adequate openings exist through which a plug may be launched.

If these appurtenances are used, a special launcher to ease the insertion and lunching of the plug is required. If available a pressurized water source such as a fire hydrant can be used to launch the plug. If water from the system is not available nearby, use a water truck with pump.

If hydrants are used as entry and exit points, the CONTRACTOR shall, under ENGINEER supervision, remove the internal mechanisms and plug the drains. Insert the plug and replace the cap with a special flange with a 2 ½ inch fitting. Connect the 2 ½ inch fitting with a pressure gauge and valve to a pressurized water source. After the last valve isolating the section to be cleaned is closed, open the hydrant supply valve. Propel the swab or pig into the main by opening the exit valve.

In mains greater than 8 inches, Wyes shall be used at the entry and exit points. Fabricate the wye section one size larger than the main to ease the insertion and extraction of the plug. The use of wyes, as with the previously mentioned appurtenances, requires an outside source of pressurized water for launching. Cap the wye with a flange with a 2 to 6 inch fitting for connecting with the pressurized water source.

During swab or pig installation, leave as much water as possible in the main to be cleaned. The water suspends the material being removed from the pipe and minimizes the chance of the material forming a solid plug. Water in the pipe also keeps the swab or pig from traveling through the pipe at excessive rates. If swabs or pigs travel too fast they will remove less material. The swab or pig will also wear more rapidly in such a case.

At the exit point or blow-off, install a wye long enough to house the swab or pig. Attach temporary piping to the end cap to allow the drainage of the water.

Where expulsion of the cleaning plugs is required through a dead end main, the CONTRACTOR shall prevent backflow of purged water into the main after passage of the cleaning plug. This can be accomplished by installing mechanical joint bends and pipe joints to provide a riser out of the trench. Additional excavation of the trench may serve the same purpose and is acceptable.
D. **Pig Cleaning Procedure** - Remove all air valves along the line. This will provide pressure relief should the pig suddenly stop and assure that no air is trapped in the main.

If the pig is inserted directly into the main, set it in motion by opening the upstream gate valve and a downstream fire hydrant or blow-off valve (usually the valve on the capped end at the exit point). If the pig is launched from a wye, fire hydrant, or other appurtenance, use an external pressurized water source to inject the pig into the main as described in Section 3.1.

Once the pig is in motion in the main, control its speed by throttling the discharge at a downstream fire hydrant or blow-off. Operate pigs typically at 1 fps. This slow speed will help prevent pressure surges when the pig passes through undersized valves, enters smaller pipes, or turns through tees or crosses. Speeds of up to 2 fps can be used on straight runs with no restrictions or sharp turns.

Make sufficient passes of the pig to obtain thorough cleaning. Two pigs may be used in tandem to save time and water. Sufficient cleaning is established when the water discharging after the pig becomes clear within one minute.

E. **Post Cleaning Procedure** - After successful completion of cleaning the main shall be tested, flushed and disinfected in accordance with applicable sections of these Specifications.

### 3.18 DISINFECTION OF WATERLINE

A. Disinfection of waterlines, valves, services, etc. shall be performed prior to placing the waterline into service. The installer shall furnish all labor, materials, water, chemicals and equipment used for disinfection. Disinfection methods and procedures shall be in conformance with AWWA C651 Standards.

B. Following the hydrostatic testing, the section to be disinfected shall be thoroughly flushed with water until all entrained dirt, rock, etc. have been removed before the introduction of disinfection chemicals. Disinfection compound to be used shall be calcium hypochlorite.

C. The chlorinating material shall provide a dosage of not less than 50 ppm throughout the entire length of the pipeline. The highly chlorinated water shall be retained in the pipe a minimum of 24 hours and a maximum of 48 hours. After the chlorinated water has been retained for the required time, the total chlorine residual at the pipe extremities and at other representative points shall be at least 25 ppm.
D. Service lines shall be disinfected with the main line. Each service line shall be thoroughly flushed after main lines have been flushed. Heavily chlorinated water shall not be discharged in such manner that will negatively effect the environment.

E. Bacteriological testing of the system shall be performed by the West Virginia State Health Department laboratory to determine the sufficiency of the disinfection. The number and location of sampling points shall be determined by the Owner. Three (3) samples taken on three (3) consecutive days are required at each sampling point. The Owner shall secure the required sample bottles from the Health Department. The installer shall collect the required samples and have them tested by the Health Department. The test results shall be returned directly to the Owner. Should the samples prove unsatisfactory; the installer will be required to proceed with additional disinfection and testing as necessary to the satisfaction of the Owner and the State Health Department. All costs associated with disinfection and testing shall be borne by the installer.

3.19 CLEANUP

Cleanup of all work areas shall be done before the work shall be considered complete. All material not used and all rubbish of any kind must be removed. All private and public facilities and structures disturbed shall be restored to essentially as good a condition as existed prior to the work. Any subsequent settling of backfill or pavement over trenched shall be replaced by the installer and surfaces brought to grade at no additional cost to the Owner. Cleanup shall be done daily to the satisfaction of the Owner.

END OF SECTION 02510
PART 1 - GENERAL

1.01 DESCRIPTION

Related Work Specified Elsewhere:

- Measurement and Payment
- Submittals
- Structure Excavation & Backfill
- Water Distribution System
- Satellite Telemetry System
- Electrical Conduit

PART 2 - PRODUCTS

2.01 GENERAL

The contractor shall furnish and install the following specified items for construction of the two booster stations as specified herein and shown on the contract drawings. Major items to be furnished include booster pumps, control panel, miscellaneous pipe and fittings, and concrete building.

2.02 PUMPS

A. The contractor shall furnish and install two (2) booster pumps each in Booster Station No. 1 and Booster Station No. 2 as shown on the plans and specified herein. The pumps shall be built in accordance with the Hydraulic Institute and ANSI standards. The Booster Station No. 1 pumps shall be capable of delivering 200 gpm against a total dynamic head of 280 feet. The Booster Station No. 2 pumps shall be capable of delivering 200 gpm against a total dynamic head of 830 feet. The booster pumps in Station No. 1 shall be vertical multistage centrifugal type with flanged suction and discharge connections in-line. The booster pumps in Station No. 2 shall be vertical turbine type with flanged suction and discharge connections in-line.

B. The booster pumps shall consist of the following component materials:

- Stainless steel: Shaft, Impellers, Diffuser Chambers, Outer Pump Sleeve, and Suction Interconnector
- Cast Iron: Suction/Discharge Chamber, Motor Spool, and Motor Coupling

C. The booster pumps for Booster Station No. 1 shall be 25 HP, 3 phase Grundfos 96419123 Model CR45-3-1, or equal. The booster pumps for Booster Station No. 2 shall be 60 HP, 3 phase Goulds 7WALC (9 stages), or equal.

2.03 CONTROL PANEL

A. The pump control panel shall be furnished and installed as shown on the contract drawings and specified herein. The panel shall control the starting-stopping of the booster pumps
specified above from the Owner's telemetry system contacts (see Section 11248), and indicate alarm conditions for "low suction pressure" from a pressure switch installed on the inlet side of the pump suction piping.

B. The panel shall include pump motor starters with adjustable overload protection, rated for the motor horsepower and voltage shown above. Starters shall provide for soft starts and stops of pumps.

C. Switches and pilot lights shall be door mounted and shall comply with NEMA ratings for oiltight and watertight construction. Contact blocks on the H-O-A switches shall be rated for a minimum of 10 amps at 600 volt AC. Pilot lights shall be full voltage type with green lenses for "Pump Run" and red lens for "Low Suction Alarm". A pump alternator timer relay shall be furnished and installed within the panel, and include a three-position selector switch on the panel cover to allow the operator to override the alternator and manually select the lead pump in the on-off sequence (Pump #1-Pump #2-Auto).

D. The entire pump control and accessory circuitry shall be mounted within a NEMA 12 dust tight enclosure with pilot lights and H-O-A switches mounted on a hinged outer door and properly labeled with plastic engraved labels. Enclosure shall be constructed of minimum 14 gauge steel with gray enamel exterior finish. The cover shall be continuous hinge type with plated screw fastened clamps with hasp.

E. The control panel internal wiring shall be neatly installed within plastic "panduit" wireways. All wires shall be numbered at each terminal location. Wiring diagrams shall be furnished and contain all wire numbers and numbers of each relay or switch terminal. As-built drawings shall also include a detailed component Bill of Material.

F. The control panel shall be fed from a 200A, 480 volt, 3 phase breaker panel per power company requirements. A 15 KVA lighting transformer shall be provided for 120/240 volt power. Contractor shall make arrangements for connection of the station to commercial power. Owner will pay any power company costs associated with the connection and any monthly charges for service.

G. Control panel shall be as manufactured by Industrial Electric, Inc., Beaver, West Virginia, or equal.

2.04 ELECTRICAL WORK

A. Included within the scope of work of the booster station is the connection of the booster pumps, pressure switch and items as described elsewhere to control panels, power and the Satellite Telemetry System specified elsewhere.

B. The intent of this is to provide for all necessary equipment, materials, labor and coordination as necessary to provide for a fully functioning booster station as described herein and shown on the Drawings.

2.05 PRESSURE SWITCH AND GAUGES

A. The pressure switch controlling the low suction alarm shall be an Allen-Bradley Model 836T-T251J or a Mercoid Type DA, with adjustable deadband.
B. The pressure gauges for the suction and discharge lines shall be remote mounted. Both
gauges shall have a 4-1/2" face with polypropylene case, bottom connections, bronze
bourdon tube and movements. The gauge shall be a Wika 212.34 or equal.

2.06 PIPING

A. All ductile iron piping outside the station shall be Class 51, mechanical joint in accordance
with ANSI/AWWA C151/A21.51. Fittings for underground installation shall be mechanical
joint ductile iron in accordance with ANSI/AWWA C111/AN21.11, with retainer glands.

B. All ductile iron piping within the station building on the suction side of the pumps shall be
Class 53, flanged ANSI 125# in accordance with ANSI/AWWA C115/A21.15. The discharge
pipe shall be adequate to resist operating pressures up to 300 psi. All ductile iron pipe shall
be cement lined and coated per AWWA C104 inside.

C. All piping 2" diameter or less shall be brass with threaded joints, schedule 40.

2.07 VALVES

A. Valves 3" in diameter and larger shall be flanged joint, resilient seat type with handwheel
operator and non-rising stem in accordance with AWWA C-509. Valves located on the
discharge side of the booster pumps shall be capable of operating in pressures up to 300
psi.

B. Valves 2" in diameter and smaller shall be bronze ball valves with threaded ends and lever
operator, rated for 300 psi WP or higher.

2.08 CHECK VALVES

A. Check valves shall be as shown on the Drawings.

2.09 PRECAST CONCRETE BUILDING AND ACCESSORIES

A. **Panel Type Construction:** The building is fabricated of six solid, one-piece concrete
panels. Panels are bolted together and joints caulked inside and out to make the building
weatherproof. Building shall be as manufactured by Carr Concrete Company, or equal.

B. **Wall Panels:** The four walls are 3" thick solid panels of concrete with primary structural
reinforcement of steel bar and welded wire fabric.

C. **Roof Panel:** The roof is a 4" thick concrete panel which extends 2-1/2" over the walls to act
as a drip edge. The roof has primary reinforcement of steel bar and welded wire fabric as
well as secondary reinforcement of polypropylene fibers. In addition, the roof is post-
tensioned through the use of an internal tensioning cable for additional protection against
cracking and checking. No additional roof coatings are required to make the building
weatherproof.
D. **Floor Panel:** The floor panel is a 4" thick concrete panel with primary structural reinforcement of steel bar and welded wire fabric and secondary reinforcement of polypropylene fibers. The floor is post-tensioned through the use of an internal tensioning cable for additional protection against cracking and checking.

E. **Panel Connections:** The panels are bolted together with 1/4" thick steel brackets and 1/2" coil thread bolts. The steel brackets are cold galvanized to resist rusting.

F. **Structural Loadings:** The standard roof loading is 30 psf. The standard wind load is 27 psf. Higher loadings for roof and wind are optional.

G. **Preassembly:** Standard procedures are for the completely assembled building to arrive at the jobsite on a tractor trailer. The building will be lifted from the trailer and set in place with a crane.

H. **Warranty of structural integrity:** Concrete building shall be warranted for a full five years. Manufacturer shall warrant all concrete components to be free from defects in material or workmanship when used within specified loadings. If found defective manufacturer will, at its option, repair or replace any concrete component of the building.

I. **Dimensions:** Outside dimensions are 8'-10" high, 11'-6" wide and 20'-6" long except for the roof which extends over the walls 2-1/2" on all sides. The inside dimensions (without optional interiors) are 8'-0" high, 11'-0" wide and 20'-0" long.

J. **Doors, Frames and Hardware:** The building shall have a 1-1/2 hour fire-rated door, consisting of two (2) 3'-0" wide x 6'-8" x 1-3/4" 18 gauge, grade II heavy duty metal doors with polyurethane foam core. The door frame is bolted and caulked to the wall panel so the frame can be replaced easily if damaged. Door is primed and painted one coat of gray enamel. Standard door hardware includes a stainless steel pull plate and deadbolt lock. The door is hung with three heavy-duty, vandal proof hinges. Other accessories include a door sweep and a 2-inch drip cap. A door bumper, lockback and aluminum threshold are to be provided.

K. **Vents:** Passive ventilation consists of two (2) 15-5/8" x 5-1/8" fixed aluminum vents with insect screens. One vent is place 6" from the floor and the other 6" from the ceiling.

L. **Caulking:** All wall-to-wall, wall-to-roof and wall-to-floor joints are caulked on both the interior and exterior surfaces for double weatherproof protection. The limestone-colored caulking is a high quality, polyurethane-based, elastomeric sealant.

M. **Sealer:** All exterior surfaces of the building are treated with a clear penetrating silane sealer to prevent water absorption and freeze-thaw damage.

N. **Lifting Points:** The building is equipped with cast-in-place lifting inserts located in the exterior edge of the floor. These remain as part of the building and can be used later to lift or relocate the building.

O. **Weight:** The building weight without options is approximately 42,000 pounds.

P. **Finishes:** An exposed aggregate finish of light Indiana limestone shall be provided.
Q. **Site preparation:** Building shall be designed to be installed on a pad of crushed stone.

R. **Accessories:** The concrete building manufacturer shall also furnish and mount necessary lights, heater, exhaust fan and louver, and 100-amp lighting distribution panel for 230 volt, 1 phase service.

**PART 3 - EXECUTION**

3.01 **INSTALLATION**

Building to be installed per manufacturer's recommendations as shown on the Drawings. Representative of pump manufacturer to provide one, eight-hour day of start-up service.

END OF SECTION 02513
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Tack Coat
2. Hot-Laid Bituminous Concrete Patching and Leveling Course
3. Hot-Laid Bituminous Concrete Base Course
4. Hot Laid Bituminous Wearing Course

B. Related Work Specified Elsewhere:

1. Submittals Section 01300

1.02 QUALITY ASSURANCE

A. Surface Tolerance:

1. When compaction is completed on the course, it shall present a uniform surface, true to line and grade, conforming to existing pavement. When tested with a ten foot straightedge and template of the specified dimensions, the finished base course shall not show a deviation greater than 1/4 inch, and the finished wearing course shall not show a deviation from the existing surface greater than 3/16-inch.

2. The Contractor shall provide the straightedge and template for checking the surfaces, and an employee to use them under the direction of the Engineer. Any irregularity of the surface exceeding the limits specified shall be corrected. Depressions which develop after the initial rolling shall be corrected by loosening the mixture and adding new material. High places shall be corrected by removing excess material.

3. Areas of compacted courses found to be defective shall be removed and replaced with approved mixtures laid in accordance with these Specifications, and no additional compensation shall be allowed for materials used or work involved in replacing defective areas.

B. Thickness Requirement:

1. Paving operations shall be carried on in such a manner that an average and uniform compacted thickness will be obtained, for each course, equal to or greater than the thickness shown on plans.

1.03 SUBMITTALS

Contractor shall submit Certification of Materials and Mix Requirements as hereinafter specified, per Section 01300 Submittals.
1.04 JOB CONDITIONS

Weather and Seasonal Limitations:

Bituminous concrete pavement shall be constructed only between April 15 and November 1, and application of bituminous material shall be made only when the condition of the aggregate and base is satisfactory to the Engineer, the base material temperature is above 40°F., and when the weather conditions are satisfactory for construction.

The temperature and seasonal requirements may be waived but only when so authorized in writing.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asphalt Cement - shall conform to the requirements of ASTM Designation D946, Grade 60-70, 85-100, or 120-150. Grade 120-150 shall be used unless specified otherwise.

B. Tack Coat and Prime Material - shall be liquid asphalt emulsion CBAE primer.

C. Course Aggregate - shall consist of crushed stone, washed gravel (crushed or uncrushed), crushed slag, or any combination thereof. The percentage of wear is determined by ASTM Designation C-131 or C-535 shall not exceed 40.

D. Fine Aggregate - For Asphaltic Mixtures shall meet the requirements of ASTM Designation D-1073, except that the gradation requirement shall be waived.

E. Mineral Filler - for Asphaltic Mixtures shall meet the requirements of ASTM Designation D-242, except that of the gradation requirement shall be waived.

2.02 MANUFACTURER

A. Composition of Mixtures:

1. The aggregate for use in the designated mixture shall consist of a mixture of aggregate (coarse, fine, or mixtures thereof), and mineral filler if required. The materials composing the combined aggregate shall be mixed in a dry condition.

2. The aggregate mineral filler in bituminous material shall be combined in such proportions that the composition by weight of the finished mix shall meet the requirements of the plant mix formula, as approved by the Engineer, for the type of bituminous concrete course designated for the work.
B. Master Range for Bituminous Concrete Mixtures:

The master range for the various types of bituminous concrete mixtures shall be as specified in Table 1 below. Quality control of bituminous concrete is the responsibility of the Contractor.

### Table 1

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<th>1 in.</th>
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<th>½ in.</th>
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C. Equipment:

1. The plant used in preparation of bituminous concrete shall be of the separate weigh batch increment type or the continuous volumetric proportioning type. Both plant types shall comply with the requirements of the West Virginia Department of Transportation in regard to feeder, drier thermometric equipment, screens, bins, tanks, truck scales, test weights and safety requirements. Other components of the type plant used will also meet the requirements of the West Virginia Department of Transportation.

2. The plant producing bituminous concrete for this project shall exhibit documented evidence of compliance with current requirements of the West Virginia Air Pollution Control Commission.

D. Preparation of Materials:

1. Preparation of Aggregate - All aggregate shall be dried until it has no surface moisture and not more than 0.5% of absorbed moisture. Mixing temperature of aggregate shall be as directed and shall range between 250° F. and 325° F., when asphalt is used, and between 200° F and 270°, when tar is used.

2. Preparation of Bituminous Material - Bituminous material shall be heated in melting kettles or tanks designed to secure even heating of the mass. Heating temperatures shall be as directed and shall range between 250° F. and 325° F. when asphalt is used and between 200° F. and 270° F. when tar
is used.

3. Preparation of mixtures in either the separate weigh batch increment type plant or the continuous volumetric proportioning type plant shall meet the requirements as established by the West Virginia Department of Transportation.

PART 3 - EXECUTION

3.01 APPLICATION

A. General

1. Transportation of Mixture:
   a. Canvas covers shall be suspended slightly above the mixture, shall extend over the sides of the truck, and shall be securely fastened to eliminate air infiltration and to prevent water from coming in contact with the mixture.
   b. Truck beds shall be cleaned of all accumulations of material by the use of steam or approved solvents at the end of each trip.

2. Cleaning and Sweeping:
   a. When required by the Engineer, immediately prior to the arrival of the paving mixture the existing base or surface shall be thoroughly cleaned by the use of tools and equipment as may be required to remove all mud, dirt, dust and other caked or loose material foreign to the type of treatment or surface being placed.
   b. Any winter-grade patching mixture on the existing surface shall be completely removed. The cleaning shall be done to a minimum width of one foot on each side beyond the width of the surface being placed.

B. Patching and Leveling Course:

1. The materials for patching shall be prepared, conditioned, and transported to the work as herein provided for other courses, except that the maximum size of the aggregate in the patching and leveling mixtures shall not be more than 3/4 of the compacted thickness. The patch mixture may be placed by shoveling directly from the truck or from a platform. Leveling and shaping may be done by hand, by the other mechanical equipment approved by the Engineer. Compaction by rolling will be required as provided for other courses.
C. Tack Coat Material:

1. West Virginia Department of Transportation Sections 408 shall govern the application of the tack coat.

2. The coat shall be liquid asphalt emulsion - CBAE Primer, and shall be applied at the rate designed by the Engineer; but in general, these shall be approximately 0.1 gallon per square yard for streets and parking areas with an existing paved surface and 0.25 gallon per square yard for streets with new rock base.

3. The Contractor shall see that the coat is evenly spread over the entire area to be paved.

D. Base and Wearing Courses:

1. Spreading and Finishing:
   a. Prior to spreading the Base Course, Contractor shall perform, in the presence of the Engineer, compaction tests on the stone Base Course to assure that the 95% density has been obtained. One test per each day paving is done for each 200 feet of road shall be considered satisfactory. Contractor shall bear all costs of testing and shall submit a written report to Engineer showing testing results.
   b. Before spreading any material, the contact surfaces of curbs, gutter, manholes, and of adjacent Portland cement concrete pavement edges shall be painted or sealed with approved bituminous material.
   c. Mechanical spreading and finishing equipment shall be used. On areas where mechanical spreading and finishing equipment is impracticable to use because of variable sections or appurtenances, the mixture shall be spread and screeded by hand.
   d. Mixtures shall be laid only on dry surfaces and only when, in the opinion of the Engineer, weather conditions are suitable. When applied, the temperatures shall range between 250° F. and 325° F. for asphalt mixtures and between 200° F and 270° F. for tar mixtures.
   e. The finished surface shall be smooth and of uniform texture. Suitable means shall be provided for keeping all small tools clean and free from bituminous accumulation. Sufficient tarpaulins or covers shall be kept available for covering any material that may be dumped in the paver and not spread during an emergency such as rains, chilling wind, or unavoidable delays.

2. Compaction Equipment
   a. Compaction equipment shall consist of steel-wheel or pneumatic-tire
rollers, or a combination of both. Other compaction equipment may be used if approved by the Engineer. The use of equipment which results in excessive crushing of the aggregate will not be permitted. Any equipment used shall meet the requirements of the West Virginia Department of Transportation.

b. Compaction equipment shall be operated by workman skilled in this type of work. The scraping, moving or otherwise defacing of adjacent curbing or other work with compaction equipment will not be permitted. Any curbing so damaged shall be repaired or replaced to the satisfaction of the Engineer, prior to final acceptance of the approved by the Engineer before any repair work is started.

3. Compaction:

a. After a course has been screeded, it shall be rolled with power driven rollers as hereinbefore provided. Before rolling is started, the screeded surface shall be checked and inequalities adjusted, all droppings of fat sandy accumulations from the screed removed, and all fat spots from any source shall be removed and replaced by satisfactory material.

b. Each course shall be rolled at the time and as directed by the Engineer. The number of rollers shall be sufficient to obtain satisfactory compaction while the mixture is in a workable condition. Delay in rolling freshly placed mixture will not be permitted. Rolling shall continue until compaction is obtained to the satisfaction of the Engineer.

4. Joints

a. Joints between the existing and new bituminous concrete pavement shall be "burned in" to the existing surface at all locations where the new paving terminates against an existing bituminous pavement. This shall be done using a heating box.

END OF SECTION 02514
SECTION 02546

STONE RESURFACING MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

Related Work Specified Elsewhere

Method of Measurement and Payment

Section 01025

PART 2 - PRODUCTS

2.01 MATERIAL

Crushed stone shall be limestone meeting the material requirements of the West Virginia Division of Highways Standard Specifications for Roads and Bridges, Section 703.1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All areas paved with crushed stone shall be restored after installation of the pipeline and structures. Examples would be as follows:

1. Stone parking areas
2. Stone storage areas
3. Stone driveways
4. Stone roads
5. Stone shoulders

B. After backfill and compaction are complete, the Contractor shall distribute the stone material evenly over the area to be covered and then compact the stone with a roller.

C. Thickness of stone material shall be the thickness of the adjacent undisturbed stone.

D. After the initial stone material is placed, any additional materials placed because of settlement shall be placed at the Contractor's expense.

E. All adjacent areas disturbed by the Contractor during the construction shall also be restored to their original condition.

END OF SECTION 02546
PART 1 - GENERAL

1.01 DESCRIPTION

Related Work Specified Elsewhere

Method of Measurement and Payment
   Section 01025
Asphaltic Concrete Paving
   Section 02514
Concrete
   Section 03300

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete - Section 03300

B. Welded Wire Fabric - ASTM A - 185
   1. Sidewalks - 6" x 6" - 10/10
   2. Driveway - 6" x 6" - 6/6

C. Stone Base Material - WVDOH Standard Specifications, Section 307, Class 1

D. Asphalt Driveways - Wearing Course Material, WVDOH Standard Specifications, Division 400

E. Concrete Curb - WVDOH Standard Specifications, Division 610

F. Expansion Joints - Pre-Molded, 3/4" thick

G. Joint Sealing Material - WVDOH Standard Specifications, Division 708

PART 3 - EXECUTION

3.01 INSTALLATION

A. Repairs for pipeline construction projects.
   1. Curbing, sidewalk or driveway cuts shall be neat, straight, parallel cuts with a concrete saw.
   2. Width of removal shall conform to the widths allowed under Trench Excavation and Backfill, but should extend to the nearest, existing joint in the concrete.
   3. After completion of the backfilling operations, stone base material shall be distributed uniformly over the area to receive the new sidewalk and

E.L. Robinson Engineering Co.
compacted.

4. Width of new sidewalk or driveway shall conform to the existing unless otherwise shown on the plans.

5. Thickness of asphalt driveways shall equal existing thickness of adjacent undisturbed driveway.

6. Sidewalks or driveways outside the allowed trench width which are damaged by the Contractor during his construction operations shall also be replaced at no cost to the Owner.

7. Construction of replacement sidewalk or driveway shall be in accordance with the following specifications for new construction.

8. All concrete curbing shall be constructed in sections having length of 10 feet unless otherwise indicated on the plans.

9. Curb sections shall be separated by joints 1/8" wide except at expansion joints.

10. All joints shall be filled with joint sealing material.

END OF SECTION 02576
SECTION 02731 - MANHOLES AND CLEANOUTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section consists of furnishing all labor, equipment and material required to construct manholes and cleanouts in accordance with lines, elevations, cross-sections, and related work as described herein and/or shown on the Drawings.

B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS

A. Shop Drawings submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer’s review of this submittal prior to fabrication.

1.3 QUALITY ASSURANCE

A. MANHOLES

1. Manholes shall be constructed to allow not more than 50 gallons/day of infiltration.

2. Refer to Section 01666 for testing of manholes.

PART 2 - PRODUCTS

2.1 MATERIALS

A. MANHOLES

1. Manhole Base: Reinforced precast concrete riser pipe with integral precast base, invert and flow channel to form watertight unit, as detailed on the Drawings.

2. Cast-in-place Manhole Base: Cast-in-place reinforced concrete in accordance with Section 03300.


4. Manhole Joints: Tongue and groove in precast wall; O-ring or mastic joint sealing compound, in accordance with Federal Specifications SS-S-00210.

5. Manhole Steps: 12 inch fiberglass reinforced plastic, in all manholes, 12” center to center, in compliance with OSHA requirements, and in accordance with ASTM C478.
6. Grade Rings: Precast reinforced concrete donuts with inside opening of 24 inches, in accordance with ASTM C478.

7. Manhole Sleeves: Flexible synthetic rubber boot type, clamped to pipe by stainless steel strap and draw bolt. Comparable systems are subject to prior approval of Engineer.

8. Manhole Frames and Covers: ASTM A48-83 Class 35B Gray Iron, non-rocking bearing surfaces, concealed type pickholes, the word “SEWER” cast in 2 inch letters in center of cover, and a 24 inch diameter solid lid.
   a. Heavy-Duty frames and covers shall be provided for manhole locations in roads, streets, alleys, driveways, and other areas subject to traffic loadings and shall be Neenah R-1642 with self-sealing lid and four (4) 1” diameter anchor bolts, or equal.
   b. Watertight frames and covers shall be provided for manhole locations in areas prone to flooding or subject to surface water ponding and shall be Neenah R-1916-F with stainless steel hex head bolts and neoprene gasket, or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Manholes shall be placed at locations and grades indicated on the Drawings. Install manhole so that all joints, pipe inlets, and outlets, joints between frame and manhole section, or any other joint, crack, or portal wall shall be watertight.

B. Stub pipes shall be installed where indicated on the Drawings. All stub pipes for future connections shall be tightly capped to prevent leakage.

C. Manhole frames shall be set in a full bed of grout or mortar. Grout or mortar shall also completely cover and enclose the frame flange.

D. All manholes must meet infiltration requirements as specified in Section 01 666.

E. The tops of manholes located in streets, roads, alleys, driveways, sidewalks, or other traveled ways shall be set flush with existing surrounding grade. The tops of new manholes in other areas, not traveled ways, shall be set approximately 3 inches higher than existing surrounding grade, unless directed otherwise by Engineer. Contractor shall mound dirt around the raised manhole top to blend with existing surrounding grade.

F. Drop connections shall be installed and constructed in accordance with details shown on the Drawings.

G. Cleanouts shall be installed and constructed in accordance with details shown on the Drawings. Frame and cover shall be Neenah R-1915-S with water tight, bolt down lid, or equal.

END OF SECTION
SECTION 02732 - DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section consists of furnishing all labor, equipment and material required to install ductile iron pipe in accordance with lines, elevations, cross-sections, and related work as described herein and/or shown on the Drawings.

B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS

A. Shop Drawings submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer’s review of this submittal prior to fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. GRAVITY SEWERS & FORCE MAINS

1. Ductile Iron


B. STREAM CROSSINGS

1. Ductile Iron

   c. Fittings – Same as for Gravity Ductile Iron Pipe.

D. All pipe and fittings shall have a cement lining with bituminous coating conforming to ANSI 21.4/AWWA C104.

E. Fittings shall match all dimensions specified for the pipe.
PART 3 - EXECUTION

3.01 INSTALLATION

A. GRAVITY SEWERS

1. Special Note: The slope of gravity sewer lines must be maintained. The Contractor, upon completion of pipe line laying from manhole to manhole, shall check the grade of pipe for proper slope and side deflection before proceeding to next manhole. Failure of the Contractor to verify and correct deviations from established grade, may require removal and replacement of several joints of pipe to correct less than minimum grade conditions detected at time of final inspection.

2. Preparation of Trench and Bedding shall be as specified in Section 02221 for rigid pipe materials.

3. Pipe shall be laid true to line and grade with a laser beam and air blower, located in the bore of the pipes. Pipe shall be laid with bells upgrade. The sections of pipe shall be fitted and matched so that when laid in the work they will form a sewer with a smooth and uniform invert from manhole to manhole.

4. Maintain a minimum of 36 inches of cover over the top of the pipe.

5. Each section of pipe shall be inspected for defects before lowering in the trench. The mating surfaces shall be completely cleaned.

6. Immediately prior to joining, the mating surfaces shall be brush coated using the special lubricant supplied by the manufacturer.

7. A lever bar may be required to shove the spigot end “home” in the bell, and if so, a board shall be used to protect the pipe.

8. The interior of the pipe shall be thoroughly cleaned of all dirt, stones, sticks, and other materials as the work progresses and the exposed ends of all pipe and fittings shall be fully protected to prevent any material from entering the pipe. All wyes which are installed but not immediately connected shall be plugged with a standard Ductile Iron pipe stopper.

9. Where the ends of the pipe project through a manhole or other structure, they shall be neatly cut to fit the inner face of the structure.

10. Wyes and 4” or 6” service laterals shall be installed at the locations designated by the Engineer. The locations of customer sewer laterals, when shown on the Drawings, are approximate. The Contractor shall make a reasonable effort to ask each property owner where he desires his sewer lateral to be located and locate the sewer lateral as close as practical to this location, subject to approval by the Construction Representative. Service laterals shall be installed to the property line, unless otherwise indicated on the Drawings. Contractor shall be responsible for installation of the lateral.
at a depth which is sufficient to serve the building on the property assuming that the sewer is laid from the building to the property line at a 2% grade. Depth of existing plumbing shall be considered in determining the required lateral elevation. Contractor shall re-lay any lateral at his expense which does not serve its intended purpose.

11. Any laterals not immediately connected shall be marked at the end of the lateral with a 2" x 2" x 4' wood stake driven flush to the normal ground level and painted with fluorescent paint. A record of the location of these unconnected laterals shall be maintained by the Contractor and shall include measured distances to at least two identifiable and permanent structures or objects.

12. If any section of pipe is out of alignment through improper laying or subsequent movement caused by the backfill operation, the Contractor, at his own expense, shall remove the section or sections and place them in true alignment.

13. Backfill shall be as specified in Section 02221.

B. FORCE MAINS

1. Trench shall be excavated to provide a minimum of 36 inches of cover over the top of the pipe.

2. Each section of pipe shall be inspected for defects before lowering in the trench. The mating surfaces shall be completely cleaned.

3. Immediately prior to joining, the mating surfaces shall be brush coated using the special lubricant supplied by the manufacturer.

4. The interior of the pipe shall be thoroughly cleaned of all dirt, stones, sticks and other material as the work progresses, and the exposed ends of all pipe and fittings shall be fully protected to prevent any material from entering the pipe.

5. Backfill shall be as specified in Section 02221.

C. STREAM CROSSINGS

1. The preparation of the trench for the river crossing shall be carefully prepared in a uniform grade so that there are no high points.

2. After the pipe is laid and the joints made, granular backfill of either gravel or crushed stone shall be placed under the haunches and around the sides of the pipe up to the elevation of the top of the pipe.

3. Above this elevation, the trench may be backfilled with suitable material removed from the trench. Rock larger than 12 inches shall not be used.
4. The material and methods the Contractor proposes to use shall be subject to the approval of the Engineer.

5. If the excavation is in rock, granular material shall be placed in the trench to a depth of six inches from the bottom. This bedding shall be uniformly graded and the pipe laid on it. Granular material shall be used to backfill the entire excavation.

6. Gradual change in slope of the force main on the river banks shall be made by deflecting the pipe joints. These deflections shall not exceed the manufacturer's recommendations for ductile iron river crossing pipe. If bends are required which cannot be made by deflecting joints, the Contractor shall furnish and install the necessary fittings. Gradual changes in slope of gravity lines between manholes is not allowed.

7. In addition the Contractor shall request and follow the manufacturer's specific instructions for making the joints which will be furnished with the river crossing pipe.

8. The depth of the pipeline, if shown on the Drawings, may vary depending on the conditions encountered during construction. In any event, the excavation shall be carried to such depths as necessary to provide a minimum of three (3) feet of cover over the pipeline unless otherwise noted on the Plans. The cover shall be measured from the largest outside diameter of the pipe or from the top of the encasement where the pipeline is encased in concrete.

END OF SECTION
SECTION 02733-PVC PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section consists of furnishing all labor, equipment and material required to install PVC pipe in accordance with lines, elevations, cross-sections, and related work as described herein and/or shown on the Drawings.

B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.2 SUBMITTALS

A. Shop Drawings submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer’s review of this submittal prior to fabrication.

1.3 QUALITY ASSURANCE

A. DEFLECTION TESTING

1. In addition to the leakage testing required in Section 01666, all sewers constructed under this Section shall be required to pass a deflection test. Deflection testing should be unnecessary when using proper construction practices during pipe installation and when using embedment material which has been properly selected, placed, and compacted. However, the Engineer reserves the right to require the Contractor to perform random deflection tests of pipe prior to final acceptance. Should three successive test locations be unsatisfactory, then the Contractor shall test the entire sewer system. Deflection tests shall be conducted after the sewer has been in the ground, completely backfilled, for 60 days. Tests shall be conducted using a nine-leg go -no-go gauge approved by the Engineer. All locations which have deflected more than 7 ½% shall be replaced by the Contractor. Pipe shall then be retested, 60 days later. All costs of testing and correction shall be included in the bid price of the pipe. The 7 ½% deflection shall be defined as 7 ½% of the stated nominal diameter of the pipe and shall not consider manufacturing tolerances or out-of-round tolerances. To ensure accurate testing, the sewer pipe must be thoroughly cleaned.

PART 2 - PRODUCTS

2.1 MATERIALS

A. GRAVITY SEWERS
1. Polyvinyl Chloride (PVC) Pipe and Fittings – SDR 35, ASTM D3034 and ASTM D1784 with minimum wall stiffness of 46 psi at 5% deflection when tested in accordance with ASTM F2412.
   a. Pipe Joints – ASTM D3212
   b. Rubber Gaskets – ASTM F477

B. FORCE MAINS AND WATERLINES

1. Polyvinyl Chloride (PVC) Pressure Pipe
   a. AWWA C900, DR 14, CLASS 200
   b. SDR 21 or SDR 26, ASTM D2241
   c. Type of pipe is shown on the Plans.

2. Fittings shall be ductile iron conforming to ANSI A21.10 with mechanical joints conforming to ANSI A21.11, except that gaskets shall be transition type for ASTM D2241 PVC pipe.

2.2 MANUFACTURE

A. PIPE

1. Pipe shall be manufactured from polyvinyl chloride resins and compounds in compliance with the above ASTM specifications.

2. Pipe shipped to the project shall be plainly marked as to type and origin of manufacture.

3. Nominal laying lengths of 12.5' and 20' shall be used.

PART 3 - EXECUTION

3.01 INSTALLATION

A. GRAVITY SEWERS

1. Special Note: The slope of gravity sewer lines must be maintained. The Contractor, upon completion of pipe line laying from manhole to manhole, shall check the grade of pipe for proper slope before proceeding to next manhole. Failure of the Contractor to verify and correct deviations from established grade or side deflection may require removal and replacement of several joints of pipe to correct less than minimum grade conditions detected at time of final inspection.

2. Preparation of Trench and Bedding shall be as specified in Section 02221 for flexible pipe materials.

3. All sewer lines shall be laid true to line and grade with a laser beam and air blower, with bells upgrade. The sections of pipe shall be fitted and matched
so that when laid in the work they will form a sewer with a smooth and uniform invert from manhole to manhole.

4. Each section of pipe shall be inspected for defects before lowering in the trench. The mating surfaces shall be completely cleaned.

5. Immediately prior to joining, the mating surfaces shall be brush coated using the special lubricant supplied by the manufacturer.

6. A lever bar may be required to shove the spigot end “home” in the bell, and if so, a board shall be used to protect the pipe.

7. The interior of the pipe shall be thoroughly cleaned of all dirt, stones, sticks, and other materials as the work progresses and the exposed ends of all pipe and fittings shall be fully protected to prevent any material from entering the pipe. All wyes which are installed but not immediately connected shall be plugged with a standard PVC pipe stopper.

8. Where the ends of the pipe project through a manhole or other structure, they shall be neatly cut to fit the inner face of the structure.

9. Wyes 4” or 6” service laterals shall be installed at the locations designated by the Engineer. The locations of customer sewer laterals, when shown on the Drawings, are approximate. The Contractor shall make a reasonable effort to ask each property owner where he desires his sewer lateral to be located and locate the sewer lateral as close as practical to this location, subject to approve by the Construction Representative. Service laterals shall be installed to the property line, unless otherwise indicated on the Drawings. Contractor shall be responsible for installation of the lateral at a depth which is sufficient to serve the building on the property assuming that the sewer is laid from the building to the property line at a 2% grade. Depth of existing plumbing shall be considered in determining the required lateral elevation. Contractor shall re-lay any lateral at his expense which does not serve its intended purpose.

10. Any laterals not immediately connected shall be marked at the end of the lateral with a 2” x 2” x 4’ wood stake driven flush to the normal ground level and painted with fluorescent paint. A record of the location of these unconnected laterals shall be maintained by the Contractor which includes measurements to at least two identifiable and permanent structures or objects.

11. If any section of pipe is out of alignment through improper laying or subsequent movement caused by the backfill operation, the Contractor, at his own expense, shall remove the section or sections and place them in true alignment.

B. FORCE MAINS

1. Preparation of Trench and Bedding shall be as specified in Section 02221 for rigid pipe materials.
2. Trench shall be excavated to provide a minimum of 36" of cover over the top of the pipe.

3. Each section of pipe shall be inspected for defects before lowering in the trench. The mating surfaces shall be completely cleaned.

4. Immediately prior to joining, the mating surfaces shall be brush coated using the special lubricant supplied by the manufacturer.

5. The interior of the pipe shall be thoroughly cleaned of all dirt, stones, sticks and other material as the work progresses, and the exposed ends of all pipe and fittings shall be fully protected to prevent any material from entering the pipe.

6. Backfill shall be as specified in Section 02221 for flexible pipe.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK

Extent of chain link fences is shown on drawings.

1.03 QUALITY ASSURANCE

A. Provide chain link fences as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

B. Manufacturer: Company specializing in commercial quality fence products with at least five (5) years experience.

PART 2 - PRODUCTS

2.01 GENERAL

A. Dimensions shown for pipe, roll-formed, and H sections are outside dimensions unless otherwise noted.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in this work include but are not limited to the following:

1. Allied Tube and Conduit Corp.
2. Anchor Fence, Inc.
3. Cyclone Fence/United States Steel Corp.
4. Century Tube

2.02 MATERIALS

A. Framework: Type I or Type II Steel Pipe.

Type I-Schedule 40 steel pipe with 1.8 ounces of zinc coating per square foot of surface area conforming to ASTM F104-3 - Group 1A.

Type II-Pipe manufactured from steel conforming to ASTM A 569, cold-formed, high frequency welded and having a minimum yield strength of 50,000 PSI. External surface triple coated with 1.0 ounce ± 0.1 ounce of zinc per square foot, 30 ± 15 micrograms of chromate per square inch and 0.5 ± 0.2 mils of clear, cross linked
polyurethane. Internal surface coated, after welding, with a zinc-rich based organic coating having an 87% zinc powder loading capable of providing galvanic protection.

Pipe shall be straight, true to section and conform to the following weights:

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<th>Type II Weight Lbs./FT.</th>
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</tr>
<tr>
<td>4&quot;</td>
<td>9.11</td>
<td>6.56</td>
</tr>
<tr>
<td>6-5/8&quot;</td>
<td>18.97</td>
<td>-</td>
</tr>
</tbody>
</table>

B. Fabric: Zinc-Coated or Aluminum-Coated Steel.

Zinc coated fabric shall be galvanized after weaving with a minimum 1.2 ounces of zinc per square foot of surface area and conform to ASTM A 392, Class I.

Aluminum coated fabric shall be manufactured in accordance with ASTM A 491 and coated before weaving with a minimum of 0.4 ounces of aluminum per square foot of surface area. The steel wire and coating shall conform to ASTM A 817.

C. Fittings: Pressed steel or cast iron, galvanized with a minimum or 1.2 ounces of zinc per square foot of surface area, or cast aluminum alloy, all conforming to ASTM F 626.

2.03 CONCRETE MIX

ASTM C 94 Portland Cement concrete with maximum 3/4" aggregate having a minimum compressive strength of 2,500 PSI at 28 days.

2.04 COMPONENTS

A. Fence Posts:

<table>
<thead>
<tr>
<th>Fabric Height</th>
<th>Line Post O.D. Type I</th>
<th>Line Post O.D. Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Under 6'</td>
<td>2-1/2&quot;</td>
<td>2-1/2&quot;</td>
</tr>
<tr>
<td>6' to 9'</td>
<td>3&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>9' to 12'</td>
<td>3-1/2&quot;</td>
<td>3-1/2&quot;</td>
</tr>
</tbody>
</table>

E.L. Robinson Engineering Co.
B. Gate Posts:

<table>
<thead>
<tr>
<th>Single Gate Width</th>
<th>Double Gate Width</th>
<th>Post O.D. Type I</th>
<th>Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 6'</td>
<td>Up to 12'</td>
<td>3&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>7' to 12'</td>
<td>13' to 25'</td>
<td>4&quot;</td>
<td>3-1/2&quot;</td>
</tr>
<tr>
<td>13' to 18'</td>
<td>26' to 36'</td>
<td>6-5/8&quot;</td>
<td>-</td>
</tr>
</tbody>
</table>

C. Rails and Braces: 1-5/8" O.D. Type I or Type II.

D. Fabric: Galvanized or aluminum-coated steel wire, 9 gauge, woven in a two inches diamond mesh with top selvage twisted and barbed and bottom selvage knuckled. Fence heights up to 12 feet to be one-piece widths.

E. Gates: Frame assembly of two inches O.D. Type I or Type II pipe with welded joints. Weld areas repaired with zinc-rich coating applied per manufacturer's directions. Fabric to match fence. Gate accessories, hinges, latches, center stops, keepers and necessary hardware of quality required for industrial and commercial application. Latches shall permit padlocking of gate. Barbed wire installed at top of gates.

F. Fittings:

1. Post Caps: Pressed steel, cast iron or cast aluminum alloy designed to fit snugly over posts to exclude moisture. Supply cone type caps for terminal posts and loop type for line posts.

2. Rail and Brace Ends: Pressed steel, cast iron or cast aluminum alloy, cup-shaped to receive rail and brace ends.

3. Top Rail Sleeves: Tubular steel, 0.051 thickness x 7" long, expansion type.

4. Tension Bars: Steel strip, 5/8' wide x 3/16" thick.

5. Tension Bands: Pressed steel, 14 gate thickness x 3/4" wide.


7. Truss Rods: Steel rod, 3/8" diameter merchant quality with turnbuckle.

8. Barbed Wire Arms: Pressed steel, cast iron or cast aluminum alloy fitted with clips or slots for attaching three strands of barbed wire. Arms shall be set outward on a 45 degree angle and be capable of supporting a 250 pound load at outer barbed wire connecting point without causing permanent deflection.

9. All fittings shall conform to ASTM F-626.
G. Tension Wire: Marcelled 7 gauge steel wire with minimum coating of 0.80 ounces of zinc or 0.40 ounces of aluminum per square foot of wire surface and conforming to ASTM A 824.

H. Barbed Wire: Commercial quality steel, 12-1/2 gauge, two strand twisted line wire with 4 point barbs at five-inch spacing. Coating shall consist of a minimum of 0.80 ounces of zinc per square foot of wire surface conforming to ASTM A 121 or a minimum of 0.30 ounces of aluminum per square foot of wire surface conforming to ASTM A 585.

I. Tie Wires: Aluminum, 9 gauge, alloy 1100-H4 or equal.

J. Hog Rings: Steel wire, 11 gauge, with a minimum zinc coating of 0.80 ounces per square foot of wire surface.

PART 3 - EXECUTION

3.01 INSPECTION

A. Installer shall examine site and report in writing to Engineer/Owner any conditions detrimental to the proper and timely completion of the work. Clearing, grading and fence line layout and staking of terminals to be completed by others before start of fence installation.

B. Installer shall receive Notice to Proceed in writing from Engineer/Owner before starting work.

3.02 INSTALLATION

A. General: Fence installation to conform to requirements of ASTM F 567.

B. Height: Provide fence height as indicated on contract drawings.

C. Post Spacing: Space line posts at intervals not exceeding ten feet or as shown on the drawings.

D. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

E. Excavation:

1. Drill holes for posts of diameter and spacings shown, in firm, undisturbed or compacted soil. If not shown on drawings, excavate holes to minimum diameters as recommended by fence manufacturer.

2. Unless otherwise indicated, excavate hole depths approximately three inches
SECTION 02830 CHAIN LINK FENCING

lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

F. Setting Posts: Center and align posts in holes three inches above bottom of excavation. Place concrete around posts and vibrate or tamp for consolidation. Top of footing to be two inches above grade and sloped to direct water away from posts. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

G. Bracing: Brace gate and terminal posts back to adjacent line posts with horizontal brace rails and diagonal truss rods.

H. Top Rail: Install through line post loop caps connecting sections with sleeves to form a continuous rail between terminal posts. Fasten to terminal posts. Provide expansion couplings as recommended by fencing manufacturer.

I. Top Tension Wire: When top rail is omitted, stretch tension wire through loop caps and fasten securely to terminal posts.

J. Bottom Tension Wire: Stretch between terminal posts six inches above grade and fasten to outside of line posts with tie wires.

K. Fabric: Pull fabric tight to provide a smooth uniform appearance, free from sag, with bottom selvage two inches above grade. Fasten to terminal posts with tension bars threaded through mesh and secured with tension bands at maximum 12 inches on posts and 24 inches on rails. Attach to bottom tension wire with hog rings at maximum 24 inches intervals.

L. Barbed Wire: Anchor to terminal extension arms, pull tight to remove all sag and firmly install in slots of line post extension arms.

M. Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to posts with metal bands spaced 15 inches o.c.

N. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

O. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns. Bend wire to minimize hazard to persons or clothing.

P. Fasteners: Install nuts for fittings, bands and hardware bolts on inside of fence. Peen ends of bolts or score threads to prevent removal.

3.03 COMPLETION

E.L. Robinson Engineering Co.
The area of installation shall be left neat and free of any debris caused by the erection of the fence.

END OF SECTION 02830
PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included

1. Grass Seed
2. Fertilizer
3. Lime
4. Mulch
5. Tilling
6. Grading
7. Raking

B. Related Work Specified Elsewhere:

1. Measurement and Payment Section 01025
2. Submittals Section 01300

1.02 QUALITY ASSURANCE

A. Seed mixture must comply with West Virginia Seed Law.

B. Any seeding area that fails to show a good stand of grass or settles to form a noticeable gully within the maintenance period shall be redressed and reseeded to the satisfaction of the Engineer.

1.03 SUBMITTALS

Contractor must submit the following in accordance with Section 01300, Shop Drawing Submittals.

Seed composition and source.
Mulch composition and source.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Grass Seed

1. First quality lawn mixture as approved by the Engineer.
SECTION 02930 LAWN SEEDING

2. Seed shall conform to the mixture as follows:

- 15% Perennial Rye Grass
- 60% Kentucky 31 Fescue
- 22% Kentucky Bluegrass
- 03% White Dutch Clover

B. Fertilizer

1. Standard grade free flowing mixture.
2. Bags fully labeled and bearing the name and warranty of the manufacturer.

C. Lime:

Approved agricultural grade.

D. Mulch:

Straw or hay free from noxious weed seed.

PART 3 - EXECUTION

3.01 PREPARATION

A. Grading:

1. Backfill areas to be settled and compacted.
2. Dressed to conform to adjacent undisturbed areas.
3. Cleanup of debris, rocks, dirt clods, etc.
4. Allow for surface drainage.

B. Tilling:

When ground has been hard, the area shall be tilled to a minimum depth of 3''.

3.02 APPLICATION

A. Fertilizer and Lime:

1. Lime applied at the rate of 12 lbs. per 100 sq. ft. and fertilizing applied at a rate of one pound per 100 square feet shall be mixed with the top 2'' of soil by raking or tilling.

2. Fine rake and dress to conform to adjacent areas with attention given to surface drainage.
B. Grass Seed:

1. Broadcast by hand or approved mechanical equipment at uniform rate of 0.15 lbs. per 100 sq. ft.

2. Scratch raked to cover seed 1/8-inch to 1/4-inch, then rolled with a hand roller weighing at least 50 lbs. per foot of width.

3. Cover with mulch.

4. Spring seeding: between March 1 and May 1.

5. Fall seeding: between August 15 and October 1.

6. Satisfactory watering must be provided when seeding is done outside of specified dates.
SECTION 02956 - SEWER CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes sewer cleaning and internal obstruction removal.

1.2 SYSTEM DESCRIPTION

A. Cleaning shall remove sediment, rocks, debris, roots, grease accumulations and obstructions from length of lines.

B. Cleaning methods shall be washing with high pressure water or other as approved by ENGINEER.

1.3 SUBMITTALS

Submit letter that identifies methods that will be used to remove sediment, debris, grease, scale, encrustations, loose concrete, and roots throughout section of sewer to be cleaned. Include the following:

A. Detailed explanation of cleaning process.

B. Schedule of activities.

C. References where identified cleaning method has been used successfully in the past by Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

Do not use chemicals without written approval of ENGINEER.

2.2 EQUIPMENT

High-Velocity Hydraulic (Hydro-Cleaning) Equipment: Equipment shall be capable of removing dirt, grease rocks, sand, roots, and other materials and obstructions from lines and manholes.

A. Equipment shall have selection of two or more high-velocity nozzles.

Nozzles shall be capable of producing scouring action from 15 to 45 degrees in all size lines designated to be cleaned, with nozzle capable of producing flows from fine spray to solid stream.

B. Equipment shall carry its own water tank, auxiliary engines, and high pressure water pump.

C. Combination Unit Pump: Capable of pumping at least 80 gallons per minute (300 liters per minute) at 2,000 psi (13.8 MPa), measured at beginning of hose reel.

D. Water Pump: Able to run at 2,000 psi (13.8 MPa) while pulling full vacuum, completely independent from vacuum system, with ability to vary vacuum without affecting water pressure.
2.3 WATER

A. When water from fire hydrants is necessary, usage must be measured and reported by the Contractor by a method approved by the Engineer. Lubeck PSD must be notified.

B. Provide temporary piping, valves, certified reduced pressure backflow preventors, equipment, and other items for handling potable water and wastewater.

PART 3 - EXECUTION

3.1 APPLICATION

A. Line Cleaning: Clean designated lines using approved methods and equipment.
   1. Remove internal obstructions such as roots or gaskets by trenchless techniques when obstruction encountered prevents further pipe cleaning.
   2. If cleaning of entire section cannot be successfully performed from manhole, set up equipment at other inlet and attempt cleaning again.
      a. If successful cleaning cannot be performed or equipment fails to traverse entire sewer line section, it will be assumed that major blockage exists.
      b. Temporarily suspend cleaning effort and immediately notify ENGINEER.
      c. Upon removal of obstruction, complete cleaning operation.
   3. Employ satisfactory precautions to protect sewers from damage that might be inflicted by improper use of cleaning equipment.
      a. Immediately notify ENGINEER if fresh soil, pieces of pipe, or other visible signs of potential problems occur during cleaning operation.

B. Removal of Debris: debris shall be removed immediately and be prevented from entering downstream sections of sewer.

3.2 CLEANING

A. Keep premises free from accumulations of waste materials, rubbish and other debris resulting from Work.
B. Remove waste materials, rubbish, and debris from and about premises.
C. Remove tools, construction equipment and machinery, and surplus materials.
D. Restore to original condition portions of site not designated for alterations by Contract Documents.

END OF SECTION
SECTION 03100 – CONCRETE FORMWORK

PART 1 – GENERAL

1.1 WORK REQUIRED

A. The work to be performed under this section consists of furnishing all labor, materials, equipment and utilities necessary for supplying, delivering and placing forms and accessories required for completion of Concrete work as indicated on the contract drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Reinforcement - Section 03200

B. Cast-in-Place Concrete - Section 03300

1.3 DESIGN

A. It is the Contractor's responsibility to determine size, shape, adequacy and rigidity of the formwork. Forms, in general, shall be properly and adequately braced to provide necessary rigidity and to maintain the desired shape and position during and after placement of concrete. At joints and splices, the forms shall be sufficiently tight and adequately braced to prevent excessive leakage of concrete and to provide a neat, uniform surface.

1.4 SCHEDULING

A. Contractor shall schedule formwork to coincide with the progress of the work and shall give full cooperation with all other trades to maintain progress of the work.

PART 2 - MATERIALS

2.1 TYPE

A. Forms shall be mortar tight and be of metal, wood, plastic, plywood or slip-form paving machine as required. The type of formwork selected by the Contractor and approved by the Owner's Representative shall be straight, free of warp and of sufficient rigidity capable of withstanding concrete pressure without buckling, bowing or springing. The subject forms shall have a depth at least equal to the depth of concrete and shall not deviate from a true plane more than 1/8-inch in 10 feet. Use of forms that are bent, worn or otherwise damaged is not permitted.

2.2 ACCESSORIES

A. Form Ties: Form ties shall be of adequate strength metal ties and be fixed or adjustable in length. Use of thin gauge wire in the construction of formwork is not permitted.

B. Clips: Form clips used with prefabricated forms shall be compatible with the forms and shall be of the type approved and supplied with the forms by the manufacturer or supplier.
C. Braces: Wooden stakes, steel pins or reinforcing bars used as braces for form supports shall be of sufficient length to provide required rigidity to the formwork.

2.3 COATING

A. The non-staining product shall be a commercial formulation of satisfactory and proven performance that will not bond with or otherwise adversely affect concrete surfaces that are to be cured.

2.4 SETTING OF MANUFACTURED ITEMS

A. Set all anchor bolts, posts, trays, etc. required by the manufacturers for the various items to be installed. Secure templates as required.

PART 3 - EXECUTION

3.1 ERECTION OF FORMS

A. Erect forms for footings, walks, and walls and conform to shape, form, grade and line as required.

B. Make all joints leakproof and securely brace to prevent offsets in alignment. Check dimensions before installing reinforcing to insure correct size. Make forms removable without hammering or prying against concrete.

C. Set top of forms to finished elevations.

D. Place no concrete until forms have been inspected by the Owner's Representative and approved.

3.2 OILING OF FORMS

A. Treat with oil before pouring and before placing reinforcing. Wipe off excess oil with rags; leave surface just oily to the touch.

3.3 REMOVAL OF FORMS

A. Forms shall not be removed from freshly poured concrete until it has set for at least 24 hours for slabs on grade, and for 48 hours for other structures. Contractor shall exercise proper care and judgment in checking hardness of concrete before removal of forms. Forms shall be carefully removed so as to avoid any damage to the concrete.

END OF SECTION
SECTION 03200  CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01  DESCRIPTION

Related Work Specification Elsewhere

Concrete -  Section 03300

1.02  SUBMITTALS

A. Submit complete shop drawings showing bending diagrams, assemble diagrams, splicing and laps of rods, shapes, dimensions and details for bar reinforcing, stirrup spacing, accessories and openings. Shop drawings shall show all openings. Submit shop drawings based on plan requirements. Redesign of reinforcing will not be acceptable. Show all bend dimensions and typical bending diagrams for slabs.

B. Unless shown otherwise, detailing of reinforcement and providing of accessories shall conform to Manual of Standard Practice for Detailing Reinforced Concrete Structures of the ACI. Support reinforcement on metal supports of proper type.

C. Shop drawings shall be complete upon first submission and no further information shall be added unless requested. See Section 01300.

PART 2 - PRODUCTS

2.01  MATERIALS

A. Furnish reinforcing steel and accessories as shown on drawings and specified herein. Verify delivery sequence for Section 03300. All reinforcing shall be from domestic mills.

B. Reinforcing steel shall be made from new billet and shall conform to the following schedule.

<table>
<thead>
<tr>
<th>Items</th>
<th>ASTM Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcing</td>
<td></td>
</tr>
<tr>
<td>#3 to #11 deformed</td>
<td>A615 Grade 60</td>
</tr>
<tr>
<td>Welded Wire Fabric</td>
<td>A185</td>
</tr>
<tr>
<td>1. Reinforcing shall have suitable marks to visually determine grades at site.</td>
<td></td>
</tr>
<tr>
<td>2. Use A615 Grade 60 steel for ties, stirrups.</td>
<td></td>
</tr>
</tbody>
</table>

C. Unless shown otherwise on drawings, wire mesh reinforcement of floor slabs and wherever wire is called for shall be electric welded 6 x 6" mesh, No.6, AS&W gauge wire. Mesh 6 gauge and heavier shall be provided in sheets.
2.02 ACCESSORIES

A. Accessories shall include metal spacers, chairs, ties and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place.

B. Provide spacers with tie wire at proper intervals to hold slab bars in position and to raise them above forms to distances shown. Support reinforcing on bolsters or chairs and carrying bars whether or not specifically called for on drawings.

2.03 FABRICATION

Conform to schedules and details on drawings and with requirements of ACI. No other bending or reinforcements will be allowed.

2.04 CLEANING AND STORING

A. Reinforcement shall be cleaned and free from rust, scale, dirt, grease, oil, snow, ice, etc., upon delivery and before installation.

B. Protect reinforcement against mechanical injury. Store at site keeping steel at least 3 inches above ground. Steel having deposits of scale will be rejected.

PART 3 - EXECUTION

3.01 PLACEMENT

A. An iron worker shall be on job to correct displacement of reinforcement just prior to and during concrete placement operations.

B. Reinforcing steel is to be inspected and approved in place before it is covered with concrete. No bending of reinforcement will be permitted and no welding of reinforcement will be permitted unless specifically called for on the plans.

C. Position reinforcement in accordance with ACI Standard Building Code requirements for reinforcing concrete and unless otherwise specified or shown, secure against displacement by using at intersections, 16 gauge soft annealed wire or suitable clips.

D. Wire fabric shall extend to within two inches of edges of slab or section. Lap sheets at least 12 inches or one wire space, whichever is greater at ends and edges and wire together. Do not extend fabric across expansions joints.

E. Support reinforcement in slabs on gravel fill with chairs and bolsters of proper height. Chairs and bolsters are to have plates to prevent their sinking into the gravel fill.

F. Bars shall be placed to clearances shown on plans and as required by ACI-318-71.

G. Lap splices shall be as noted in ACI-318-71 except that in circular tanks bars in ring tension shall have a minimum splice of 40 bar diameters. Stagger splice locations
wherever possible.

H. Corner lap bars shall be same size as maximum bar size jointing at corner and extend minimum 36 diameters in each direction from corner, unless noted otherwise on plans.

I. Wherever possible, rebar shall be spaced to clear pipe sleeves, pipes, etc. Where this is impossible rebar shall be field cut as approved by Engineer. Add rebar at pipe projections through wall. #5 bars each face of wall at field cuts. Four #5 each face, pipe size plus 48 rebar diameters typical.

J. Extend wall rebar into concrete support bolsters, effluent outfall walls, etc. Add corner bars as above.

K. Take special care in bar placement when it relates to anchor bolt setting and hole drilling.

L. All chase openings, manhole openings, boxouts, etc., shall be reinforced with #5 bars on each face of wall or slab, along all sides of opening. Bars shall extend 24 bar diameters past the edge of opening.

END OF SECTION 03200
PART 1 - GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK
   A. Extent of concrete work is shown on drawings.

1.03 QUALITY ASSURANCE
   A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
      1. ACI 301 "Specifications for Structural Concrete for Buildings."
      2. ACI 318 "Building Code Requirements for Reinforcements for Reinforced Concrete."
      3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
      4. AWWA D103-97 Factory Coated Bolted Steel Tanks for Water Storage Foundation
   B. Concrete Testing Service: Employ, at Contractor's expense, a testing laboratory acceptable to Engineer to perform material evaluation tests and to design concrete mixes.
   C. Materials and installed work may require testing and retesting, as directed by Engineer, at any time during process of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense. Retesting of rejected materials and installed work, shall be done at Contractor's expense.
   D. Installed work that is found to be constructed of inferior or rejected materials shall be replaced at the Contractor's expense.

1.04 SUBMITTALS
   A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Engineer.
   B. Samples: Submit samples of materials as specified and as otherwise requested by Engineer, including names, sources and descriptions.
C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified.

D. Material Certificates: Provide material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class 1, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Product shall be equal to Debond as manufactured by L & M Construction Chemicals, Inc.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars (Rebar): ANSI/ASTM A 615, Grade 60, deformed.


D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS

A. Portland Cement: ANSI/ASTM C 150, Type I. Use one brand of cement throughout project, unless otherwise acceptable to Engineer.

B. Normal Weight Aggregates: ANSI/ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete. Local aggregates not complying with ANSI/ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Engineer.

For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.

C. Use of Pozzolans (flyash) will not be approved by Engineer.

D. Water: Potable.


Available products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Sika Aer"; Sika Corp.
"MB-VR or MB'AE"; Master Builders.
"DAREX AEA"; W.R. GRACE.
"Edoco 2001 or 2002"; Edoco Technical Products.

F. Water-Reducing Admixture: ANSI/ASTM C 494, Type A, and contain not more than .1% chloride ions.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Eucon WR-75"; Euclid Chemical Company
"Pozzolith 344"; Master Builders
"Plastocrete 161"; Sika Chemical Corporation
"Chemtard"; Chem-Masters Corporation

G. Water-Reducing, Accelerator Admixture: ASTM C 494, Type E.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
"Accelguard HE"; Euclid Chemical Company
"Pozzolith 122-HE"; Master Builders
"Darex"; W.R. Grace
"Plastocrete 161 FL"; Sika Chemical Company

H. Calcium chloride not permitted.

2.04 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Engineer.

B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to starting work. Do not begin concrete production until mixes have been reviewed and approved by Engineer.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.

D. Admixtures:

1. Use water-reducing admixture in all concrete.

2. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50° F (10° C).

3. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits:

   Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:

   6% plus or minus 1%

4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
5. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

Reinforced foundation systems: Not less than one-inch and not more than 3 inches.

2.05 CONCRETE MIXES

A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94, and as herein specified.

1. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.

2. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ANSI/ASTM C 94 may be required.

3. When air temperature is between 85° F. (30° C) and 90° F. (32° C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90° F. (32° C) reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 FORMS

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Form Ties: Factory-fabricated, adjustable-length removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2 inches inside concrete.

2. Unless otherwise shown, provide form ties which will not leave holes larger than one-inch diameter in concrete surfaces.

H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at
least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS

A. Provide keyways at least 1-1/2 inches deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

3.04 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. Tank floors with embedded starter sheets must be constructed by trained personnel as indicated in Section 06530 of these specifications.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.05 CONCRETE PLACEMENT

A. Replacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General: Comply with ACI 304, and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

E. Consolidate placed concrete by mechanical vibrating equipment supplemented by
hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel, floor or section is completed.

H. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

I. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

J. Maintain reinforcing in proper position during concrete placement operations.

K. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

2. When air temperature has fallen to or is expected to fall below 40° F. (4° C.), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50° F. (10° C.), and not more than 80° F. (27° C.) at point of placement.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

4. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerator's unless otherwise accepted in mix designs.

L. Hot Weather Placing:

1. When hot weather conditions exist, place concrete in compliance with ACI 305 and herein specified.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90° F. (32° C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.
3. Cover reinforcing steel with water-soaked burlap so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Wet forms thoroughly before placing concrete.
5. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.06 FINISH OF FORMED SURFACES

A. Rough Form Finish (RfFm-Fn): For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4-inch in height rubbed down or chipped off.

B. Smooth Form Finish (SmFm-Fn): For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish (SmRbd-Fn): Provide smooth rubbed finish (SmRbd-Fn) to scheduled concrete surfaces, which have received smooth form finish (SmFm-Fn) treatment, not later than one day after form removal. Moisten concrete surfaced and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Related Uniformed Surfaces: At tops of walls, horizontal offsets surfaced occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated. Surface plane tolerances shall not exceed 1-inch in 10 feet when tested with a 10 feet straightedge.

3.07 MONOLITHIC SLAB FINISHES

A. Scratch Finish (Scr-Fn): Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

B. After placing slabs, plane surface to a tolerance not exceeding 1/2-inch in 10 feet when tested with a 10 feet straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms
or rakes.

C. Float Finish (Flt-Fn): Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and otherwise indicated.

D. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4-inch in 10 feet when tested with a 10 foot straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

E. Trowel Finish (Tr-Fn): Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating.

F. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8-inch in 10 feet when tested with a 10 foot straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

G. Non-Slip Broom Finish (NSBrm-Fn): Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

H. Should the concrete fail to meet the above standards, the Contractor shall replace the concrete at no cost to the Owner.

3.08 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep concrete continuously moist for not less than seven days.

3. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least seven days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining
cover curing compound, and by combinations thereof, as herein specified.

C. Provide moisture curing by following methods.

1. Keep moisture surface continuously wet by covering with water.

2. Continuous water fog spray.

3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with four-inch lap over adjacent absorptive covers.

D. Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least three-inch and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Provide curing compound to slabs as follows:

1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within two hours). Apply uniformly in continuous operation by operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

F. Curing Formed Surfaces:

Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces:

1. Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing compound.

2. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
3.09 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength of inplace concrete by testing field-cured specimens representative of concrete location or members.

C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.10 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used for work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Engineer.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar within 24 hours after removal of forms, when acceptable to Engineer.

B. Cut out honeycomb, rock pockets, voids over 1/4-inch in any dimension, and holes
left by tie rods and bolts, down to solid concrete, but, in no case to a depth of less than one-inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

C. For exposed-to-view surfaces, blend with white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repair of Formed Surfaces: Remove concrete having defective surfaces if defects cannot be repaired and replace with fresh concrete. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar or precast cement cone plugs secured in place with bonding agent.

E. Repair concealed form surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace with fresh concrete.

F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having a required slope.

G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01-inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

I. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.

J. Repair defective areas, except random cracks and single holes not exceeding one-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surface in contact with patching concrete and apply bonding compound. Mix patching concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finish concrete. Cure in same manner as adjacent concrete.
K. Repair isolated random cracks and single holes not over one-inch in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours. Use epoxy-based mortar for structural repairs, where directed by Engineer.

L. Formwork is to be properly positioned and braced to stay in true alignment during concrete placement, curing and hardening process. Deviation of more than one-inch in 10 feet in either horizontal or vertical plane will be cause for removal of entire pour.

M. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Sampling and testing for quality control during placement of concrete may include the following, as directed by Engineer.

B. Sampling Fresh Concrete ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure for normal weight concrete; one for each set of compressive strength test specimens.

3. Concrete Temperature: Test hourly when air temperature is 40° F. (4° C.) and below, and when 80° F. (27° C.) and above; and each time a set of compression test specimens made.

4. Compression Test Specimens: ASTM C 31; one set of six standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

5. Compressive Strength Tests: ASTM C 39; one set for each 50 cubic yards or fraction thereof, each concrete class placed in any one day or for each 5,000 square feet of surface area placed; two specimens tested at seven days, three specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

6. When frequency of testing will provide less than five strength tests for a given class of concrete, conduct testing from at least five randomly selected
batches or from each batch if fewer than five are used.

7. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

8. Strength level of concrete will be considered satisfactory if average of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.

C. Test results will be reported in writing to Engineer and Contractor on same day that test are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive breaking strength and type of break for both seven-day test and 28-day tests.

D. Additional Tests: The testing service will make additional test of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION 03300
SECTION 05580  GLASS-COATED BOLTED STEEL STORAGE TANKS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to install, field test, complete, and make ready for service one (1) 221,000 gallon and one 16,000 gallon glass-coated, bolted-steel water storage tanks, including tank foundations, structure and tank appurtenances as shown on the drawings as specified herein.

1.02 RELATED WORK

A. Section 2200 - Earthwork
B. Section 3200 - Concrete Reinforcing
C. Section 3300 - Concrete Work
D. Section 2830 - Fencing

1.03 SUBMITTALS

E. Submit to the ENGINEER as provided in Section 01300, shop drawings, details of construction and erection of tanks as follows:

1. Structural Calculations for the tank structure and foundation stamped by a Professional Engineer licensed in the State of West Virginia and stamped by a Professional Engineer employed by the tank manufacturer.
2. Construction Drawings for the tank structure and foundation stamped by a Professional Engineer licensed in the State of West Virginia and stamped by a Professional Engineer employed by the tank manufacturer.
3. The tank manufacturer’s and installing contractor’s standard published warranty. Dimensions of tank, fittings and attachments, with bolt and gasket material.
4. Locations of fittings and attachments and size of manway openings.
5. Statement that materials and resin used are smelted and produced in the U.S.A. service.
6. Statement indicating that the tank manufacturer is ISO-9001 certified.
7. Tank manufacturer shall submit written proof of a factory mutual inspection of the factory where the glass coated bolted-steel tanks are manufactured.
8. Clarifier access stairway, walkway and support details.

B. Drawing Approval

1. Shop drawings shall be approved by the ENGINEER prior to any manufacturing of tanks, fittings, etc. Approval of drawings by the ENGINEER shall not release the CONTRACTOR of responsibility of compliance with these specifications. All proposed changes to these Specifications shall be stated in writing.

1.04 REFERENCE STANDARDS
A. American National Standards Institute (ANSI)
   1. ANSI Standard 61- Indirect Additives

B. American Water Works Association
   1. ANSI/AWWA D103 Section 10.4- Factory Coated Bolted Steel Tanks for Water Storage.

C. American Society of Testing Materials (ASTM)
   2. ASTM A36- Specifications for Carbon Structural Steel.
   3. ASTM D1751 - Specifications for Performed Expansion Joint Filler for Concrete Paving.
   4. ASTM A1011 Specifications for Mild Steel Strength.
   5. ASTM C652 Disinfection of Water Storage Facilities.

D. American Iron and Steel Institute (AISI)
   1. AISI 1010 Rolled Structural Shapes

E. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The tank manufacturer shall provide a list of five (5) tanks presently in U.S.A. potable water service, of size and character specified herein, operating satisfactorily for a minimum of five (5) years, include the telephone number of Owner and Engineer.

B. The tank shall be new construction as supplied from a U.S.A. manufacturer who owns and operates its production plant, fabricates and glass coats the tank at one location.

C. Tank and Dome substitutions which cause engineering and contract changes may require changes in design and construction. All costs which result from such changes in design and construction shall be borne entirely and unconditionally by the Contractor, said costs to include but not be limited to, structural, piping, mechanical and electrical changes and all engineering costs incurred as a result of the substitution.

PART 2 - PRODUCTS

2.01 GENERAL

A. The use of a manufacturer’s name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
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B. Like items of materials, equipment shall be the end product of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.

2.02 GLASS COATED, BOLTED-STEEL POTABLE WATER TANKS

A. The glass coated, bolted-steel potable water tanks shall be designed to the sizes shown on the Drawings.

B. The glass coated, bolted-steel tanks shall meet the following criteria-

Design Loads:

- Specific Gravity :1.0
- Wind Velocity: 100 miles per hour
- Shape Factor: 0.6
- Roof Snow Load: 30 psf
- Seismic per AWWA D103-97 Zone 1 Effective Mass Method

PART 3 - MATERIALS

3.01 GENERAL

A. Plates and sheets used in the construction of the tank shell or tank roof shall comply with the minimum standards of AWWA D103, Section 2.4.

B. Design requirements for mild strength steel shall be ASTM A1011 Grade 30 with a maximum allowable tensile stress of 14,566 psi per AWWA D103.

C. Design requirements for high strength steel shall be ASTM A607 Grade 50 with a maximum allowable tensile stress of 25,400 psi per AWWA D103.

D. The annealing effect created from the glass coated firing process shall be considered in determining ultimate steel strength. In no event shall a yield greater than 50,000 psi be utilized for calculations detailed in AWWA D103, Section 3.4 and 3.5.

E. Multiple vertical bolt line sheets and plates of ASTM A607 Grade 50 only shall be manufactured such that holes are staggered in the vertical bolt lines and that no two adjoining holes are in-line horizontally, except at the center of the sheet or plate.

1. Bolt seam design shall generally be in accordance with the requirements of AWWA D103 section 3.5.2, bolt spacing may be adjusted in the vertical bolt lines to increase the net section and improve joint efficiency to a maximum of 85%.

2. Double sheeting of tank panels shall not be permitted to achieve structural sidewall thickness requirements.

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F. Rolled Structural Shapes shall conform to minimum standards of ASTM A36 or AISI 1010.

G. Horizontal Wind Stiffeners
   1. Intermediate horizontal wind stiffeners shall be of the “web truss” design with extended tail to create multiple layers of stiffener, permitting wind load to transfer around tank.
   2. Web Truss stiffeners shall be of steel with hot dipped galvanized coating.
   3. Rolled steel angle stiffeners are not permitted for intermediate stiffeners.

H. Bolt Fasteners
   1. Bolts used in tank lap joints shall be 1/2”-13 UNC-2A rolled thread and shall meet the minimum requirements of AWWA D103, Section 2.2
   2. Bolts shall be SAE Grade 2 (1” bolt length), with:
      a) Tensile strength of 74,000 psi minimum
      b) Proof load of 55,000psi minimum
      c) Allowable shear stress 36,818 psi (AWWA D103)
   3. For bolt greater than 1” length, SAE grade 8 (ASTM A325), heat treated to the following properties
      a) Tensile strength 150,000 psi minimum
      b) Proof Load 120,000 psi minimum
      c) Allowable shear stress 36,818 psi (AWWA D103)
   4. Bolt finish shall be Zinc, mechanically deposited, 20 mils minimum under bolt head, on shank and threads
   5. Bolt Head Encapsulation shall be high impact polypropylene co-polymer encapsulation of entire bolt head up to the splines on the shank. Encapsulation shall be natural resin with UV light inhibitor. Color to be black.
   6. All tank shell bolts shall be installed such that the head portion is located inside the tank and the washer and nut are on the exterior.

I. Lap Joints
   1. All lap joint bolts shall be properly selected such that threaded portions will not be exposed in the “shear plane” between tank sheets. Bolt lengths shall be sized as to achieve a neat and uniform appearance. Excessive threads extending beyond the nut after torquing will not be permitted.
   2. All lap joint bolts shall include a minimum of four (4) splines on the underside of the bolt head at the shank in order to resist rotation during torquing.

J. Lap Joint Sealants
1. Lap joint sealant shall be a one component, moisture cured, polyurethane compound. The sealant shall be suitable or contact with potable water and meet applicable FDA Title 21 regulation as well as ANSI/NSF Additives Standard 61.

2. Sealants shall be used to seal lap joints, bolt connections and sheet edges. The sealant shall cure to a rubber like consistency, have excellent adhesion to the glass coating, have low shrinkage, and be suitable for interior and exterior exposure.

3. Sealant curing rate at 73°F and 50% RH

4. Tack-free time 6 to 8 hours

5. Final cure time 10 to 12 days

6. The sealant shall be ESPC System Sealer No. 98

7. Neoprene gaskets and tape type sealer shall not be used.

K. Stainless Steel

1. All steel baffles shall be bolted 12 gauge stainless steel.

2. Unless noted otherwise, all steel shall be stainless per ASTM A123 after fabrication. All bolts, threaded rods, nuts and washers shall be stainless steel.

PART 4 - GLASS COATING SPECIFICATION

4.01 PREPARATION FOR COATING

A. Following the decoiling and shearing process, sheets shall be steel grit-blasted on both sides to the equivalent to SSPC-10. Sand blasting and chemical pickling of steel sheets is not acceptable or permitted.

B. The surface anchor pattern shall be not less than 1.0 mil.

C. The sheets shall be evenly oiled on both sides to protect them from corrosion during fabrication.

D. Sheet edges of sidewall and floor plates shall be mechanically rounded and flame coated with stainless steel prior to glass coating. Glass coating of the sheet edges shall be similar to the flat panel surface. The process shall be applied to all four sheet edges, and shall be equal to EDGECOAT™ by Engineered Storage Products Company.

E. After edgecoating and prior to application of the coating system, all sheets shall be thoroughly cleaned by a caustic wash and hot rinse process followed immediately by hot air drying.

F. Inspection of the sheets shall be made for traces of foreign matter or rust. Any such sheets shall be re-cleaned or grit blasted to an acceptable level of quality.

4.02 COATING PROCESS
A. VITRIUM PLUS Coating Technology or equivalent shall be used.

B. All sheets shall be primed with catalytic nickel oxide glass ground-coat on both sides and then air dried per section 10.4.2.1 of AWWA D103.

C. A coat of milled glass shall be applied to the inside of the sheet and then air dried. This milled glass shall be formulated with titanium dioxide to produce a finished interior surface with optimum toughness and resistance to conditions normally found in potable water storage tanks.

D. A second cover coat of the titanium dioxide formulated milled glasses shall be applied to the interior surface. The finished interior color shall be white and have a minimum glass thickness of 10 mils.

E. A final cover coat of milled cobalt oxide enhanced (blue) glass shall be applied to the exterior of the sheet.

F. The sheet shall then be fired at a minimum temperature of 1,500°F in strict accordance with the manufacturer's ISO 9001 quality process control procedures, including firing time, furnace humidity, and temperature control.

G. The finished exterior color shall be the manufacturer's standard cobalt blue.

H. All coated sheets shall be inspected for 10 mil minimum glass thickness (Mikrotest or equal).

I. All coated sheets shall be checked for color uniformity by an electronic colorimeter.

J. An electrical “holiday” detection test shall be performed on the inside surface after fabrication of the sheet. Sheets with excessive “holidays” shall be rejected so as to minimize field touch up.

4.03 PACKAGING AND SHIPPING

A. All approved sheets shall be protected from damage prior to packing for shipment.

B. Heavy paper or plastic foam sheets shall be placed between each panel to eliminate sheet-to-sheet abrasion during shipment.

C. Individual stacks of panels will be wrapped in heavy mil black plastic and steel banded to special wood pallets built to the roll-radius of the tank panels. This procedure eliminated contact or movement of finished panels during shipment.

D. Shipment from the factory to the job site will be by truck, hauling the tank components exclusively. No common carrier, drop or transfer shipments

PART 5 - TANK ERECTION
5.01 TANK FOUNDATION AND FLOOR

A. The tank foundation is part of this contract. The tank foundation shall be designed by the manufacturer to safely sustain the structure and its live loads.

B. The tank footing design shall be based on soil bearing capacity indicated in the soils investigation. Copies of the soils investigation report can be obtained from the Owner or Engineer.

C. The Tank floor shall be constructed of concrete. The floor design is of reinforced concrete with embedded glass coated steel starter sheet per AWWA D103-97 Section 11.4.1.6 and the manufacturer’s design. The tank foundation and floor will be poured in two separate pours and will be constructed by trained personnel that regularly engage in this type of construction.

D. Leveling of the starter ring shall be required and the maximum differential elevation within the ring shall not exceed one-eighth (1/8) inch, nor exceed one-sixteenth (1/16) inch within any ten (10) feet length.

E. A leveling plate assembly (per Harvestore Products Inc - U.S. Patent No 4,483,607) consisting of two 18" anchor rods (3/4" dia.) and a slotted plate (3-1/2" x 11" x 3/8" thick) shall be used to secure the starter ring, prior to encasement in concrete. Installation of the starter ring on concrete blocks or bricks; using shims for adjustment is not permitted. The foundation with anchor bolts/leveling plates shall be a separate pour from the concrete floor.

F. Two water stop seals made of butyl rubber elastomer special for this application shall be placed on the inside surface of the starter ring below the concrete floor line. These materials shall be installed as specified by the tank manufacturer.

5.02 TANK SIDEWALLS

B. Field erection of the glass-coated, bolted-steel tank shall be in strict accordance with the procedures outlined in the manufacturer’s erection manual, and preformed by an authorized dealer of the tank manufacturer, regularly engaged in erection of these tanks.

C. Special erection jacks and building equipment developed and manufactured by the tank manufacturer shall be used to erect the tanks.

D. Particular care shall be taken in handling and bolting of the tank panels and members to avoid abrasion of the coating system. Prior to liquid test, all surface areas shall be visually inspected by the Engineer.

E. An electrical holiday test shall be performed during erection using a nine (9) volt leak detection device. All electrical leak points found on the inside surface shall be repaired in accordance with manufacturer’s published touch
SECTION 05580 GLASS-COATED BOLTED STEEL STORAGE TANKS

up procedure using urethane sealer.

F. The placement of sealant on each panel may be inspected prior to placement of adjacent panels. However, the Engineer's inspection shall not relieve the contractor from his responsibility for liquid tightness.

G. No backfill shall be placed against the tank sidewall without prior written approval and design review of the tank manufacturer. Any backfill shall be placed according to the strict instructions of the tank manufacturer.

5.03 ROOF INSTALLATION

C. Tanks with diameters of 14 to 31 feet shall include a radially sectioned roof fabricated from glass-coated, bolted steel panels, as produced by the tank manufacturer and shall be assembled in a similar manner as the sidewall panels utilizing the same sealant and bolting techniques, so as to assure a water/air tight assembly. The roof shall be clear span and self supporting. Both live and dead loads shall be carried by the tank walls. The exterior coating finish shall be cobalt blue glass. The manufacturer shall furnish a roof opening which shall be placed near the outside tank ladder and which shall be provided with a hinged cover and a hasp for locking. The opening shall have a clear dimension of at least twenty-four (24") inches in one direction and eighteen (18") inches in the other direction. The opening shall have a gasketed weather tight cover.

D. A properly sized vent assembly in accordance with AWWA D103 shall be furnished and installed above the maximum water level of sufficient capacity so that at maximum possible rate of water fill or withdrawal, the resulting interior pressure or vacuum will not exceed 0.5" water column.

E. The overflow pipe shall not be considered to be a tank vent.

F. The vent shall be constructed of aluminum.

G. The vent shall be so designed in construction as to prevent the entrance of birds and/or animals by including an expanded aluminum screen (1/2 inch) opening. An insect screen of 23 to 25 mesh polyester monofilament shall be provided and designed to open should the screen become plugged by ice formation.

5.04 APPURTENANCES

A. The installation of all appurtenances shall conform to AWWA D103, Section 5

B. Where pipe connections are shown to pass through tank panel, they shall be field located, saw cut, (acetylene torch cutting or welding not permitted), and utilize an interior and exterior flange assembly. ESPC Sealer 98 shall be
applied on any cut panel edges or bolt connections.

C. Overflow piping shall be 10 inch diameter schedule 80 PVC.

D. Outside tank ladder shall be furnished and installed as shown on the contract drawings. Ladders shall be fabricated of aluminum and utilize grooved, skid-resistant rungs. Safety cage and step platforms shall be fabricated of galvanized steel.

E. A hinged, lockable gate shall be installed at the base of the ladder safety cage to deter unauthorized access to the top of the tank. The owner shall provide and install the lock.

F. One sidewall access manway shall be provided as shown on the contract drawings in accordance with AWWA D103. The manway shall be a minimum of 24 inches in diameter and shall include a properly designed reinforcing frame and cover plate. A davit to hold the cover plate, when open, is required for tanks in excess of 38' tall.

G. Identification Plate A shall be provided indicating the manufacturer, tank serial number, tank diameter and height, and maximum capacity. The nameplate shall be affixed to the tank exterior sidewall at a location approximately five (5') feet from grade elevation in a position of unobstructed view.

H. A passive, sacrificial magnesium anode cathodic protection system shall be designed and supplied by the tank manufacturer.

PART 6 - FIELD TESTING

6.01 Following completion of erection and cleaning of the tank, the structure shall be tested for liquid tightness by filling tank to its overflow elevation. Any leaks disclosed by this test shall be corrected by the erector in accordance with the manufacturer's recommendations.

6.02 Water required for testing shall be furnished by the Owner at the time of tank erection completion, and at no charge to the tank erector. Disposal of test water shall be the responsibility of the Owner.

6.03 Labor and equipment necessary for tank testing is to be included in the price of the tank.

PART 7 - DISINFECTION

7.01 The tank structure shall be disinfected at the time of testing by chlorination in accordance with AWWA Specification C652 “Disinfection of Water Storage Facilities” as modified by the tank manufacturer.

7.02 Disinfection shall not take place until tank sealant is fully cured (10 to 12 days)

7.03 Acceptable forms of chlorine for disinfection shall be
SECTION 05580 GLASS-COATED BOLTED STEEL STORAGE TANKS

1. Liquid chlorine as specified in AWWA C652
2. Sodium hypochlorite as specified in AWWA C652
3. Calcium hypochlorite as specified in AWWA C652

7.04 Acceptable methods of applying chlorination are as per AWWA C652 Section 4.1.1, Section 4.1.2 (chemical feed pump only), and Section 4.3.

7.05 AWWA C652 Section 4.2 shall not be used to chlorinate the tank.

END OF SECTION 05580
PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This item will be considered as an alternate to the glass lined bolted steel tank materials shown on the drawings. The work called for in this Section shall consist of all necessary materials, tools, equipment and all labor for the construction of the tank foundations, valve vault, piping, tank erection and all necessary appurtenances as shown on the Plans. It shall also include fabrication, field erection, testing and coating system all in conformity with detailed shop and erection drawings to be furnished by the tank manufacturer and as specified herein. All tanks supplied by this Specification must meet AWWA Standard D100-96 and all details of this specification which exceed AWWA D100-96 and be approved by the West Virginia Bureau for Public Health.

1.02 RELATED WORK

A. Section 2200 - Earthwork
B. Section 3200 - Concrete Reinforcing
C. Section 3300 - Concrete Work
D. Section 2830 - Fencing

1.03 SUBMITTALS

E. Submit to the ENGINEER as provided in Section 01 300, shop drawings, details of construction and erection of tanks as follows:

1. Structural Calculations for the tank structure and foundation stamped by a Professional Engineer licensed in the State of West Virginia.
2. Construction Drawings for the tank structure and foundation stamped by a Professional Engineer licensed in the State of West Virginia.
3. The tank manufacturer's and installing contractor's standard published warranty.
4. Dimensions of tank, fittings and attachments.

B. Drawing Approval

1. Shop drawings shall be approved by the ENGINEER prior to any manufacturing of tanks, fittings, etc. Approval of drawings by the ENGINEER shall not release the CONTRACTOR of responsibility of compliance with these specifications. All proposed changes to these Specifications shall be stated in writing.
SECTION 05585 - PAINTED WELDED STEEL TANKS

PART 2 - PRODUCTS

2.01 MATERIAL

A. All welded steel water tanks and accessories shall be in conformance to the latest revisions of AWWA Standard D100 with AWWA Standard D102 Painting Steel Tanks for Water Storage. A self-supporting all butt welded ellipsoidal steel dome roof must be supplied. An “umbrella type supported roof”, center support roof or any type of rafters/bracing will not be accepted. A 1/16” inch corrosion allowance shall be included on both the inside and outside of the tank shell, floor, and roof.

B. Plate and sheet materials shall be open-hearth, electric-furnace or basic oxygen-process steel conforming to ASTM Specification A36 for hot-rolled structural shapes as outlined in AWWA Standard D100, Section 2.

C. Bolts, anchor bolts and nuts shall conform to ASTM Specification A307 as outlined in AWWA D100, Section 2.

D. Accessories shall be as shown on the drawings and conform to AWWA Standard D100 Section 7 for: Shell Manholes, Pipe Connections, Ladders, Overflows, Safety Devices, Roof Openings, Vent and Ladder Gate.

E. All Safety devices shall conform to Federal Specification RR-S-1301 and OSHA requirements.

F. The tank contractor shall provide with his bid a written warranty stating that if within a period of five years form the date of completion of the tank and acceptance by the Owner, the coating on the tank chips, cracks, fades, blisters or peels as a result of normal usage, the contractor shall supply an identical or substantially similar replacement part or make such repairs as are necessary to the coating system to restore it to a same as new condition.

G. The tank contractor shall further warrant that for a period of five years from the date of completion of the tank and acceptance by the Owner that the tank, or any part thereof, shall be free from defects in materials and workmanship.

H. The tank manufacturer shall design and detail the tank and foundation in accordance with AWWA Standard D100-96 and submit the design drawings for the steel structure and foundation to the Engineer. All drawings must be signed and sealed by a Professional Engineer registered in the State of West Virginia.

I. The foundation shall be designed by the tank manufacturer and design drawings shall be submitted to the Owner as stated above.

J. Excavation shall be accordance with Appropriate Section of this Specification.

K. Concrete work shall be accordance with Appropriate Section of this Specification.

L. Piping shall be accordance with Appropriate Section of this Specification.
M. Valves shall be accordance with Appropriate Section of this Specification.

N. Tank foundation is to be designed for an allowable soil bearing pressure of 2,500 PSF.

O. The tank manufacturer may make minor deviations in the size of the tanks (height and diameter) to conform to industry standards, manufacturing and/or shipping economies. All such deviations shall be brought to the attention of the Engineer for approval prior to fabrication and shipping of materials to the job site.

P. The tank manufacturer shall design the tank and foundation in accordance with AWWA Standard D100-96 and submit the design drawings to the Engineer. All drawings must be signed and sealed by a Professional Engineer registered in the State of West Virginia. The construction of the foundation and erection of the steel shall be in strict compliance with the approved design drawings and in accordance with AWWA Standard D100-96. A National Sanitation Foundation Std. 61 Certificate must be supplied with the bid for the interior paint coating.

Q. The tank manufacturer must provide evidence of having a satisfactory annual factory inspection of their QA/QC procedures by Factory Mutual (FM), or by another independent national inspection firm of equal standing.

PART 3 - EXECUTION

A. Access road and site grading: the tank erector shall take the necessary steps to protect the access road while working and reinstate the road to the condition it was prior to his entering the site.

B. Contractor is responsible for all excavation for the foundation, piping and valve vault. All unused excavated material shall be placed as directed by the Engineer for final grading and fill. All excavation shall be performed as outlined in this Specification and shown on the Plans.

C. The erector contractor shall be certified by the tank manufacturer as being proficient and having the equipment and experience necessary to erect the tank. Further, the Contractor shall provide a factory trained supervisor who will be in charge of the construction of the foundation and tank to insure compliance to the manufacturer's specifications.

D. All welds must be full penetration butt welds. Lap welds will not be accepted on any portion of the tank structure.

E. Weld inspection shall be in accordance with AWWA D100-96 except that inspection of full penetration butt-welded joints shall be made by radiographic method. Inspection by removal of sectional specimens shall not be permitted. On request of the owner the Contractor shall provide additional spot radiographic examination over and above the number set forth in AWWA Standard D100. Such additional
radiographic inspections shall be paid for by the owner.

F. Cathodic protection for the tanks shall be of the impressed current design as supplied by Harco CP Waterworks or equal. The design of and specifications for cathodic protection of the tank shall be the responsibility of Harco CP Waterworks or equal. The impressed current cathodic protection shall conform to AWWA D104 latest edition.

G. The water storage tanks, baffles, ladders and accessories shall be painted in accordance with sections 3.11 & 3.12 herein.

H. Foundation shall be excavated to the depth and dimension shown on the approved Contractor submittals. All excavation shall be to stable material. Excavations shall be inspected prior to placing concrete. Reinforcing steel shall be as detailed on the Plans and shall be clean, free of rust, scale and dirt.

I. All steel surfaces shall be prepared by the fabricator as specified in Steel Structures Painting Council Specification SSPC-SP10 “Near-White Blast Cleaning” for interior surfaces; SSPC-SP6 for exterior surfaces. After blast cleaning, all surfaces shall be thoroughly and completely cleaned of any residue or dust before applying primer. Primer must be applied within 24 hours after blast cleaning.

J. After the structure is erected and welded, the welded seams and adjacent unprimed areas shall be cleaned by using SSPC-SP6-63 “Commercial Blast Cleaning”. The shop primed surfaces shall be cleaned of all dirt and foreign matter. Dust that has settled on any part of the structure as a result of the blast cleaning must be removed before spot priming.

K. The outside paint system shall consist of a four coat system (Series 91H2O Hydro-Zinc/Organic Zinc, 2.5-3.5 mils; Series 20 Pota-Pox High build Epoxy, 4.0-6.0 mils; Series 73 Eudura-Shield Semi-gloss, 2.0-5.0 mils; Series 76 Endura-Clear, 1.0-2.0 mils.) system by TNEMEC, or equal with a total dry film thickness of 9.5-16.5 mils.

L. The inside paint system shall consist of a Corrcotell PW system as manufactured by Madison Chemical Industries, Inc. or equal. The total dry film thickness shall not be less than 20 mils. The system must be approved by the Bureau for Public Health and the U.S. Environmental Protection Agency. No coatings containing lead, coal tar resins, barytes, lampblack, carbon black or bituminous materials will be approved. **NSF Std. 61 certification is required**.

M. All coatings shall be a “system” and shall be thoroughly compatible each with the other. No coatings or primers of different manufacturers shall be applied one upon the other. The Contractor shall submit the coatings schedule to the Owner.

N. Paint shall not be applied when the temperature of the steel or paint is below 40 degrees F. Paint shall not be applied when the surface temperature is expected to drop to 32 degrees F before the paint has dried. With chemically cured coatings, (catalyzed epoxies, etc.) particular care shall be exercised to follow manufacturer's special temperature requirements (usually 50 degrees F or above).
O. Paint shall not be applied in rain, snow, fog, mist or when the steel temperature is below the dew point, resulting in condensation.

P. Each coat of paint shall be in proper state of cure or dryness before the application of the succeeding coat. A minimum of twenty-four hours shall be allowed between coats.

Q. All weld seams shall receive one brush coat of the specified primer after the sandblasting and cleaning has been completed. This brush prime coat is in addition to the specified prime coat.

R. All coats shall be smooth, free of brush marks, streaks, laps or pile up of paints, and skipped or missed areas.

S. The tank manufacturer shall further warrant that for a period of five years from the date of completion of the tank and acceptance by the Owner that the tank, or any part thereof, shall be free from defects in materials and workmanship.

T. Upon completion of the tank, the Contractor shall provide the Owner with a "Notarized Certification of Compliance" stating that the tank has been designed, fabricated, erected, inspected and tested in accordance with all the requirements of the AWWA Standard D100, and that the results of all inspections, radiographs and tests indicate the tank is in full compliance with AWWA Standard D100.

PART 4- WARRANTY

A. The tank contractor will provide with his bid a warranty that if within a period of five years from the date of completion of the tank and acceptance by the Owner the coating on the tank chips, cracks, fades, blisters or peels as a result of normal usage the Contractor will make such repairs as are necessary to the coating system to restore it to a same as new condition. The tank contractor shall further warrant for a period of one year from the date of completion of the tank and acceptance by the Owner the tank, or any part thereof shall be free from defects in material and workmanship. Any defects shall be replaced or repaired by the tank contractor at the discretion of the Engineer at no cost to the Owner.

END OF SECTION 05585
PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of Conditions of Contract and of Sections listed under General Requirements (Division 1) apply to work under this section.

B. Work Included:

1. Description
2. General
3. Samples and Tests
4. Colors
5. Examination of Surfaces
6. Protection
7. Storage of Materials
8. Materials
9. Manufacturers
10. Workmanship
11. Preparation of Surfaces
12. Priming
13. Finishing
14. Exterior Finish
15. Interior Finish
16. Miscellaneous Painting
17. Touch Up, Cleaning, Repairs
18. Testing

C. The following work will be painted or finished under other sections or will not require painting or finishing:

1. Shop coat of paint on miscellaneous metals work.
2. Concealed sheet metal duct and pipe work.
3. Factory finished units or equipment, except as hereinafter specified.
4. Copper, lead coated copper, bronze, chromium, nickel, aluminum, and stainless steel shall not be painted or finished unless specifically stated. Piping and conduit shall be painted as specified.

1.02 GENERAL

A. Read Metals and Specialties specifications and become familiar with requirements regarding shop and field coats of paint on work included in those sections.

B. Number of coats specified hereinafter includes prime and body coats specified under other sections of these Specifications. Prime coats are not required on items delivered with prime or shop coats applied.

C. Coatings described later are based on brush, roller and spray application (if allowed). If mil thickness and uniformity requirements are not met according to specification requirements, the Engineer reserves the right to demand an extra application of paint to correct these deficiencies at no cost to the Owner.

D. All exterior piping and piping exposed in all buildings and exposed piping in manholes are to be painted. Submerged piping in all pump rooms, wet wells and basins are to be painted. All piping is to be color coded as specified herein.
E. All equipment not furnished with a finish coat shall be painted. This includes new support rails, grit collection and disposal equipment, clarification equipment, aeration equipment, solids handling and disposal equipment, chemical equipment.

1.03 SAMPLES AND TESTS

A. Before any work is done the Engineer will furnish the Contractor a set of color cards and schedule showing where various colors shall go. The Contractor shall prepare samples at job as required until colors and textures are satisfactory.

B. Before proceeding with painting, finish one complete room, space or item of each color scheme required and showing selected colors, finished texture, material and workmanship. After approval, these sample rooms or items shall serve as standard for similar work throughout building.

C. Prepare sample panels of painted work as instructed by Engineer. Approved samples will be kept on job for comparison.

PART 2 - PRODUCTS

2.01 COLORS

A. Contractor shall assume that each individual room shall have wall color and second color for trim, etc. Ceilings generally will be painted white.

B. Louvers, support beams, fans, etc., shall be painted to match color of paint of adjacent wall or ceiling surfaces.

C. Door closures and prime coated butts, where they occur, shall be painted to match door trim to which they are attached.

D. Hollow metal work, including trim, will generally be painted same color but different color than adjacent walls.

E. Piping and Ducts

1. Exposed piping and ducts, covered or exposed, in finished painted area generally, except for identification banding, will be painted color and texture to match wall or ceilings adjacent to it.

2. All submerged piping and exposed piping not covered above shall be painted in accordance with the following color coded schedule:

<table>
<thead>
<tr>
<th>Water Lines</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>Medium Green</td>
</tr>
<tr>
<td>Settled or Clarified</td>
<td>Aqua</td>
</tr>
<tr>
<td>Non-potable</td>
<td>Aqua w/Dark Blue band</td>
</tr>
<tr>
<td>Finished or Potable</td>
<td>Dark Blue</td>
</tr>
<tr>
<td>Flushing Water</td>
<td>Tan</td>
</tr>
<tr>
<td>Heating-Cooling Water</td>
<td>Blue/w/6&quot; Red band spaced 30&quot; apart</td>
</tr>
</tbody>
</table>
Gases:
Chlorine Gas (Vacuum) Yellow
Air (Compressed) Dark Green

Process Piping:
Sludge Discharge Dark Brown
Effluent Discharge Tan w/6" Light Gray band spaced 30" apart

Waste Lines:
Sludge, Scum Dark Brown
Sewer (Sanitary, Dewatering Dark Gray - where exposed, Lines or other) match wall finish

3. All pipe finishes will be gloss and above colors will conform to Carboline color chart for gloss paint. All pipe lines shall be labeled as to their use in accordance with Engineer’s instructions. Labeling will be done with a gloss paint of a contrasting color. All pipes to be marked with arrows of paint of contrasting colors every 10 feet to indicate direction of flow.

4. Apply two (2) coats of an appropriate sealer before applying color to prevent the asphalt from bleeding into the colored paint as previously noted.

5. Each coat of paint shall be slightly darker than the preceding coat unless otherwise directed. Undercoats shall be tinted similar to finish coats. Color of priming shall be lighter than body coat. Body coat shall be same color but lighter than finish coat.

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACES

A. If surfaces to be finished cannot be put into proper condition for finishing by customary cleaning, sanding and puttying operations, or if surfaces were improperly primed by others, Contractor shall assume responsibility and rectify any unsatisfactory finish resulting.

B. Contractor’s work removed and replaced to correct surface defects due to procedure on unsuitable surfaces will be at Contractor’s expense.

C. Where there is question as to dryness of surface, test them with dampness indicating machine. Apply no paint on masonry or plaster when moisture exceeds 8% as determined by testing device. Apply no paint to wood surface when moisture content exceeds 15%.

3.02 PROTECTION

A. Cover materials and surfaces - including floors - adjoining or below work in progress with clean drop cloths or canvas.
B. Remove hardware, accessories, plates, lighting fixtures and similar items or provide protection by masking. Upon completion, replace above items or remove protection and clean.

3.03 STORAGE OR MATERIALS
A. Keep storage place neat and clean and make good damage thereto or to its surroundings. Cleaning rags and waste materials shall be deposited in metal containers having tight covers or removed from building each night. Buckets of sand and water shall be available at all times with every precaution taken to avoid danger of fire. Provide dry chemical or $\text{CO}_2$ fire extinguishers in areas. Allow no smoking or open containers of solvents. Store solvents in safety cans.

B. Empty containers used on job shall have labels cancelled and shall be clearly marked as to use.

3.04 MATERIALS
A. All systems shall be product of one manufacturer or approved for use by manufacturer. All materials shall be new.

B. Purchase all materials for project and deliver to project at one time. Submit shipping invoices at time of delivery. Materials shall be stored in room where directed.

C. Deliver material to project in sealed, original packages or containers bearing name and brand of manufacturer. Each container shall have manufacturer's printed label stating type of paint, color of paint, instructions for reducing, and spreading rate.

D. Painting materials such as linseed oil, shellac, turpentine, etc., shall be pure and of highest quality.

E. Upon delivery, all supplies will be checked. Only materials brought to room and approved may be used.

F. Use materials on work exactly as hereinafter specified. No claim by Contractor as to unsuitability or unavailability of materials specified or his inability to produce first class work will be entertained unless such claim is made in writing and submitted with his bid.

G. Upon completion of project, material remaining, if any, will become property of Owner. Material shall be sealed as required for storage, marked as to contents, and shall be stored in room where directed.

3.05 MANUFACTURERS
A. Except where other manufacturers' products are specifically required, Carboline Company's products are hereinafter described in order to indicate the standard of quality required. Contractor may use equivalent quality products of PPG Industries,
 SECTION 09900

PAINTING

Inc., or equal. If other products are selected, a list comparing products with Carboline products specified shall be submitted. Painter's line paints not permitted. List must be submitted within 30 days after award of contract or Owner will reserve right to select paint from manufacturers listed. All paint to be gas-proof and adapted for use where water is present.

B. Mil thickness required by Carboline Company. If other manufacturer is used, then manufacturer's requirements shall be followed, but in no case may thickness be less.

3.06 WORKMANSHPH

A. Brush or roll on materials smoothly in solid, even colors without drops, runs, lumps, defective brushing, discoloration or clogging of lines and angles. Make edges of paint adjoining other materials or colors clean and sharp, without overlapping.

B. Do not apply exterior paint in cold, foggy, damp or rainy weather. On interior, apply no finish in dusty rooms; sprinkle floors to lay dust. Do not apply paint when temperature is lower than 50°F. Coats shall be thoroughly dry before applying succeeding coats.

C. Touch up knots, pitch streaks and sappy spots with a coat of shellac before priming where finish calls for paint.

D. Do necessary puttying of nail holes, cracks, etc. after first coat, with putty of color to match that of finish. Bring putty flush with adjoining surfaces.

E. Sand paint finish applied to wood or metal between coats with fine sandpaper to produce even, smooth finish.

F. Keep pigments, filler and paints well stirred during application. Paint and finishing materials to be free from skins, lumps, or other foreign matter when used. Apply materials without addition of ingredients except for thinning as recommended by the manufacturer.

G. At completion, touch up and restore finish where damaged. Paint top and bottom edges of metal doors one coat, as required, after fitting. Exterior doors shall be finished on edges as specified for faces.

H. Work at site where coat of material has been applied must be inspected and approved before application of succeeding specified coat, otherwise no credit for coat applied will be given and Contractor automatically assumes responsibility to recoat work in question. Contractor shall furnish Engineer report of particular coat applied and when completed for inspection and approval to comply with above.

I. Provide proper ventilation. If necessary, provide power operated fans, partition off area in which work is to be done and provide other precautions required.

J. Contractor will remove and re-install, or provide acceptable in-place protection for, all installed hardware, accessories, lighting and electric components, factory finished material, plumbing fixtures and fittings and any other materials that may be damaged by paint splatter and overspray.

E.L. Robinson Engineering Co. 09900-5
3.07 PREPARATION OF SURFACES

A. Before applying paint or finish, surfaces, including floor, shall be clean, dry, smooth and free of loose dirt and dust. Vacuum clean all floors, sills, walls, etc., before starting to paint.

B. Surfaces which will be submerged or subject to heavy fumes or condensation shall receive special surface preparation procedures. All weld heads shall be ground smooth and all weld splatter removed. All surfaces will also be sandblasted according to the Structural Steel Painting Council Specification - SSPC SP5-63 for white metal blasting. The selection of the abrasive grit size will be determined by the coating thickness specified for these surfaces to establish the correct sandblast mil profile.

<table>
<thead>
<tr>
<th>Sandblast Mil Profile</th>
<th>Coating Thickness</th>
<th>Required Grit Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25-1.50</td>
<td>5-6 mils of coating</td>
<td>40 mesh grit</td>
</tr>
<tr>
<td>1.50-2.00</td>
<td>8-10 mils of coating</td>
<td>30 mesh grit</td>
</tr>
<tr>
<td>2.00-2.50</td>
<td>10-plus mils of coating</td>
<td>20 mesh grit</td>
</tr>
</tbody>
</table>

Note - Spent sand shall not be re-used in blasting procedure.

All such surfaces must be primed within 8 hours of preparation.

C. Smooth woodwork with "00" sandpaper and dust clean by sponging before priming, sealing or staining. Go over, (brick and concrete brick and concrete block surfaces) lightly with fine sandpaper or wide putty knife, removing loose grit.

D. Wash steel and iron surfaces with turpentine or mineral spirits to remove dirt or grease. Where rust or scale is present, wire brush surfaces clean before painting. Clean and touch up shop coats of paint that become marred with primer specified.

E. All galvanized metal surfaces, both exterior and interior, submerged and non-submerged, both subjected to fume or in a non-corrosive environment, are to be pretreated with Carboline 1037 WP or sandblasted as recommended for coating applied with a total dry mil thickness above 6.0.

F. Non-galvanized surfaces not subjected to fumes shall have commercial sandblasting per SSPC-SP6 (NACE No. 3).

G. Remove markings on ducts, piping and other materials placed by mechanical trades or seal. Responsibility of preventing markings from bleeding through subsequent paint films rests with Contractor.

3.08 PRIMING (SHOP)

A. Where shop applied prime coat is damaged, these areas are to be spot primed after
proper preparation on all equipment, metal, etc. This spot priming is not to be considered as a first coat.

B. Touch up suction spots or "hot spots" after application of first coat and before applying second coat, to produce ever result in finish coat.

C. Prime woodwork specified to receive paint finish on all surfaces. Apply body and finish coats after work has been installed.

D. All metal work submerged to be given shop prime of Plasite 7103 Primer or equal to yield 2.0 to 3.0 mil dry per coat. All steel not submerged but subject to fumes and condensation or in a non-corrosive environment such as steel over tanks, railings around tanks, piping below grade or in tunnels shall be given one coat of Carboline Rustbond 8HB or equal to yield 2.0 to 3.0 mil per coat.

3.09 FINISHING

A. Finish surfaces same as nearest adjoining surfaces unless otherwise specified or shown.

B. Finish woodwork on edges, tops and bottoms in same manner as specified for faces. Sand between coats, dust clean.

C. Drying shall be done under conditions that will eliminate possibility of dust becoming impregnated in finish.

3.10 EXTERIOR FINISHES

A. Omit finish coat on surfaces concealed after installation. Prime or first coat not required on items delivered with shop prime coat. Touch up abrasions to prime coat applied by others. Mil thickness where specified is dry mil thickness for each coat.

B. Paint exterior metal:

1. Except where other finishes are specified, use this finish for all ferrous metal such as steel lintels, steel stairs, ladders, metal guards, gate, steel frames, metal doors, hollow metal frames, metal effluent troughs in hydraulic tanks and vents including units on roof. Paint equipment in and on all tanks.

2. All metal surfaces, except for galvanized and aluminum, not primed under other articles or contracts, to be submerged shall have one (1) field prime coat of Plasite 7103 Primer to yield 3.0 mil dry, and two (2) coats of Plasite 7122 to yield 5.0 mil dry per coat.

3. All metal surfaces, except for galvanized and aluminum, not primed under other articles or contracts, not submerged but subjected to fumes and condensation, shall have one (1) field prime coat of Carboline 893 to yield
4.0 to 6.0 mil dry and one (1) top coat of Carboline 890 to yield 4.0 to 6.0 mil dry thickness.

4. All metal surfaces, except for galvanized and aluminum, not primed under other articles or contracts, not subjected to fumes and condensation, shall have one (1) field prime coat of Carboline GP-818 to yield 2.0 mil and two (2) coats of Carboline 139 to yield 2.0 mil dry per coat.

5. Galvanized and aluminum surfaces not primed under other articles or contracts, not submerged but subjected to fumes and condensation shall be sandblasted as required and have two (2) coats of Carboline 890 to yield 4.0 to 6.0 mil dry per coat.

6. Aluminum surfaces not primed under other articles or contracts, not subjected to fumes and condensation shall be pretreated with Carboline 1037 WP and have one (1) field prime coat of Carboline AD-29 to yield 2.0 mil dry and two (2) coats of Carboline 139 to yield 2.0 mil dry per coat.

7. Galvanized steel submerged shall be sandblasted as required and have two (2) coats of Plasite 7122 to yield 7.0 mil dry per coat.

8. Galvanized steel not subjected to fumes or condensation shall be pretreated with Carboline 1037 WP and have two (2) coats of Carboline 139 to yield 2.0 mil dry per coat.

C. Exterior Coating of Concrete Block

1. Concrete blocks must be fully cured or pH reading of 10.5 or less is achieved.

2. Temperature shall be at least 38°F before applying sealer or stain and surface temperature must be in or above 38°F for at least a 8 hour period.

3. Stain shall be Tuf-Top Silicone Concrete Stain, utilizing a acrylic/silicone resin system and inorganic pigments. Water repellent shall be Tuf-Top WR-10 Siloxane Water Repellent.

4. Apply two (2) coats of concrete stain. Stain can be applied with brush, roller or spray. There shall be a two (2) hour minimum curing time between coats or no more than three (3) coats in a 24 hour period.

5. Water repellent shall have a one coat application and can be applied with brush, roller, or spray. Application shall be at a rate of 100 to 250 sq. ft. per gallon.

6. Products Manufacturer is:

Tuf-Top Coating Division
Marine Industrial Paint Company, Inc.
St. Petersburg, Florida or equal.

3.11 INTERIOR FINISH

G. Interior finish required specified herein and as shown on plans. Mil thickness specified is from a dry interior finish mil thickness for each, unless it is specified that wet mil thickness is called for.

B. Concrete and Concrete Block: Remove dust, dirt, oil and efflorescence using stiff fiber or wire brushes. Acid may not be used where metals are also present in area, especially chrome plated. Prepared cleaning solutions as Sure-Klean Compounds or equal may be used.

C. Paint concrete block as follows in all areas:
   1. One coat Sanitile CB Base at not less than one gallon per 65 sq. ft.
   2. One coat Sanitile 550 Finish at not less than one gallon per 225 sq. ft.

D. Coat concrete floor as follows in all areas.
   1. Concrete shall receive a chemical treatment for Water Proofing and protection. Concrete shall receive a dry-shake application of Xypex Concentrate DS-1 or approved other.
   2. Compound shall be applied at the rate recommended by manufacturer.
   3. Application procedure shall generally be as follows:
      a. Wait until concrete can be walked on leaving an indentation of 1/4 in. - 3/8 in. (6.5 mm - 9.5 mm). Concrete should be free of bleed water and be able to support the weight of a power trowel. Then, float open the surface.
      b. Immediately after floating open the surface, apply the dry shake material by hand or mechanical spreader. The dry shake material must be spread evenly.
      c. As soon as the dry shake material has absorbed moisture from the base slab, it should be power floated into the surface.
      d. When concrete has hardened sufficiently, power trowel surface to the required finish.

E. Paint wood as follows:
   1. One coat Sanitile PC Base 1.5 to 2.0 mils, or equal.
2. Two coats Sanitile 550 finish. 5.0 to 6.0 mils per coat, or equal.

F. Paint metal as follows: Apply this finish on interior exposed metal surface including, but not limited to, doors, frames, grilles, access panels, vents, ladders, steel at stairs, weatherstripping, steel in finished and unfinished areas, except where specified exempted or where items are furnished with factory finish.

1. One coat Carboline GP 818 on surfaces not shop primed to yield 1.25 mil dry, or equal.

2. One coat Carboline GP 818 to yield 2.0 mil dry, or equal.

3. One coat Carboline 139 to yield 2.0 mil dry, or equal.

4. Galvanized surfaces not shop primed shall be pretreated as specified under Section 3.7, Preparation of Surfaces. One (1) coat Carboline GP 818 to yield 2.0 mil dry and one (1) coat Carboline 139 to yield 2.0 mil dry.

G. All metals submerged in sewage and/or water.

1. Prime or pretreat all surfaces as specified under sections 3.7 E, 3.8 D, and 3.10 B.

2. One coat Plasite 7103 Primer at 3.0 mil thickness, or equal.

3. Two coats Plasite 7122 at 5.0 to 6.0 mil thickness per coat, or equal.

H. Cast iron pipe, valves, fittings, etc., exposed to view inside building (not wet during application).

1. Two coats Carboline GP 818 at 1.5 mil dry.

2. Two coats Carboline GP 139 at 2.0 mil dry per coat, or equal.

I. Cast iron pipe exposed in manholes and inside wet wells.

1. Two coats Plasite 7122 at 3 mil per coat, or equal.

3.12 MISCELLANEOUS PAINTING

A. Paint in finished areas only, exposed or visible galvanized metal ducts, hangers, sheet metal work, grilles, heating units, metal cabinets such as electrical, fire extinguisher, etc., access panels and exposed covered and uncovered plumbing, heating and other piping and conduit. See mechanical and equipment plans and specifications for amount and type of piping and equipment. Cabinet heaters, unit heaters, radiation enclosures will be prefinished-see H & V Specification.

B. Finished areas are areas in which walls and/or ceilings are painted or have coating
applied.

C. Piping or ducts above ceilings need not be painted.

D. Paint plumbing, heating, ventilating and electrical equipment not furnished with factory finish under this heading. Equipment furnished with prime coat shall receive two (2) coats of Carboline 139 in colors selected to yield 2.0 mil dry per coat.

E. Ducts behind wall or ceiling grilles, and bright metal portion of duct that is visible through grille when viewed from distance of one foot from grille, shall receive one coat of Carboline 139 to yield 2.0 mil dry.

F. Remove oil or grease from piping and duct work exposed in finished areas and apply one coat of Carboline GP 818 to yield 1.5 mil dry and two (2) coats of Carboline 139 to yield 2.0 mil dry per coat. On galvanized piping or ducts exposed in finished areas, use Carboline 1037 WP and two (2) coats of Carboline 139 to yield 2.0 mil dry per coat.

G. Covered piping and duct work in finished areas shall receive one coat Carboline GP 818, .75 mil dry, and one coat of Carboline 139 2.0 mil dry. Covered piping and duct work, when exposed in unfinished areas, shall receive one coat Carboline GP 818 at .75 mil dry.

H. Paint covered equipment as specified for covered piping in section 3.12 G.

I. Areas designated on plans as parking areas and directional markings shall be provided utilizing specially formulated paint for use on bituminous surfaces. Coatings shall be T-7990 White, as manufactured by the Rust-Oleum Corp., Pitt-Chem, or Mobil, or PPG 11-3 White, or 11-4 Yellow, or equal. Surface preparation and application shall be in accordance with the manufacturer's recommendations.

3.13 TOUCH UP, CLEANING, REPAIRS

A. Touch up painted work after other trades have completed their work, leaving painted work in perfect condition.

B. After doors have been fitted and hung, they will be removed from hinges, and edges, tops and bottoms shall be refinished.

C. Upon completion of painting, remove paint spots from floors, glass and other surfaces.

D. Damaged, spotted or smeared parts of building and equipment shall be replaced by the Contractor.

E. Work of materials damaged beyond repair, in opinion of Engineer, shall be replaced by the Contractor.

F. Mask exposed hardware and after painting is finished, carefully clean all hardware. Masking to include valve stems, electrical devices, steam specialties, controls,
expansion joint covers, etc.

END OF SECTION 09900
SECTION 11050  SPECIAL PROVISIONS FOR PROCESS PIPING & EQUIPMENT

PART 1 - GENERAL

1.01  SHOP DRAWINGS

A. After the award and execution of the Contract the Contractor shall supply the Engineer with detailed drawings of all equipment to be furnished in accordance with Section 01300. These shall show all principal dimensions, foundations required, floor space, size and location of piping, size and location of motors, motor outlets, etc. The Engineer shall review such drawings for conformance with requirements before the Contractor places his order for the same.

B. When the equipment is shipped, the Contractor shall supply six sets of complete erection drawings and instructions sufficient in detail and information so that the Engineer can check the same prior to actual erection of equipment.

C. After the equipment has been erected and before it is placed in operation or final payments are made, the Contractor shall make such other submittals as required by Section 01300.

1.02  EQUAL EQUIPMENT

Whenever in these Contract Documents an article, material, or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term; or approved equal, if not inserted, shall be implied. The specific article, material or equipment mentioned, shall be understood as indicating the type, function, minimum standard of design, efficiency. The Contractor shall comply with the requirement of the Contract Documents relative to an Engineer's and/or Owner's approval of material and equipment before they are incorporated in the Project.

1.03  PATENTS

The Contractor agrees and guarantees to hold harmless and defend the Owner from any and all actions that may be brought against the Owner through the use of any patent and/or invention as the result of the use of the equipment furnished by him.

PART 2 - PRODUCTS

2.01  MOTORS AND CONTROLS

A. All motors shall be 3-phase, 60-cycle, 240/480-volt (nameplate rating). In each case the motor shall be a weather protected squirrel cage type unless specified to the contrary. Motors shall be of rugged construction for constant duty and of sufficient horsepower to operate the particular unit continuously under all load conditions without overloading and a temperature rise within the safe operating limits of the motor. The motor speed in no case shall exceed 3,500 R.P.M. without special permission or unless otherwise specified.

B. The bidders are referred to the plans where detailed descriptions are provided as to minimum horsepower for all motors and other related equipment pertinent to electrical requirements.
C. Where special controls are required special to a particular manufacturer's equipment forming an integral part thereof, the controls shall be furnished with the unit.

2.02 PAINTING

The equipment manufacturer shall furnish a prime coat of paint at the factory and protective grease coating where necessary. Refer to painting specifications Division 9, for finished painting specifications.

2.03 TOOLS

There shall be furnished by the manufacturer a complete set of any special tools required and necessary for the proper maintenance or repair of his equipment. Special tools are those tools necessary for maintenance and repair which are manufactured for or by the equipment manufacturer for his equipment and are only supplied by him. The special tools shall be delivered to the Owner when the unit is placed in operation and the Owner's operator has been properly instructed in the operation, repair and maintenance of the equipment. The tools and lubricating equipment shall be of a quality equal to the unit the manufacturer furnished under this contract. The Engineer shall be notified by the Contractor in writing when the tools are delivered. The notification shall include a list of all items supplied.

2.04 GUARDS

All exposed moving parts of any machine where such moving part is less than six feet above the floor on which it rests or where a workman can come in contact shall be protected by suitable guards. These guards shall completely cover the moving part and must be designed so they can easily and quickly be removed without dismantling the equipment. This applies to all fly-wheel belts, couplings, shafts, gears, etc. The type of guards and method of attaching shall be approved by the Engineer and the West Virginia State Department of Labor.

2.05 GUARANTEE - QUALITY

A. The general design of the machinery shall be such that all working parts are readily accessible for inspection and repairs, easily duplicated and replaced and each and every part suitable for the service required.

B. The Contractor guarantees the design and workmanship of the machinery to be as specified herein; that it is in the accordance with the drawings and specifications accompanying his bid and that all the work and material in said machinery is of the best quality and first class in every particular.

C. The Contractor further agrees to replace said machinery or any part thereof shown deficient by the test herein described by service operation or otherwise.

D. And if, during the period of one year from the date of acceptance of the machinery and work by the Owner, any repairs shall become necessary on account of defective
material or workmanship or both, the Contractor shall furnish all necessary materials or parts and shall make such repairs so rendered necessary, at his notice by mail when given him to do so. The Owner may proceed to have such repairs made and the Contractor shall reimburse the Owner for all expenses incurred if the work is not accomplished within 30 days.

PART 3 - EXECUTION

3.01 ITEMS EMBEDDED IN CONCRETE

A. Where the installation of mechanical equipment or any portion of the mechanical equipment or the satisfactory completion of the Contractor's work requires that items be permanently anchored in the structure, the embedded items must be furnished by the equipment supplier and delivered in ample time to permit their installation by the Contractor.

B. Upon notification by Contractor and prior to his placing of concrete, the equipment manufacturer shall inspect the location, alignment, etc. of all embedded items, pertaining to the mechanical work, in order to assure satisfactory installation of mechanical equipment and completion of all mechanical work.

3.02 LUBRICATION

A. Where lubrication is required for the proper operation of the equipment, all necessary and proper provisions shall be incorporated in the equipment. Where possible, it shall be automatic but positive.

B. Where oil is used the reservoir shall be of sufficient capacity to supply the unit for a 24-hour period. Where grease is used fittings including a pressure grease gun, shall be the best obtainable.

3.03 MANUFACTURER'S FIELD SERVICE

A. The Contractor's bid price shall include for each bid item the services of competent erection engineers from the respective equipment manufacturer's organization capable of properly instructing the Contractor's mechanics on the erection of his particular equipment. After the equipment has been erected and before it is placed in operation, each erection engineer shall check and approve the erection. When the equipment is placed in operation, he shall make such adjustments as may be necessary and properly instruct the operating personnel on the care and operation of the equipment. It is expected that each erection engineer will remain at the plant when his unit is placed in operation.

B. Where an erection engineer inspects and supervises the operation of several items, his time may be divided, but sufficient time must be devoted to each item to secure satisfactory operation and properly instruct the operators.
C. During the twelfth month of the first year after final acceptance each equipment installation engineer shall make one inspection of his equipment. Following this inspection, a written report shall be made to the Owner and the Engineer.

3.04 TESTING EQUIPMENT

A. All equipment shall be tested after it is installed in the permanent structure under actual operating conditions to determine compliance with the specifications. Equipment and instruments shall be furnished by the Contractor. The Contractor will be given ample opportunity to operate his equipment and make adjustments necessary before the final test is run. The Engineer will notify the Contractor when the official test of his equipment is to be made so that he may be represented.

B. Equipment which does not conform to the specifications either in quality, operation, or results produced will be rejected by the Engineer. The Engineer and Owner shall be the sole judge of compliance with the specifications.

3.05 GUARANTEE-PERFORMANCE

A. The Contractor shall guarantee that the equipment furnished by him will perform in accordance with these specifications. Data submitted with his bid shall be adapted for the performance of the equipment which is being offered. The Contractor shall guarantee that the equipment supplied will efficiently perform the function required by these specifications.

B. After preliminary operation, permitting adjustments to be made by the manufacturer, the official test will be run under the direction of the Engineer. Special instruments which the Contractor may desire to use in testing his equipment shall be furnished by him subject to the Engineer's approval.

C. Equipment not meeting the guarantee for efficiency and performance as set forth in the Contractor's proposal will be rejected. Such equipment shall be replaced or altered in a manner that it will meet the original guarantee. This work shall be done under the supervision of the Engineer.

D. The Contractor will demonstrate to the engineer that the water treatment plant equipment and hydraulic installations will work as designed. The contractor and the various manufacturers will explain the individual and complete process to the operator to ensure proper operation of the plant by the owner.

END OF SECTION 11050
PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall furnish and install as part of the contract Satellite Telemetry Supervisory Control and Data Acquisition (SCADA) System equipment to monitor water level in the storage tanks, open/close control valves and start/stop water booster pumps. The Manufacturer shall provide design, programming, documentation, equipment, installation and start-up services for satellite telemetry system. The CONTRACTOR shall install all satellite telemetry system equipment specified herein including all wiring, conduit, antennas, support structures to connect to equipment at the sites and to connect the equipment to power.

B. The system specified herein shall be manufactured by High Tide Technologies, LLC., or equal.

1.02 GENERAL PROJECT INFORMATION

A. Proposal submitters not meeting all of the qualifications as defined in Paragraph 1.06 need not apply and will not be accepted.

B. Not all of the defined sites are identical.

C. The project shall include all work required to create a working satellite telemetry system suitable for three (3) locations. The project work shall include all software, all screens, and documentation for the complete system.

1.03 DEFINED TELEMETRY SITES

A. Office PCs and mobile Laptops

The satellite telemetry system shall provide a web based software host on a central remote server. Each office PC shall be equipped with a web browser with Microsoft Internet Explorer 5.0 or Netscape 4.0 or better.

B. Tanks

There is two new tanks as described below:

1. PROPOSED KING COAL HIGHWAY TANK

SPECIFIED RTU MODEL; HTT 2000

I/O
AI Tank Level
4-20 mA pressure transducer to be supplied by Telemetry Supplier
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1. PROPOSED BOOSTER STATION NO. 2 TANK

SPECIFIED RTU MODEL; HTT 2000

I/O
AI Tank Level
4-20 mA pressure transducer to be supplied by Telemetry Supplier

POWER SOURCE: Contractor will make arrangements for power to be brought to site, provide and install electrical service as shown on the Drawings. Owner will pay any power company costs associated with bringing power to the site and any monthly bills for service.

C. Booster Pump Stations

1. PROPOSED BOOSTER STATION NO. 1
(ON/OFF controlled by operation of the Proposed Booster Station No. 2)

SPECIFIED RTU MODEL; HTT 3000

I/O
Suction Pressure 4-20mA input from pressure transducer
Discharge Pressure 4-20mA input from pressure transducer
Chlorine Analyzer 4-20mA input from flow meter
Flow, totalized Pulse input from flow meter
Pump 1 Running contact Pump 2 Running contact
Pump 1 Failure
Pump 2 Failure
H-O-A Pump 1 in Auto
H-O-A Pump 2 in Auto
Power Phase Lost
Valve 1 LS
Valve 2 LS
Co-axial cable: 100 feet

2. PROPOSED BOOSTER STATION NO. 2
(ON/OFF controlled by level in the Proposed King Coal Highway Tank)

SPECIFIED RTU MODEL; HTT 3000

I/O
Suction Pressure 4-20mA input from pressure transducer
Discharge Pressure 4-20mA input from pressure transducer
Chlorine Analyzer 4-20mA input from flow meter
Flow, totalized Pulse input from flow meter
Pump 1 Running contact Pump 2 Running contact
Pump 1 Failure
Pump 2 Failure
H-O-A Pump 1 in Auto
H-O-A Pump 2 in Auto
Power Phase Lost
Valve 1 LS
Valve 2 LS
Co-axial cable: 100 feet

1.05 SITE INSPECTIONS

All defined sites may be inspected prior to proposal submittal. The OWNER shall provide one (1) person to provide access to all sites.

1.06 QUALIFICATIONS

A. Manufacturers Qualifications: Only manufacturers who have been regularly engaged in the supply of Supervisory Control and Data Acquisition (satellite telemetry system) equipment for at least 2 years and capable of meeting the following criteria need respond.

B. Installers Qualifications: Only firms who have been regularly engaged in the installation of Supervisory Control and Data Acquisition (satellite telemetry system) equipment and have completed the certification course for High Tide Technologies installers need respond.

C. Each responsible manufacturer shall meet the following minimum qualifications and shall:

1. Have completed a minimum of three (3) satellite telemetry system applications throughout the regions – no exceptions.

2. Provide the OWNER with references and phone numbers of each of the three satellite telemetry systems. A minimum of two names per each SATELLITE TELEMETRY SYSTEM reference shall be provided. References will be contacted and completed work verified by the ENGINEER and OWNER.

3. Acknowledge that shipment of the SATELLITE TELEMETRY SYSTEM RTU nodes and related equipment shall be authorized only by the ENGINEER and OWNER group – no exceptions.

4. Utilize only UL listed and rated components in enclosure manufacture.

5. Provide 100 percent of all hardware and software technical manuals to the ENGINEER and OWNER in digital format. The manuals shall be in Adobe pdf format.

6. Provide all system concept, layout, design, and telemetry setup notes in Microsoft Word or Excel formats to the ENGINEER and OWNER.
7. Provide all final enclosure layouts and electrical wiring diagrams in Adobe pdf. version 2002 on CD to the ENGINEER and OWNER – no exceptions.

8. Provide complete bill-of-materials (BOMs) and enclosure layouts that are numerically cross-referenced together for each SATELLITE TELEMETRY SYSTEM node. All BOMs shall contain the standard factory supplied part numbers instead of proprietary numbers – no exceptions.

9. Provide a warranty and emergency support for a period of not less than one (1) year after the ENGINEER and OWNER accept each satellite telemetry system node.

10. Provide primary technical support to the OWNER by full-time qualified staff members only. Temporary or part-time staff members do not quality as full time employees. Technical support provided by manufactures representatives, salespersons or local distributors is not acceptable - no exceptions.

1.07 REFERENCES

A. Publications listed below form part of specification to extent referenced. Publications are referenced in text by basic designation only.

1. NATIONAL FIRE PROTECTION AGENCY (NFPA)

PART 2 - PRODUCTS

2.01 DEFINITION

A. Remote Terminal Units

2.02 REMOTE TERMINAL UNIT DESCRIPTION

A. The satellite telemetry system design shall use High Tide Technologies' Model No. 2000 satellite monitoring/control unit, or Model No. 3000

B. Manufacturer's products, including design, materials fabrication, assembly, examination, inspection, and testing shall be in accordance with ANSI/NFPA 70, except as modified herein or indicated otherwise.

C. Contractor's Responsibility: Provide a complete satellite telemetry system, including RTUs, and satellite telemetry equipment; indicating devices; controls;
power supplies; enclosures; conduit, wire, and installation. Provide interconnecting wiring for the system to be based upon general requirements of specified components with spare capacity. Coordinate the interconnecting wiring requirements with OWNER provided instruments and provide necessary wiring for the system. Coordinate the loop impedance requirements of the equipment provided and provide additional loop isolation, noise suppression, surge protection, drivers, and other devices necessary to provide a complete and operating system properly installed and protected in accordance with the device manufacturer's recommendations.

D. Electrical wiring diagrams including Cable Interface drawings for each RTU shall be included.

2.03 NOT USED

2.04 BASIS OF DESIGN

The satellite telemetry system is based on Stellar satellite modems, ANSI C protocol Software – no exceptions.

2.05 NOT USED

2.06 SATELLITE MODEM SYSTEM REQUIREMENTS

A. Modems

1. The modems shall use the mobile frequency designated by the Orbcomm Satellite System.

2. The modems shall be able to be programmed.

3. The communication protocol shall be Orbcomm Satellite Communication standard.

4. The modems shall be model ST2500 by Stellar Communications, LTD or approved equal.

5. One modem shall be installed at each of the sites.

B. Antennas

1. Omni-directional antennas tuned specifically for the Orbcomm Satellite frequency bands.

2. Proper grounding shall be provided as part of price proposed at each site, including wiring, conduit, clamps, and any other item for state-of-the-art grounding.

3. One antenna shall be installed at each of the sites.
C. Antenna Cable Lengths

The following minimum standard cable lengths shall be used during the bidding process:

1. Tank site – see individual Tank RTU spec.
2. Booster Pump – See individual Booster Pump RTU spec.
3. The actual as-installed cable lengths may be more or less per site.

D. Antenna Mounting

1. All antennas shall be mounted with galvanized clamps or other non-corroding attachment devices.
2. The mounting of the antennas shall be in such a manner to prevent welding, drilling or other corrosion and stress inducing modifications, or damage to paint systems.
3. All antennas shall utilize existing non-load bearing structures such as safety rails for mounting points.
4. Antennas shall be mounted in a manner so that cables and antennas do not interfere with safety equipment or harnesses while climbing up or on the structures.
5. Cutting into a structural member is not acceptable.
6. All antennas shall be mounted to insure the most direct view of the southern sky at the remote sites.
7. Antenna masts shall be provided where necessary to elevate the antenna high enough to insure direct view of the southern sky, and shall include the mast and all attachment hardware.

E. Antenna Connection Sealing

1. All antenna connections shall be covered with a protective rubber boot.

2.07 NOT USED

2.08 NOT USED

2.09 SITE COMMUNICATIONS

A. Methods

1. Each RTU shall be capable of communicating with the High Tide Technologies central server.
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2.10 SITE CONTROL

A. Control Methods

1. The control of the typical remote booster pump shall be based upon the comparison of adjustable setpoints and dynamic tank levels. The pump shall be able to be controlled by the tank of interest. Provide override pump control from the web based software.

2. Each booster pump location shall have an operator interface on the web based software for display of local alarm messages, pump status, relevant remote tank levels, and setpoints.

3. The ability to operate pumps manually will be by Owner provided Hand-Off-Auto (H-O-A) switches.

4. When the switch is in the “Hand” position, the pump shall be manually controlled by the switch and without the aid of a functioning RTU controller.

5. When the switch is in the “Auto” position, the RTU or controller shall automatically control the pump.

6. The status of all H-O-A switches shall be observed on the web based software interface. (optional)

2.11 SUBMITTALS

A. General

Within 7 days after receiving the contract, the Manufacturer shall submit all component data sheets in an orderly manner for review and approval.

1. A bill-of-material (BOM) shall be submitted according to each type of SATELLITE TELEMETRY SYSTEM telemetry site such as the primary site at the tanks, booster pump stations, etc.

2. All data sheets shall be printed out from PDF format files. Legible copies from catalogs will also be accepted. All copies shall be clear and legible.

3. The specified product in the data sheet shall be highlighted with a pointed stamp to clearly identify the submitted item.

4. The sheets shall list all pertinent product data such as name, catalog number, model number, nameplate data, dimensions etc.

5. The submitted data shall be organized into separate loose-leaf three-ring binders according to the type of site such as tanks, and booster pump station, etc.

6. The BOM shall precede the data sheets and the sheets shall be
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organized according to the order of the BOM.

7. A detailed description and/or list of functions, including spares for future items, for each SATELLITE TELEMETRY SYSTEM site shall be submitted to the ENGINEER. The Manufacturer shall meet with OWNER and ENGINEER, as requested, to fully explain functionality submittal.

8. Five (5) duplicate copies of the submittals shall be required.

B. Submittals

1. Manufacturer’s Catalog Data
   a. Software.
   b. DC power supplies.
   c. Terminal blocks.
   d. Conductors.
   e. Control relays.
   f. I/O equipment racks.
   g. Hardware.
   h. Network cable.
   i. Analog cable.
   j. Push buttons.
   k. System computer.
   l. Operator interface enclosures.

2. Drawings
   a. Control system enclosures.
   b. Instrumentation system.
   c. Surge protection.
   d. Wiring diagrams.

3. Operation and Maintenance Manuals
   a. Instrumentation system.

2.13 PROGRAMMABLE RTU PROCESSOR

A. Provide a High Tide Technologies system, or equal. The control system shall consist of individual RTUs located at each monitoring location. The capability shall exist to allow for expansion of the system by the addition of hardware and/or software. Program development is the responsibility of the Manufacturer of the satellite telemetry system.

1. All hardware of the RTU shall operate at an ambient temperature of minus 20 to 60 degrees C (-4 to 140 degrees F), with an ambient temperature rating for storage of minus 40 to plus 60 degrees C.
2. All RTU hardware shall function continuously in the relative humidity range of 5 to 95 percent with no condensation.

3. Each RTU shall have at least one dedicated serial port.

B. Processor Hardware

1. The processor shall be an integral piece of the modem, and will provide control program execution and support remote or local programming.

2. The user program, data, and operating system shall include EEPROM or equivalent for backed memory storage.

3. Each processor shall contain enough base memory for at least 30% growth room after the program has been completed and tested.

4. The front enclosure of the processor shall include an RS232 serial port.

5. All system modules, local and remote chassis shall be designed to provide for free airflow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be permitted.

C. RTU Power Supplies

1. The RTU power supplies shall operate in compliance with an electrical service of 85-265 VAC, single phase, in the frequency range from 47 to 63 Hz, or 17-32 VDC.

2. The manufacturer shall, if electrical power is unavailable, provide a solar powered RTU.

3. The RTU shall have an integral AC to DC power converter.

4. The power supply shall monitor the incoming line voltage for proper levels. When the power supply is wired to utilize AC input, the system shall function properly within the range of 85 to 265 VAC. When the power supply is wired to utilize DC input, the system shall function properly within the range of 17 to 32 VDC. In addition, the power supply shall provide surge protection and isolation.

5. In addition to the electronic protection described above the power supply shall offer a failsafe fuse that is not accessible by the customer.

6. The RTU shall include an Axiomatic Model DSP-WG6-120VAC-10A-01

D. RTU Networking and Communications

1. RTUs in the satellite telemetry system shall have standard communications that support ASCII or Modbus protocols(3000only).
2. The RTU shall have a standard programming instruction that allows bi-directional satellite messaging with the central server.

3. The RTUs shall support both scheduled and unscheduled communications between the central server.

E. Digital Inputs

1. Number of Digital Inputs: SEE SITE DESCRIPTIONS

2. All digital inputs shall be optically isolated

3. Ambient Operating Temperature Rating: Minus 20 degrees C to 60 degrees C.

F. Digital Outputs

1. Number of Digital Outputs: SEE SITE DESCRIPTIONS

2. Digital outputs shall be sync only.

3. Ambient Operating Temperature Rating: Zero degrees C to 60 degrees C.

4. External SSR’s shall be provided by the Manufacturer.

H. Analog Inputs

1. Input Type: voltage.

2. Number of Analog Inputs: Shall be as needed.


4. Current/Voltage Ranges: 0-5 dc or 4-20 mA

6. Resolution: 10 bits.

7. Ambient Operating Temperature Rating: Minus 20 degrees C to 60 degrees C.

I. RTU System Technical Support

1. The manufacturer of the RTU shall provide multiple-channels of technical support to the OWNER. These channels include toll free telephone, fax, and web-based support.

2. The satellite telemetry system manufacturer shall maintain technical assistance toll free telephone “hotline.”

2.14 RTU SYSTEM ENCLOSURES
A. The system enclosure shall contain the RTU, complete with inputs/outputs, power supplies, surge protection, terminals and all associated wiring. The enclosures shall come pre-assembled with all associated components mounted and wired.

B. Remote Terminal Enclosures: Provide pre-built and wired Hoffman brand or equivalent remote terminal enclosures. Enclosures shall be delivered with standard ANSI 61 gray powder coating inside and out. Each remote terminal enclosure shall consist of:

1. One (1) molded NEMA 4 rated enclosure. Enclosures shall be lockable, hinged stainless steel or PVC.

2.15 NOT USED

2.16 DC POWER SUPPLIES

A. Regulated: Solid-State

B. Input: 85-230 volts ac, single phase, 60 hertz.

C. Output: Model 100A- 17 volts dc
   Model 101- 24 volts dc.

D. Output Current: 2.0A.

E. Ambient Temperature Range: Minus 20 to 50 degrees C.

I. Mounting: Enclosure-mount acceptable.

J. Primary Protection: Internal fuse

K. Additional Protection: Over-current protection for secondary

2.17 TERMINALS

A. Provide single-circuit feed-through terminal blocks for all control system enclosures. Provide the following:

1. Voltage Rating: 30 volts AC/DC maximum.

2. Model 100A – Screw Type

3. Colors: Gray, Green, or Orange for conductors and grounds. Green for all grounds.

4. Identification Markers: All terminals shall have label markers for each terminal.
2.18 CONDUCTORS

A. Shielded twisted pairs for signal wiring such as instrument signals. General wiring for enclosures. Group and neatly route conductors within enclosures.

B. Wire Color Codes: General internal wiring color code specifications for all supplied enclosures/enclosures. There shall be no exceptions.
   1. All 120V single-phase AC wiring shall be red.
   2. All single-phase AC neutral wiring shall be white.
   3. All wiring originating outside the enclosure/enclosure that is not controlled by the local disconnect or main breaker shall be yellow.
   4. All 24V DC positive wiring shall be blue.
   5. All 24V DC common wiring shall be blue or blue w/white tracer.
   6. All ground wiring shall be green or green with yellow tracer.

C. Shielded Twisted Pair
   1. Tinned, soft copper and insulated with nylon-jacked polyvinyl chloride.
   2. Color code each conductor pair.
   3. Twist conductors into pairs with a 1-1/2-to 2-1/2-inch lay.
   4. Code each pair with a unique pair number.
   5. 100 percent shielded coverage, aluminum-polyester.
   6. No. 22 AWG.
   7. No. 22 AWG stranded copper drain wire.
   8. Rated 300 volts, 60 degrees C.

D. Conductors: General internal wiring of specified electrical enclosures. Group and neatly route conductors within enclosures.
   1. All wiring internal to the supplied enclosures/enclosures shall be machine tool wiring rated MTW/AWM/TFF with an insulation rating of at 600-volts and UL approved - no exceptions.
   2. All non-input/output module point-to-point wiring shall be 16 AWG.
3. All discrete input module to terminal wiring shall be 20 AWG.
4. All discrete output module to terminal wiring shall be 18 AWG.
5. Provide nylon wrapping around wire bundles crossing door hinges for protection.

2.19 SOLID STATE RELAYS

A. Mounting:
B. Relay Rating: 24-240 volts, 10 amperes.
C. Contacts: SPST.
D. Coil Voltage: 3.5-32 Volt.

2.20 ANALOG SURGE PROTECTION

A. Provide surge protector on 4-20mA inputs and outputs to each RTU. Provide the following:
1. Rated Maximum Voltage: 28-30 volts DC.
2. Operating Current: 80-300 mA maximum.
3. Terminals: Screws or terminal mount only.
4. Impulse Discharge Current: 5 kA (minimum).

2.29 WIRING DIAGRAMS

A. Electrical "as-built" CAD-based wiring diagrams shall be provided for the previously defined sites using the specified standards:
1. Detailed I/O point assignments will be provided for each enclosure by the Manufacturer of the SATELLITE TELEMETRY SYSTEM system to the CONTRACTOR.

2. All drawings shall be generated using Adobe pdf software.

3. NFPA Electrical Standard for Industrial Machinery 1997 Edition shall be used as the standard for all electrical symbols.

4. NFPA Annex C and D shall be used as the reference for sample electrical diagrams.

5. All drawing files shall be provided to the ENGINEER for review and approval before the enclosures are wired.

2.30 NOT USED

2.31 FIELD INSTRUMENTS

A. All of the OWNER'S existing field instrumentation shall be integrated into the manufacturer's satellite telemetry system. Any broken or malfunctioning instrumentation shall be brought to the attention of the ENGINEER and the OWNER'S attention immediately for replacement by the OWNER.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

Install all equipment in accordance with ANSI C2, ANSI/NFPA 70 and the requirements specified herein.

3.02 WIRING

A. Install conductors and cables in conduit, unless indicated otherwise.

B. Complete raceway systems and remove obstructions before pulling conductors into place. Avoid damaging insulation during conductor installation. Use an approved lubricating compound as required to facilitate pulling wires.

3.03 SPLICES AND TERMINATIONS

A. Make up both mechanically and electrically tight.

B. Provide with a flashover or insulation value at least 100 percent in excess of wire insulation.

C. Make splices and terminations in junction boxes.

D. Make connections in No. 14 AWG and smaller conductors with insulated pressure connectors or wire nut connections.
E. Use terminal blocks of the proper voltage for interconnecting or splicing control cables, communication cables, and other conductors. Mount terminal blocks in a cabinet and label terminals properly.

3.04 NOT USED

3.05 TESTING

A. Performance Verification Test: Conduct performance verification tests to demonstrate that control system maintains set-points, and that system is programmed for the correct sequence of operation. Conduct performance verification test one day after work is installed of continuous RTU systems operation and before final acceptance of work. Performance verification test shall demonstrate the following:

1. Field Testing: Calibrate field equipment and verify equipment and system operation before placing the system on-line. Field-testing shall include the following tests.

2. Calibration Accuracy and Operation of Inputs Test: Check for proper calibration and operation of each input instrument. Document each reading for the test report.

3. Operation of Outputs Test: Check the operation of each output to verify correct operation. Command digital outputs on and off. Document each command and result for the test report.

5. RTU Startup and Memory Test: Demonstrate that programming is not lost after a power failure, and RTU controllers automatically resume proper control after a power failure.

6. Surge Protection: Show that surge protection, meeting the requirements of this specification, has been installed on incoming power to the digital controllers and on communications lines.

3.06 FIELD TESTS

A. Demonstrate compliance of the control system with the contract documents. Furnish personnel, equipment, instrumentation, and supplies necessary to perform calibration and site testing. Ensure that tests are performed by competent employees regularly employed in the testing and calibration of instrumentation systems.

B. Notify the OWNER of any defective products and workmanship disclosed by the tests.

C. Testing will include the field and the performance verification tests. Field tests shall demonstrate proper calibration of input and output devices, and the operation of specific equipment. Performance verification test shall ensure proper execution of the sequence of operation and proper tuning of control loops.
D. Test each device such that each item will function not less than five times.

E. Obtain approval of the plan for each phase of testing before beginning that phase of testing. Give to the OWNER written notification of planned testing at least 45 days prior to initiating testing procedures. In no case will the manufacturer be allowed to start testing without written approval of test procedures. Provide test procedures consisting of detailed instructions for complete testing to prove performance of the control system.

F. Before scheduling the performance verification test, furnish the field test documentation and written certification to the OWNER that the installed system has been calibrated, tested, and is ready for the performance verification test. Do not start the performance verification test prior to receiving written permission from the OWNER.

G. Tests are subject to oversight and approval by the OWNER.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE

The CONTRACTOR shall furnish and install automatic air release outlets at the locations shown on the Drawings or as directed by the ENGINEER. The details of the outlets shall be as shown on the drawings.

1.2 SUBMITTALS

Shop drawings and manufacturer's literature for equipment to be supplied shall be Submitted to the ENGINEER for approval in accordance with General Requirements

PART 2 - PRODUCTS

2.1 COMBINATION AIR VACUUM RELEASE VALVES

The CONTRACTOR shall provide two (2) inch pressure release valve as manufactured by GA Industries, Cla-Valve or approved equal. Bodies shall be cast iron with stainless steel floats.

2.2 CURB BOXES

Curb boxes shall be the standard, cast iron, sliding or screw type, 1" or 2-1/2" as required, complete with lid and head bolt. Boxes shall be adjustable from 18 inches to 66 inches.

Acceptable manufacturers: Bingham & Taylor, Mueller, Handley Industries, Clay and Bailey, A.Y. McDonald, Quality Water Products or equal.

END OF SECTION
SECTION 16300  ELECTRICAL CONDUIT

PART 1 - GENERAL

1.01 DESCRIPTION

Related Work Specified Elsewhere:

Measurement and Payment Section 01 025
Submittals Section 01 300
Trench Excavation and Backfill for Water Lines Section 02220
Satellite Telemetry System Section 11248

1.02 SUBMITTALS

Submit Certificates of Compliance and manufacturer's literature as per Section 01300.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Buried and Installed within Buildings:

1. Polyvinyl Chloride (PVC) Plastic
   a. Conduit - ASTM F512 - Type EB-20
   b. Fittings- ASTM F512 - Type DB-60
   c. Solvent Cement - ASTM D2564

   a. Conduit and Fittings - ASTM D1788 - Type 1 (EB)
   b. Solvent Cement - ASTM D2235

B. Exposed Exterior:

   Shall be rigid steel conduit galvanized on the inside and outside by hot-dipped galvanizing or electro-galvanizing.

2.02 MANUFACTURE

A. Conduit shall be manufactured from polyvinyl chloride resins and compounds in compliance with the above ASTM specifications.

B. Conduit shipped to the project shall be plainly marked as to type and origin of manufacture.

C. Nominal laying lengths of 20' shall be used.
PART 3 - EXECUTION

3.01 INSTALLATION

A. Open Trench Conduit:

1. Storage and Transportation
   a. Conduit stored for extended periods of time shall be kept covered.
   b. When transporting long lengths, support should be provided for the full length of the conduit. Unsupported overhang shall not be permitted.

2. Preparation
   a. Where required, a hacksaw (for sizes up to 1-1/2 inches) or a fine tooth wood saw (for larger sizes) shall be used to cut conduit. The cut shall be square and all burrs removed.
   b. Make certain that all foreign matter has been wiped from both the conduit and the fittings at the joints.
   c. The conduit should not insert more than 3/4 of the way into the socket when dry; this is necessary to make a good welded joint.

3. Solvent-Cement Joints
   a. The cement shall be obtained from the conduit manufacturer. A clean paper paint pot is convenient for containing the cement during use. Thinners are not allowed.
   b. Both the bell (or the fitting socket) and the spigot end of the conduit shall be wiped clean with an clean cloth.
   c. A liberal and uniform coat of cement shall be applied to the conduit for a length equal to the depth of the socket. Sufficient cement should also be applied to wet the socket of the fitting. Excess cement on the fitting shall be avoided as it may be wiped into the joint and tend to weaken the pipe. Plastic bristle brushes should not be used. The brush size should be about equal to joint depth, for example, a four-inch brush for eight-inch pipe.
   d. Slip conduit into the fitting with a slight twist until it bottoms. Hold the joint for 15 seconds (one (1) minute in extremely cold weather) so the conduit does not push out of the fitting. Do not twist or drive the pipe after the insertion is complete.
   e. The joined members shall be cured undisturbed for at least five (5) minutes before any stress is applied to the joint. After this initial cure, care must be exercised in handling to prevent twisting or pulling the...
SECTION 16300 ELECTRICAL CONDUIT

Joint. In cold or damp weather, this interval shall be increased to allow for the slower evaporation of the solvent. Where possible, all conduit should be assembled above ground and allowed to lie undisturbed for the weld to cure before being lowered into the ditch.

f. Excess cement that is left on the outer shoulder of the fitting shall be wiped off.

g. Another fitting or section of conduit may be added to the opposite end within two or three minutes if care is exercised in handling so strain is not placed on the previous assembly.

h. After covering the joint surfaces, return the brush to the cement pot. When stopping work, place the brush in a solvent; pour unused cement back in the can and cover tightly. When reusing the brush, shake the excess solvent out before dipping into the cement. The cement brush can be cleaned with a wire brush.

i. Any joint included in a section of conduit to be bent in the ditch should be made up above ground and allowed to lie undisturbed for at least two (2) hours before installation.

j. The plastic joint must be held rigid after insertion for the cure period. In cases where a plastic connection is made with the union under stress, due to misalignment or other factors, it shall be firmly staked to relieve stress on the joint until the conduit is backfilled or encased.

k. The conduit shall not be exposed in an open trench longer than is absolutely necessary.

4. Temperature

a. All plastic conduit and fittings to be joined shall be exposed to the same temperature conditions for a reasonable length of time before assembly.

b. Precautions: Due to expansion and contraction of the plastic conduit of 1-1/2 inch/100 feet for every 20°F change in the temperature, the following precautions should be taken: (1) Allow extra conduit footage at each tie-in for contraction when the conduit temperature is higher than that of the earth; or extra room for expansion if the converse condition exists. (2) Backfill from the center of the ditch toward the ends or from one tie-in point toward the other end of the conduit run. (3) After the ditch is backfilled and compacted and the conduit temperature is the same as that of the surrounding soil, lines may be cut off and matched up for connections with tie-ins. All conduit tie-ins entering the manhole or vault walls shall be grouted into the walls and the concrete encased for a minimum distance for 15 inches outside of the walls.
5. Concrete Encasement:
   a. All conduit should be tied and fastened to prevent floating.
   b. Spacers should be placed at the intervals shown in paragraph 6 for all sizes of conduit.
   c. Minimum spacing of conduit is required.
   d. Minimum concrete coverage should be at least three inches on the top, bottom, and sides of conduit.
   e. The backfill should be as specified in Section 02220 after the concrete has cured.
   f. Conduit is subject to temperature rise as the concrete cures. Therefore, allow the free end to expand. This can be accomplished by pouring the concrete from the center of the run or from one tie-in point.

6. Conduit Spacers
   a. Conduit spacers shall be used where required. Place horizontal and vertical spacers as follows:

<table>
<thead>
<tr>
<th>Conduit Size</th>
<th>Spacing</th>
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<tbody>
<tr>
<td>Up to 4 inches</td>
<td>6 feet</td>
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<tr>
<td>5 and 6 inches</td>
<td>4 feet</td>
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   Grid spacers when used must be 12 inches or more distance from any coupling or joint.
   b. Grid spacers should not be located at the center of a radius bend: (1) On fabricated bends, locate the spacer in the tangent free of the coupling. (2) On trench formed radius sweep, locate the spacer midway between the tangent and center of the bend.

END OF SECTION 16300
ATTACHMENT NO. 3

RESPONSE NO. 9
MINGO COUNTY REDEVELOPMENT AUTHORITY
AND TOWN OF MATEWAN TO COMMISSION STAFF’S
FIRST SET OF INTERROGATORIES, DATA REQUEST OR
REQUESTS FOR INFORMATION
MINGO COUNTY REDEVELOPMENT AUTHORITY

CONSTRUCTION DRAWINGS FOR

MINGO CENTRAL HIGH SCHOOL
WATER AND SEWER EXTENSION PROJECT

MINGO COUNTY, WEST VIRGINIA

INDEX OF SHEETS

TITLE SHEET  1
NOTES AND LEGEND  2
PLAN SHEET LAYOUT INDEX  3-14
PLAN AND PROFILE SHEETS  15-17
SITE PLANS  18-34
DETAIL SHEETS  35-44

PLANS PREPARED BY:
E.L. ROBINSON

BOARD OF DIRECTORS
M. WHITT, EXECUTIVE DIRECTOR
TERRY SAMMONS, CHAIRMAN
ANGIE DILLON, VICE CHAIRMAN
JAMES SIMPKINS, SECRETARY/TREASURER
STEVE KDMINAR, MEMBER
PAUL PINSON, MEMBER

LOCATION MAP
MINGO COUNTY, WEST VIRGINIA

VICINITY MAP

PROJECT MAP

STATE OF

E.L. ROBINSON

CERTIFIED TO PRACTICE AS A PROFESSIONAL ENGINEER IN THE STATE OF WEST VIRGINIA
1. The contractor shall include the cost of the various depths required in the unit price of the line.
2. The contractor shall provide and supply, at no extra charge, all appurtenances and the various depths required in the unit price of the line.
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NOTE:
SHEETS 10 THROUGH 13 ARE FOR ILLUSTRATION PURPOSES ONLY. WORK SHOWN ON THESE SHEETS IS NOT PART OF THIS CONTRACT.
NOTE: WATER AND SEWER INSTALLED IN KING COAL HIGHWAY UTILITY CORRIDOR ARE NOT IN THIS CONTRACT.
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HOT MIX ASPHALT MATCH EXISTING DEPTH (6 MAX & 1 MIN)

CONCRETE TO BE ROUGH FOR BONDING OF HOT MIX ASPHALT

FLOWABLE FILL (1,000 PSI MIN)

NOTE: WHERE TYPE A TRENCHES ARE WIDER THAN 7 FEET IN
EXISTING BITUMINOUS PAVEMENT, CONCRETE MAY BE DELETED
IF EXISTING HOT MIX ASPHALT THICKNESS AND 18" STONE
ARE RESTORED.

TRAFFIC IS TO BE MAINTAINED AT ALL TIMES BY THE USE OF
APPROPRIATE TRAFFIC CONTROL DEVICES. USE OF METAL
PLATES, HAVING SUFICIENT RIGIDITY TO SPAN TYPE "A"
TRENCH, IS REQUIRED TO PREVENT WHEEL LOADS FROM BEING
TRANSMITTED TO THE CLAY. THE PLATES ARE TO BE SECURELY
ANCHORED TO PREVENT MOVEMENT CAUSED BY TRAFFIC, THE
PLATES ARE TO BE LEFT IN PLACE UNTIL THE FLOWABLE FILL
HAS OBTAINED 50% OF ITS COMPRESSIVE STRENGTH.

NEW PAVEMENT - 3/4"

HOT Poured ELASTIC TYPE SEALER NEW

PLAN - BENDS

PLAN - TEEs

SECTION G-G

PLAN AND ELEVATION PLUGS

THrust BLOCK STANDARDS

Note: Dimensions based upon soil bearing capacity of 2000 psi and static pressure to be increased proportionally for higher pressure.

SIZe IN. 30° BENDS 45° BENDS 22.5° Bends TESTS & PLUGS
A B C D
3 5 6 4 5 8 4 10 12 12 31
6 10 10 8 8 10 12 10 31
8 22 15 12 12 10 16 16 12 29
10 26 17 14 14 10 18 20 14 28

STANDARD THRUST BLOCKS FOR WATER LINES

CONCRETE ENCASEMENT

Contractor shall encase sanitary sewer pipe in concrete where waterline crossings do not achieve distance (X) inches of vertical separation. The sanitary sewer pipe shall be wrapped in thin plastic prior to concrete encasement. The concrete encasement shall be a minimum of (X) inches all around and extend a minimum of (Y) feet each side of the intersection with the waterline.

OPEN CUT DETAILS

CONCRETE ROADWAY REPAIR

NOTES

1. WHERE TYPE A TRENCHES ARE WIDER THAN 7 FEET IN EXISTING BITUMINOUS PAVEMENT, CONCRETE MAY BE DELETED IF EXISTING HOT MIX ASPHALT THICKNESS AND 18" STONE ARE RESTORED.

2. TRAFFIC IS TO BE MAINTAINED AT ALL TIMES BY THE USE OF APPROPRIATE TRAFFIC CONTROL DEVICES. USE OF METAL PLATES, HAVING SUFICIENT RIGIDITY TO SPAN TYPE "A" TRENCH, IS REQUIRED TO PREVENT WHEEL LOADS FROM BEING TRANSMITTED TO THE CLAY. THE PLATES ARE TO BE SECURELY ANCHORED TO PREVENT MOVEMENT CAUSED BY TRAFFIC, THE PLATES ARE TO BE LEFT IN PLACE UNTIL THE FLOWABLE FILL HAS OBTAINED 50% OF ITS COMPRESSIVE STRENGTH.

3. NEW PAVEMENT - 3/4"

4. HOT Poured ELASTIC TYPE SEALER NEW

5. PLAN - BENDS

6. PLAN - TEEs

7. SECTION G-G

8. PLAN AND ELEVATION PLUGS

9. THrust BLOCK STANDARDS

10. Note: Dimensions based upon soil bearing capacity of 2000 psi and static pressure to be increased proportionally for higher pressure.

11. STANDARD THRUST BLOCKS FOR WATER LINES

12. CONCRETE ENCASEMENT

Contractor shall encase sanitary sewer pipe in concrete where waterline crossings do not achieve distance (X) inches of vertical separation. The sanitary sewer pipe shall be wrapped in thin plastic prior to concrete encasement. The concrete encasement shall be a minimum of (X) inches all around and extend a minimum of (Y) feet each side of the intersection with the waterline.

13. OPEN CUT DETAILS

14. CONCRETE ROADWAY REPAIR

NOTES
SECTION WITH DITCH OR CURB

SECTION WITHOUT DITCH OR CURB

BORE & JACK DETAILS

SEALING END SEAL WITH T-304 STAINLESS STEEL BANDS AT EACH END (CASCADE MODEL CCES OR EQUAL)

NOTES:
- UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER, INSTALL CONCRETE ANCHORS IN ACCORDANCE WITH THE FOLLOWING TABLE:

<table>
<thead>
<tr>
<th>PIPE SLOPE</th>
<th>MIN. CONCRETE ANCHOR SPACING CENTER TO CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS THAN</td>
<td>25 FT.</td>
</tr>
<tr>
<td>25K TO 34K</td>
<td>35 FT.</td>
</tr>
<tr>
<td>35K TO 49K</td>
<td>45 FT.</td>
</tr>
<tr>
<td>50K OR GREATER</td>
<td>55 FT.</td>
</tr>
</tbody>
</table>

CONCRETE ANCHOR FOR SLOPES

NEW SEWER LINE

PREVIOUS 8" LAYER OF COMPACTED CLASS 1 AGGREGATE BASE COURSE, ITEM 307-1 ON EXISTING SHOULDER AFTER DRAINAGE SEWER INSTALLATION. FUTURE 8" LAYER OF COMPACTED CLASS 1 AGGREGATE BASE COURSE, ITEM 307-1 ON EXISTING SHOULDER, EVEN IF EXISTING SHOULDER HAS NOT STONE. THE QUANTITIES USED FOR SI. ITEM "WHATWT 307-1" SHALL BE SUBJECT TO FINAL APPROVAL BY THE ENGINEER.

NEW SEWER LINE

DETAIL - TYPICAL LONGITUDINAL UTILITY INSTALLATION
(MDLG. AV. BS)

DETAIL - TYPICAL CASING PIPE/CARRIER PIPE INSTALLATION

NOTE:
- THERE ARE ADDITIONAL SPACERS TO BE PLACED AT INTERVALS NOT GREATER THAN 5' WITHIN THE CASING, DEPENDING ON THE CASING PIPE SIZE AND THICKNESS.

CARRIER PIPE SIZE AND THICKNESS SHALL BE AS FOLLOWS:

<table>
<thead>
<tr>
<th>CARRIER PIPE SIZE</th>
<th>CASING PIPE SIZE (TOTAL)</th>
<th>CASING PIPE THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;</td>
<td>20&quot;</td>
<td>0.375&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.00&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.25&quot;</td>
</tr>
</tbody>
</table>
Provide butyl mastic between manhole grade rings and frame.

Watertight C-1 manhole frame & cover thickness 8"-10"-5-3 with gasket & bolted cover; or equal.

Preformed hole with rubber gasket cast into manhole (typical, new manhole).

Existing or new manhole grade rings for precast concrete manhole per ASTM C-478.

Tongue and groove joints.

Prefabricated hole with rubber gasket cast into manhole (typical, new manhole).

Existing or new manhole grade rings for precast concrete manhole per ASTM C-478.

Tongue and groove joints.

Flange to springline.

Compacted crushed run.

Branch line.

Field-cast, ready mix, Class B, 4,000 psi, concrete footer.

6" compacted bedding (3&7 stone) under manhole.

Manhole over existing sewer (dog house).

Outside drop detail.

Construct an outside drop at all locations where sewers enter manholes 2.0' or higher above the manhole invert.

Copolymer polypropylene plastic, 1/4" shade rod.

Steel reinforcement.

Concrete cap (3' thick x 12' 4")

Field-cast, ready mix, Class B, 4,000 psi, concrete footer.

6" sewer line.

Concrete pipe.

Concrete gasket.

6" 45° x 16' branch.

In-line cleanout detail.

Proposed 2 1/2" force main.

Concrete cap (3' thick x 12' 4"

Concrete pipe.

Concrete gasket.

6" sewer line.

Concrete pipe.

Concrete gasket.

6" 45° x 16' branch.

In-line cleanout detail.

Proposed 2 1/2" force main.
NOTE:
1. STEAMER NOZZLE (4" DIA.) TO BE PROVIDED WITH NATIONAL STANDARD NOSE THREADS.
2. PUMPER NOZZLES (2" DIA.) TO BE PROVIDED WITH NATIONAL STANDARD NOSE THREADS.
3. HYDRANT SHALL BE RESTRAINED FROM MOVEMENT BY THRUST BLOCKING AND RODDING OR BY RESTRAINED JOINT DUCTILE IRON PIPE.
4. HYDRANT TEE CONNECTION TO MAIN LINE.
5. LOCATOR WIRE TO BE PULLED INTO VALVE BOX.

NOTE:
1. FOR VALVES LESS THAN 4 FEET DEEP THE VALVE BOX SHALL BE TWO PIECES AND ADJUSTABLE SUCH AS MUELLER H10357, OR EQUAL.
2. ALL VALVE BOXES SHALL BE SURROUNDED BY A 6 INCH DEEP CONCRETE PAD 2'-0" SQUARE.
3. LOCATOR WIRE TO BE PULLED INTO VALVE BOX.

NOTE:
1. DISTANCE FROM VALVE BOX TO VALVE MARKER MAY BE VARIED WITH OWNERS APPROVAL, IF FIELD CONDITIONS WARRANT.

NOTE:
1. STEAMER NOZZLE AND SERVICE PIPE TO BE PAID FOR UNDER THEIR RESPECTIVE ITEMS.
TYPICAL RAILROAD CROSSING

NOTE:


SEALING CASING INSTALLATION

NOTE:

CASING INSULATORS TO BE EQUAL TO THOSE MANUFACTURED BY F.H. MALONEY CO. MATERIAL TO BE HIGH DENSITY POLYETHYLENE OR POLYESTER FIBERGLASS.

CARRIER PIPE

STEEL CASING

NEW WATERLINE

PROVIDE MINIMUM 8" LAYER OF COMPACTED CLASS I AGGREGATE BASE COURSE. ITEM 375-11 IS EXISTING SHOULDER AFTER WATERLINE INSTALLATION. WIDTH OF NEW STONE TO BE SAME WIDTH AS CASING SHOULDER. FOOTING IS EXISTING SHOULDER OR NATURAL STONE. THE QUANTITIES USED FOR BID ITEM "WSTD 376-1" SHALL BE SUBJECT TO PRIOR APPROVAL BY THE ENGINEER.
LMI OR EQUAL 35 GALLON CHEMICAL STORAGE TANK W/ LMI MODEL ALD1352 SI CHEMICAL FEED PUMP (58 GPH) MOUNTED ON COVER PUMP AND TANK FOR FEEDING 12-15% LIQUID SODIUM HYPOCHLORITE. PUMP MUST BE ABLE TO DELIVER AGAINST PRESSURE OF UP TO 250 PSI. CHEMICAL FEED SYSTEM TO BE WIRING TO OPERATE IF EITHER PUMP IS OPERATING.
LMI OR EQUAL, 35 GALLON CHEMICAL STORAGE TANK WITH LMI "MODEL A141352 SI CHEMICAL FEED PUMP (0.58 gph) DELIVERED AGAINST PRESSURE OF UP TO 350 PSI. CHEMICAL FEED SYSTEM TO BE TOLERATED TO OPERATE IF EITHER PUMP IS OPERATING.
NOTE: INTERIOR FUNNEL, ELBOW & PLANE TO BE 304 STAINLESS STEEL. OVERFLOW PIPE TO BE SCH 80 PVC.

304 STAINLESS STEEL FASTENERS /

CONTRACTOR TO VERIFY ANCHOR BOLT SIZE AND QUANTITY.

#9 BARS @ 6" (MAX. SPA) (T & B)

#9 BARS @ 12" (T & B)

#4 BARS @ 12" (T & B)

REBAR SEPARATION FOR CLARITY (SIDE-BY-SIDE, IN ACTUALITY)

#8 BARS @ 12" @ 48" C/C (BOTH WAYS)

#8 @ 12" C/W TOP MAT

CONTRACTOR TO VERIFY ANCHOR BOLT SIZE AND QUANTITY

#8 @ 6" C/W STIRUP

#8 @ 6" C/W E/W BOTT. MAT

FOUNDATION DETAIL

NOTE: FOUNDATION SHALL BE DESIGNED BY CONTRACTOR TO ACCORDANCE WITH LOCAL AND CURR. ANNA STANDARDS.

TANK OVERFLOW DETAIL

TANK INTERIOR

STAINLESS STEEL FASTENERS

SCH 80 PVC

304 STAINLESS STEEL

TANK SHELL SHEET

NOTE: INTERIOR FUNNEL, ELBOW & PLANE TO BE 304 STAINLESS STEEL. OVERFLOW PIPE TO BE SCH 80 PVC.

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**TANK TABLE**

<table>
<thead>
<tr>
<th>TANK LOCATION</th>
<th>CAPACITY (GALLONS)</th>
<th>NOMINAL INSIDE DIAMETER</th>
<th>NOMINAL SIDEWALL HEIGHT</th>
<th>FLOOR ELEVATION</th>
<th>MOUNT ELEVATION</th>
<th>TOP ELEVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPS #2 TANK</td>
<td>14,000</td>
<td>14.00 FEET</td>
<td>14.68 FEET</td>
<td>1,539.00</td>
<td>1,545.84</td>
<td>1,553.68</td>
</tr>
</tbody>
</table>

**NOTES**

1. WATER STORAGE TANK DRAWINGS AND DETAILS ARE RECOMMENDED OF MINIMUM REQUIREMENTS ONLY. CONSTRUCTION CONTRACTOR SHALL SUBMIT DRAWINGS TO THE ENGINEER IN ACCORDANCE TO THEIR OWN SPECIFICATIONS.
2. TARGET GAUGE TO BE PROVIDED TO SHOW WATER LEVEL.
NOTE: INTERIOR FINISH, EARTH & \(\frac{1}{2}\) IN. MATERIAL IS FREE OVERFLOW HAP TO BE INS 80 PVC.

**PLAN**

- **Tank Overflow Detail**
  - Tank interior
  - Tank shell sheet
  - Funnel, elbow
  - Flange to be 304 stainless steel
  - Foundation pipe to be SCH 80 PVC
  - Stainless steel fasteners

**NOTES:**
1. (10) sheets per ring
2. Seismic design code: AWWA D103-97, Zone 1
3. Seismic design code: AWWA D103-97, Zone 1
4. Tank overfill

**FILLER**

- **Specifications**
  - 1400' tank
  - Foundation
  - Foundation bolts
  - Floor mat rebar:
    - #4 rebar @ 24" (both ways)
  - Curvature rebar:
    - #4 rebar (2) rings
  - Gravel backfill
  - Gravel base:
    - 2" x 2" x 8" (1) per sheet
  - Building:
    - 1400' tank
  - Curb:
    - Curvature rebar:
      - #4 rebar (2) rings

**SECTION THRU FOOTING**

- **Foundations**
  - Foundation:
    - #4 rebar (2) rings
  - Foundation bolts:
    - 1/2" dia. @ 3' long (6) per sheet
  - Grouting:
    - (2) rebar (2) rings

**NOTES:**
- The foundation dimensions and reinforcement shown are based on a preliminary design by Engineered Storage Products Company and are intended for conceptual purposes only. The contractor shall submit detailed foundation drawings and design calculations signed and sealed by a professional engineer registered in the state of West Virginia, for review.
A Silt Fence is a temporary barrier with a life expectancy of six months or less installed below small disturbed areas or at the toe of a slope.

The purpose of a Silt Fence is to intercept and detain sediment from small unprotected areas.

Silt Fence Cloth: Filter fabric shall be a woven or non-woven textile fabric or other fabric that is impervious to water, impermeable to particles smaller than 25 microns. The fabric shall be fixed so that the filter fabric retains its relative positions to each other. The fabric shall be resistant to chemical deterioration of degradation by rain, snow, ice, frost, and rodents.

Filter Posts shall be maximum of 46" in length. Filter posts will be of round, quality hand wood with a minimum diameter of 2 inches, or as approved. Steel posts shall be standard T or U section weighing not less than 3.5 pounds per linear foot.

Filter Wire Fencing shall be a minimum 14-9 gauge wire mesh, opening, or as approved. Filter fabric shall be attached to the filter wire posts by staples or wire ties. Staples shall be used to fix the filter cloth to the upstream side of the woven wire. Filter cloth shall be allowed to contact soil for anchorage at the bottom.

Filter Cloth shall be embedded in the soil a minimum of 6 inches and have compacted soil hold in place. The inspection shall be frequent and the filter cloth shall be replaced promptly as needed if it is torn. Sediment shall also be removed to insure capacity.

The following conditions are required by the West Virginia Public Land Corporation for stream crossings on this project. The contractor shall comply with these conditions.

1. All shore areas disturbed by this operation must be resown, seeded and mulched immediately upon completion of work.
2. Work must be performed during low flow.
3. Any stream bed disturbance should be restricted to the immediate area. Use of equipment should be kept to a minimum.
4. Green concrete must not be put into the stream (toxic to aquatic life).
5. The amount of streamside vegetation removed should be kept to a minimum.
6. Best management practices must be followed.
7. No stream work is to be conducted during the fish spawning season (April–June 20).

The Contractor shall use either of the following methods to install the stream crossings:

Method 1: The Contractor shall construct a temporary dam of sandbags or inflatable bags across the entire stream at a location upstream from the proposed stream crossing. A layer of 6-mil polyethylene sheeting shall be placed on the upstream side of the temporary dam. Temporary pumphouse shall be installed to transfer the normal stream flow to a point downhill from the pipeline crossing until construction and restoration is completed. The temporary dam shall be carefully removed in order to prevent erosion of stream banks. All excess material from trench excavation shall be removed to an off-site disposal area.

Method 2: The Contractor shall construct a cofferdam of sandbags or inflatable bags from the stream bank to a point downstream of the center of the stream. The main pipe shall then be installed in a trench within the cofferdam. Any excess trench shall then be removed and the pipe installed to a point beyond the centerline of the stream.

The same procedure shall be used to install the remainder of the stream crossings. Super silt fence is to be installed at all stream crossings on this project.

Note: Although the WV/NDPS construction stormwater permit is registered in the name of the owner, the contractor shall be responsible for all fines incurred because of violations of aforementioned permit.
DETAIL-CHAIN LINK FENCE VEHICLE GATE ARRANGEMENT

DETAIL-CHAIN LINK FENCE CORNER AND INTERMEDIATE ASSEMBLY SECTIONS

DETAIL-CHAIN LINK FENCE END SECTION

CHAIN LINK FENCE NOTES:

- The post brace and 9" diameter truss rod must be used on the first section between the end posts and the first line posts, and on the first section both sides between the corner, intermediate assembly, or full post and the first line post.
- Line posts adjacent to end, full, corner, gate and intermediate assembly posts shall be set in concrete. Other line posts shall also be set in concrete, except length line posts 15' and longer shall be pipe posts set in concrete footings.
- Post caps for end, corner, gate, line or full posts shall be shank fitted or securely attached to pipe posts by means of set screws, pins or rivets.
- Fence fabric is 2" No. 9 galvanized, knuckled on both selvages and galvanized with a Class "B" zinc coating.
1. Use 2–4 inch stone for low volume entrances, larger stone (4–6 inch) for heavy use or material delivery entrances.
2. Length is as required, but not less than 70 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Runners should be not less than 2 inches thick.
4. The runner shall be a minimum of 10 feet, but not less than the full width at points where ingress or egress occurs.
5. Geotextile fabric shall be placed over the entire area prior to the placing of stone.
6. All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If a culvert is impractical, a mountable berm with 5:1 slopes shall be used.
7. If necessary, divert any water running down access road to a sediment trap located on either side of the stabilized construction entrance.

**BMP 3.02—STABILIZED CONSTRUCTION ENTRANCE**

**BMP 3.02—STABILIZED CONSTRUCTION ENTRANCE**

Large quantities of mud can be tracked onto public and private roads causing dangerous driving conditions and muddy runoff when it rains. Construction entrances are stabilized to reduce the amount of sediments transported onto paved roads by vehicles or equipment by constructing a stabilized pad of stone at entrances to construction sites.

The entrance shall be maintained in a condition that will prevent tracking or flowing of sediments onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or clearing of any areas used to trap sediments. All sediment applied, dropped, washed or tracked onto public rights-of-way must be removed immediately. Wheels on all vehicles shall be cleaned to remove sediment prior to entrance onto public rights-of-way. If washing is required, it shall be done on an area stabilized with stone and which drains into approved sediment trapping device. If the street is washed precleaned, steps must be taken to prevent muddy water from running into storm sewers. Inspection and needed maintenance should be provided daily but at a minimum every seven days and after every rain of 0.5 inch or greater.