SPECIAL

BOARD OF COMMISSIONERS AGENDA

Radnor Township Municipal Building

Zoom Meeting

Monday, August 17, 2020 - 6:30 PM

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1. Pledge of Allegiance
2. Resolution #2020-93 - Engage Gannett Fleming for Emergency Valley Creek Stream Bank Stabilization Design and Permitting at 790 Robinhood Road, for the not to exceed price of $145,000
3. Adjournment

Meeting Notice

There will be a Special Board of Commissioners meeting held on Monday, August 17, 2020 at 6:30 PM via Zoom and streamed live on the Radnor Township YouTube Channel at https://www.youtube.com/channel/UCvh6jeMQTvo3ojCTh8wZkbA. The purpose of meeting is to consider Resolution #2020-93 - Engage Gannett Fleming for Emergency Valley Creek Stream Bank Stabilization Design and Permitting at 790 Robinhood Road, for the not to exceed price of $145,000 and any other matters. If you would like to submit public comment, please send an email to publiccomment@radnor.org. This email address will only be monitored during the meeting.

RESOLUTION NO. 2020-93

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, ENGAGING GANNETT FLEMING FOR EMERGENCY VALLEY CREEK STREAM BANK STABILIZATION AT 790 ROBINHOOD ROAD

WHEREAS, the gabion baskets installed as part of a previous Township project have failed during Tropical Storm Asais, endangering the dwelling at 790 Robinhood Road

WHEREAS, the Board of Commissioners previously approved short-term repairs to the stream bank at 790 Robinhood Road, while a permanent solution can be designed and permitted

WHEREAS, Gannett Fleming, Incorporated has provided a cost estimate to provide design and permitting for the permanent solution, that being retaining walls or a culvert extension

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township does hereby Authorize Gannett Fleming to Perform Design and Permitting for the retaining walls or culvert extension, at a cost of $145,000

SO RESOLVED this 17th day of, August A.D., 2020

RADNOR TOWNSHIP

By: _____
Name: John Larkin
Title: President

ATTEST: _____
William M. White
Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: August 12, 2020

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer

CC: William M. White, Township Manager

LEGISLATION: Resolution 2020- 93 Engage Gannett Fleming for EMERGENCY Valley Creek Stream Bank Stabilization at 790 Robinhood Road

LEGISLATIVE HISTORY: At the regularly scheduled August 10th, 2020 Board of Commissioners meeting, based on the Township's emergency work requirements, the Board authorized Terra Structures to complete Emergency short term repairs to the streambank for $150,000 and Emergency design cost of $10,000 to Gannett Fleming, Incorporated.

PURPOSE AND EXPLANATION: The situation at 790 Robinhood Road is still precarious and deemed an emergency. The purpose of the short-term repair is to provide time to prepare emergency design and permitting plans to permanently address the issue. We will be back in front of the Board of Commissioners in two months to request emergency authorization for the construction work, cost to be determined upon final design. To that end, Gannett Fleming has provided a report (attached) outlining the costs of design and estimated costs of construction, as well as the design cost proposals.

The proposal for design of a pipe extending beyond 790 Robinhood Road is $145,000, and that to design a Ready Rock Wall is $100,000 (increased due to field conditions noted on site).As part of these proposals, an evaluation will be completed to determine the feasibility of constructing the wall versus the pipe extension.

The request before the Board of Commissioners is to award the design proposal for the pipe/culvert extension at $145,000. If during the feasibility study it is determined the Ready Rock Wall is the best solution, the cost will revert to $100,000.

IMPLEMENTATION SCHEDULE: Pending Commissioners approval, a purchase order will be processed, and design work will begin immediately. It is anticipated that the Department of Environmental Protection will address this permit on an Emergency Basis, with final design completed approximately two months from the award date.

FISCAL IMPACT: The following costs are based on the design and construction costs for the pipe/culvert extension. Please note that at the Manager's direction, a Keystone Communities Program Grant is being applied for to subsidize the cost of the project. The balance will be funded by the 04 Stormwater Fund. It is important to understand that construction costs are high level; upon actual design, a more detailed cost estimate will be provided, but the following illustrates the magnitude of the project.

790 Robinhood Road Costs - Pipe/Culvert Extension		
Description	Costs	Grant Funding
Design & Permitting	$145,000	$14,500
Pipe/culvert extension construction costs (estimated)	$580,000	$500,000
Subtotal	$725,000	
Inspections estimated at 10% of construction cost	$58,000	
Contingency at 15% of construction cost	$87,000	
Total Cost	$870,000	$514,500
Net cost after grant proceeds	$355,500	

<u>REQUESTED ACTION</u>: I respectfully request the Board of Commissioners Engage Gannett Fleming for EMERGENCY Valley Creek Stream Bank Stabilization Design and Permitting at 790 Robinhood Road, at a cost of $145,000.

Gannett Fleming

Excellence Delivered ***As Promised***

MEMORANDUM

Date: August 12, 2020

To: Stephen Norcini, P.E. – Township Engineer

From: Roger Phillips, P.E.; Ted Roehrig, P.E.

RE: 790 Robinhood Road
Replacement of Wall at Robinhood Road and Valley Run

An initial visual inspection was performed on June 26, 2020 of the above-referenced downstream gabion wall and culvert carrying Valley Run under Robinhood Road in Radnor Township, Delaware County. The inspection was performed to assess the extent of deterioration of an existing gabion wall and provide recommendations to replace the wall and provide a preliminary cost estimate for feasible wall alternatives. The inspection was limited to visible portions of the wall elements, i.e. above ground and areas with minimal vegetation cover. The stone gabion wall and adjacent embankment was examined for undermining, rotation, erosion and settlement, with particular attention to the effect on the adjacent home at 790 Robinhood. A follow-up inspection was performed on August 5 after a significant flood event resulted in failure of the gabion wall and extensive embankment erosion.

Wall Description

In 2001, the existing CMP arch culvert carrying Valley Run under Robinhood Road and the downstream headwall were replaced in-kind, and the downstream east embankment was stabilized with a stone gabion wall, extending roughly 85 feet from the culvert headwall to near the middle of the footprint of the adjacent home. The wall is approximately 9-12 feet in total height according to the existing plans and is within 10 feet of the existing home at its closest point. The embankment behind the gabion wall is steep and heavily vegetated.

As part of the 2001 project, an existing sewer pipe approximately 30 feet downstream of the culvert outlet was encased and stabilized with a concrete abutment approximately 4 feet in height. The existing upstream stone headwall was re-used and tied into the new pipe culvert. A roadway drainage pipe outlets through the downstream headwall. The water in the channel at the time of the initial inspection was approximately 3-6 inches deep with locally deeper areas, which likely represents normal flow. The area is very prone to heavy flood flows.

General View of Pipe Culvert from downstream

General View of Gabion Wall (left) prior to failure (conc. abutment sewer encasement in right foreground)

Inspection Findings

The metal pipe culvert and downstream concrete headwall and apron are in good condition. The existing upstream masonry wingwalls exhibit moderate undermining.

The downstream gabion wall has failed downstream of the sewer encasement, and the embankment has severely eroded, undermining the driveway and HVAC unit of the adjacent home and partially exposing the concrete block basement wall. The east embankment beyond the end of the failed gabion wall is also severely eroded with the remains of a dry-stack stone wall lying in the channel and on the bank.

The concrete-encased sewer pipe 30’ downstream from the culvert is in good condition. An existing 6” steel sewer pipe approximately 110 feet downstream of the culvert exits the eroded east embankment and is exposed, crossing the creek approximately 3 feet above the streambed. The invert of the pipe is approximately one foot above the bottom of the manhole on the west embankment. The stone wall on the west side downstream of the sewer encasement has fallen into the channel, exposing the sewer main. The west embankment beyond the end of the wall exhibits moderate erosion.

End of Gabion wall prior to failure

Undermining of gabion wall prior to failure

End of Gabion wall after failure, exposed wall

Failed stone wall, west bank w/exposed sewer

6" exposed sewer lateral downstream

Upstream wingwalls - undermined

Exposed 6" sewer and manhole on west embankment

A contractor was mobilized on August 5, 2020 to provide emergency countermeasures to mitigate the erosion and protect the foundation of the adjacent home. Recommendations for permanent countermeasures are provided below.

Recommendations

The downstream gabion wall has failed and is beyond repair. The embankment behind the wall has significantly eroded, putting the foundation of the house and the air conditioning unit at risk. It is recommended that the wall be replaced and extended at least 25 feet beyond the footprint of the house, for a total length of approximately 130 feet, incorporating the 6" sewer pipe. The embankment behind the wall should be restored and drained appropriately. The failed stone wall on the west bank of the channel is also recommended for replacement. Estimated length is 40 feet.

Wall Option

Upon investigation of feasible wall types, it was determined that a prefabricated modular retaining wall system such as the Redi-Rock® wall system is the most suitable long-term alternative. Redi-Rock® is an engineered, precast retaining wall system that utilizes massive blocks weighing over one ton each to create a gravity wall system. Compared to the other conventional retaining wall systems, Redi-Rock® can be constructed relatively quickly with minimal excavation. The wall does not require reinforcement and can be installed in limited workspace with minimal disturbance to the adjacent stream. Moreover, the mass of the wall makes it much more durable in flood flow situations than gabion or crib walls. Redi-Rock® comes in different finishes which would be aesthetically pleasing and in general would be a versatile solution for this location.

Replacement with an in-kind gabion wall is not recommended since this wall type has not performed well at this site. A cast-in-place reinforced concrete (RCC) wall would be feasible, however, it is not considered to be cost-effective as indicated in the estimate below. Moreover, considering the tight working conditions present at the site, RCC wall may not be well suited compared to a Redi-Rock® wall system. Rock outcrops were noted on the upstream side, so other wall types like soldier pile and lagging would not be suitable. Due to the steep slope, limited workspace, and high flood flow velocity, riprap is not a feasible solution.

Due to the elevations of the existing sanitary sewer lateral being above the creek with insufficient depth of the existing manhole to lower the lateral beneath the creek bed, alternates for relocation are limited. One option would be to install a grinder pump system in the rear yard of the residence and construct a low-pressure force main around the rear of the residence and within the existing driveway to a point of connection with the existing sanitary sewer located within Robinhood Road. Alternately, the sanitary sewer can be left in place and can be incorporated in the proposed wall design, providing an isolation wall penetration to account for movement and future settlement. Costs for the grinder pump/force main alternative are included in the overall estimated construction cost.

The following is a summary of the anticipated work:

Engineering Phase (Wall option):

- Survey
- Environmental assessment and permitting
- Evaluation of Alternatives
- Geotech Evaluation with Borings
- Design, Plan Preparation, and Bid Package for New Wall
- Bid Services

Estimated cost: $100,000

Construction Phase (Wall option):

- Stream Diversion
- Erosion and Sediment Pollution Control
- Removal of existing wall
- Excavation and Levelling Pad
- Construction of New Wall extending 25' beyond footprint of house (total 130 LF)
- Underpinning of upstream wingwalls
- Relocation of existing downstream sewer lateral
- Rock Slope Protection

Estimated cost: $310,000 (Recommended Alternative – Prefabricated Modular Wall)
Estimated cost: $440,000 (Reinforced Concrete Wall)

Culvert Extension Option:

An alternative option would be to extend the existing culvert in-kind, to a point at least 25 feet past the residence, eliminating the potential for further erosion adjacent to the residence. A full Hydrologic and Hydraulic (H&H) study, geotechnical study, and survey would need to be performed for this option. The concrete-encased sewer main will need to be incorporated or relocated. The downstream sewer lateral work would be similar to the wall option.

The following is a summary of the anticipated work:

Engineering Phase (Culvert Extension option):

- Survey
- H&H Study Report (HEC-RAS)
- Geotechnical Analysis (borings, lab analysis)
- Environmental assessment and permitting
- Design, Plan Preparation, and Bid Package for New Wall
- Bid Services

Estimated cost: $145,000

Construction Phase (Culvert Extension option):

- Stream Diversion
- Erosion and Sediment Pollution Control
- Removal of existing wall
- Excavation and Levelling
- Construction of New Culvert extending 25’ beyond footprint of house (total 130 LF)
- Underpinning of upstream wingwalls
- Relocation/Incorporation of existing downstream sewer lateral and main
- Backfill and site restoration

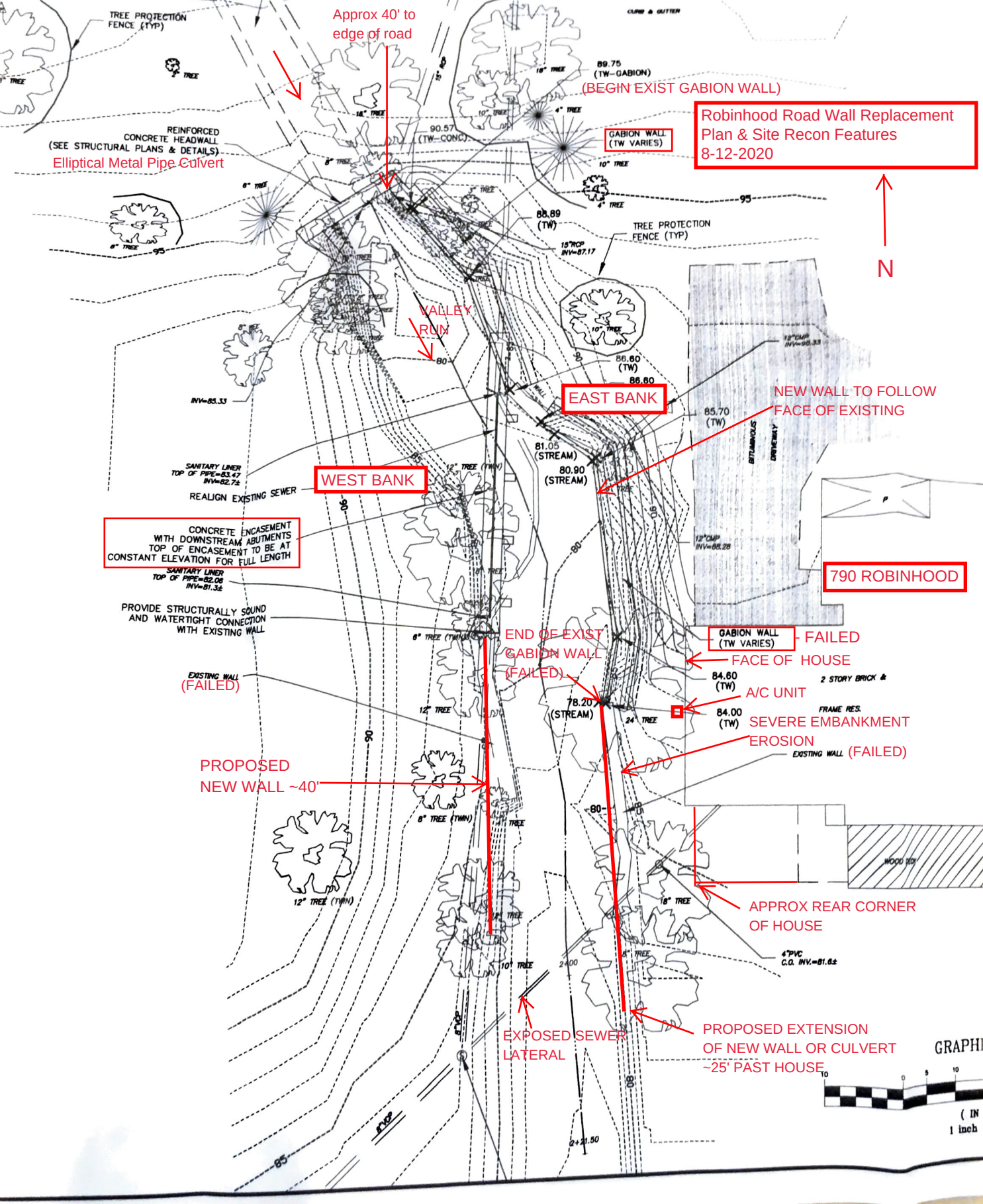
Estimated cost: $580,000 (Extension of culvert in-kind)

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Associate


Robinhood Road Wall Replacement
Plan & Site Recon Features
8-12-2020
N
Approx 40' to edge of road
(BEGIN EXIST GABION WALL)
TREE PROTECTION FENCE (TYP)
REINFORCED CONCRETE HEADWALL (SEE STRUCTURAL PLANS & DETAILS)
Elliptical Metal Pipe Culvert
GABION WALL (TW VARIES)
VALLEY RUN
EAST BANK
WEST BANK
NEW WALL TO FOLLOW FACE OF EXISTING
790 ROBINHOOD
REALIGN EXISTING SEWER
CONCRETE ENCASEMENT WITH DOWNSTREAM ABUTMENTS TOP OF ENCASEMENT TO BE AT CONSTANT ELEVATION FOR FULL LENGTH
PROVIDE STRUCTURALLY SOUND AND WATERTIGHT CONNECTION WITH EXISTING WALL
EXISTING WALL (FAILED)
END OF EXIST GABION WALL (FAILED)
FACE OF HOUSE
A/C UNIT
SEVERE EMBANKMENT EROSION
EXISTING WALL (FAILED)
PROPOSED NEW WALL ~40'
APPROX REAR CORNER OF HOUSE
EXPOSED SEWER LATERAL
PROPOSED EXTENSION OF NEW WALL OR CULVERT ~25' PAST HOUSE

Gannett Fleming

Excellence Delivered ***As Promised***

August 12, 2020

Stephen F. Norcini, P.E.
Township Engineer
Radnor Township
301 Iven Avenue
Wayne, PA 19087

Dear Steve:

Robinhood Road Culvert Repairs

Gannett Fleming, Inc. is pleased to submit the following scope of work and cost proposal for providing engineering services for the emergency repair of the Robinhood Road Culvert and Streambank Restoration. The evaluation and design will consider two scenarios, one (1) to perform complete streambank stabilization with a ready rock retaining walls, and two (2) to consider the extension of the culvert downstream past the existing house and the filling in of the area above the culvert.

I. SCOPE OF WORK

Gannett Fleming will provide engineering consultation services for the design of the stream band stabilization, or alternately the extension of the culvert. Design tasks are outlined below.

- Survey of the existing structure and immediate area downstream
- Structure Work Plan & Notes
- Geotechnical Evaluation with borings
- Evaluation of Alternatives
- Streambank Stabilization
- Erosion and Sediment Control Plan
- Filing of GP-11 Permit
- Construction Specifications
- Biddable Plans and Project Manual (PennBID Compliant)
- Estimate of Probable Construction Cost

Should it be determined during preliminary design that it is feasible to extend the culvert, the following must be completed for design

- Survey of the existing structure and 300’ downstream
- H&H study (HEC-RAS modeling)
- Geotechnical Evaluation with borings
- Hydraulic Design of Culvert Extension
- Civil Design of Site
- Structure Work Plan & Notes

- Streambank Stabilization
- Erosion and Sediment Control Plan
- Filing of GP-11 Permit
- Construction Specifications
- Biddable Plans and Project Manual (PennBID Compliant)
- Estimate of Probable Construction Cost

II. COST

Based on the above scope of work, we will perform the services for the following estimated price:

Total Estimated Cost – Streambank Stabilization	**$100,000**
Total Estimated Cost – Culvert Extension	**$145,000**

Costs are estimated, and additional meetings, presentations, or additional requested out of scope services exceeding the estimated price will be billed in accordance with our current approved rate schedule. Estimated costs will not be exceeded unless approved in writing. We are prepared to begin this assignment upon your authorization to proceed and anticipate completion within sixty days of authorization.

We appreciate this opportunity to offer our services. If you have any questions concerning our proposal, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Associate