



Memorandum

November 3, 2008

TO: City Council of Boone, IA

CC:

FR: Nicholas Kuhn, P.E. – Sr. VP Foth Infrastructure & Environment LLC

RE: Response to AAC Report

The purpose of this memo is address a number of concerns presented in the AAC Report in regards to sanitary sewer issues, drainage studies and engineering services in general. Specifically this memo will address the following:

- The Need for Clarification
- General Comments about the report
- The positive accomplishments of the AAC
- The positive accomplishments of the City of Boone

First I would like to commend the Administrator's Advisory Council. The effort they expended in developing their report for the City is truly a "gift of time and talent". Given their self interest referred to in their report, they managed to create a very thorough document which is a testament to their discipline.

In light of the fact that this report is now public record, I respectfully request that this written response be allowed into the public record along side of the AAC Report.

NEED FOR CLARIFICATION

I have read this document carefully many times. My first review was for pure content and I'll be honest and say there is no alignment between the AAC and myself. On my second pass, I read this to try to understand their perspective. It then became glaringly obvious that the one person that may have been able to give this group their "desired" clarity is myself. And for not being able to accommodate them, I apologize. Had I been able to meet with them, embarrassment could have been avoided. I then read their report one more time for the overall message. Here we have more alignment between the AAC and myself. I am in agreement with the spirit of the message for change, reform, or improvement, depending on what side of the aisle you're on.

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Generally speaking, in the absence of absolute clarity, there is a tendency for people to make assumptions and to start filling in the blanks (and understandably so). With that being said, I offer the following points of clarity:

- a. The value of studies in general seems to be a recurring concern. To a person who may not be familiar with technical studies and their purpose, I can certainly understand why they would question the value. Our technical reports have always been written with the intended audience being a technical one. If the City desires these reports be written for a non-technical audience, then obviously a change in format is required. Also, it is important to keep in mind that the purpose of a technical study is to arrive at conceptual solutions and order of magnitude costs so that an informed decision can be made as to whether or not to proceed with more detailed analysis, design and cost.
- b. In regards to specific studies, the validity of 3 drainage studies completed by Foth is in question with the AAC. Yet, 2 of the 3 studies they offered no comment. It is the NE Boone Drainage Study in which they focused their attention. The technical response from Foth is attached to this memo for your review.
- c. Another area where I may be able to provide clarity is in regards to whether or not it is appropriate to have the "fox guard the chicken house" (using the words of the AAC). My response to this is - much like doctors, attorneys and other licensed professionals, there is a code of ethics that we are sworn to adhere to and this is a requirement of professional licensure. And like any professional relationship, it is a relationship of trust. Would you let an unlicensed plumber into your home? Of course not. But if they are licensed, you would trust them to do the job. Then why, would you question the integrity of a licensed engineer, especially one that has exceeded your expectations for the past 4 years. I hope I have addressed the implied concern of any potential conflict of interest.
- d. For the past four years, the only feedback we have ever received from our Client, which is you the Council, the Mayor, and City Staff has always been one of satisfaction with the services we have provided. This positive feedback is based upon the successful teaming arrangements of Foth IE and Nilles & Associates. Contrary to what is implied by the AAC report, the teaming relationship between the two firms goes far beyond the corporate limits of Boone with successful projects in Ankeny, Johnston and Cedar Rapids.
- e. From the perspective of the AAC, they did not receive the specific answers they were seeking from Foth staff during their single meeting. This would explain the tone of their report. As for the meeting itself, I have no personal perspective on this since I was not there. However, detailed meeting minutes were immediately submitted by Foth to the City. These minutes have been attached for your review.

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It is obvious that I personally needed to attend this meeting and again I apologize for my unavailability.

- f. As for the competence of our staff, we are more than qualified to provide the comprehensive engineering services to this community. We are proud to have a stellar group of over 450 engineers and scientists including the senior water resources engineer who worked on the single study in question. His name is Mike Liebman and he is also the technical leader whom you entrusted as an expert witness on your behalf this year.
- g. Concerning the authorization of work, this authorization came in many forms by directive of council, committee and staff, both verbal and written. I agree that a more structured work order practice similar to the one started under the tenure of Darrel Rensink is necessary. As for the commissioning of past drainage studies, you may recall that some members of the AAC were present at utility committee meetings where the verbal directives were actually given. The directives were given as a reaction to the impacts of yet another historical year of rainfall in this community.

COMMENTS

As you know, historically I have never been one to tell you “what you want to hear” and I am not about to start today. Therefore, I offer the following comments for your consideration:

1. When commissioning a report as critical as the one provided by the AAC, it is imperative that there is absolute clarity in purpose, scope and facts gathered. Otherwise opinion and supposition tend to be used to fill in the blanks.
2. There is a lack of historical context with this report. The sewer and drainage issues sited in this report are “historical issues” exacerbated by storm events of “historic” proportions. I have attached a National Weather Service report on extreme rainfall events in Boone for your review. The 2nd and 3rd largest rainfall events in 104 years of recorded history of storms in Boone occurred in May 2008 and August 2007. These dates coincide with the dates of widespread flooding and sewer backups in Boone. The largest storm event occurred in July 1993. The 4th largest event occurred in 1907. Prior to 1993, very few people in this City have actually experienced storm events of this magnitude in their lifetime.
3. There is a general lack of context with the technical assertions and facts gathered. When context is omitted, it begs questions and opens the door for misinterpretation. One example - “...is ready and capable of taking back Boone”. What does this mean, and who said it?

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4. Recognize what is left unsaid in this document. For example, the “technical information sources” cited in the report are not disputing the competency of anybody.

POSITIVE ACCOMPLISHMENTS OF THE AAC

While the AAC may not have had a firm grasp of the technical aspects of the sanitary sewer issues facing this City, they did have a firm grasp of the magnitude and complexity of this situation. The AAC independently developed some great recommendations which you will be happy to hear had been employed or initiated by City Staff. In some respects, the AAC has validated the approach the City is taking to find resolution to the sewer issues. Specifically:

1. A funded, perpetual and focused maintenance program for all infrastructure, and not just sewers, is absolutely necessary. On September 23rd an expert was brought in to offer guidance to your staff in developing a long-range sewer program.
2. Start a marketing campaign to educate the public on the challenges that lay ahead. Foth has provided City staff with some excellent tools to initiate this campaign and your staff has already begun the process.
3. A concise and effective capital improvement plan is necessary. Your staff has already begun using the appropriate tools to achieve this and they have been provided some good examples to review.
4. Develop a strategic focus to meet the infrastructure challenges. On November 7, 2008 an expert in sustainability and municipal funding strategy will be meeting with City staff for this very purpose. A sustainable solution addressing the social, economic and environmental components of these challenges is absolutely necessary.
5. Absolutely retain the most qualified technical resources needed, especially for your biggest challenges. Said differently, align the level of technical expertise with the complexity of the need. For example, a simple water main design only requires a basic level of expertise and cost. A water main design with complexities, such as major utility coordination, or contaminated soils, requires a much higher level of expertise and cost.

RECENT ACCOMPLISHMENTS IN THE CITY OF BOONE

The report of the AAC implies that the City of Boone has been sitting by idly and this could not be further from the truth. There are a number of recent accomplishments in the City of Boone for which you can be most proud of. Over the course of the past 4 years:

- Your success in receiving grant and appropriation dollars has improved dramatically. Upwards of two million dollars has been secured in the past four years.

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- You have initiated important civic projects such as Safe Routes to School without any cost to the taxpayers to date.
- You have greatly improved the quality of life in this community with a Quiet Zone at little cost to the taxpayers.
- You have restored a competitive interest in this community with infrastructure contractors from abroad which offers you a greater return on investment than you have ever had before.
- And you have partnered with strategic consultants such as Foth IE and Nilles & Associates who are always looking out for your best interests and who truly invest their time, talent and financial resources in your community.

Thank you for your time and consideration.

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Memorandum

10/26/08

TO: Files – Boone Drainage Study – Northeast Area

CC: Nick Kuhn, Foth

FR: Michael D. Liebman, P.E.
Senior Water Resources Engineer

RE: Northeast Drainage Evaluation Clarifications for AAC

Background

In order to help improve the stormwater drainage situation in Boone's northeast area, and to better utilize the existing stormwater ponds in this area, the City requested that Foth complete a detailed hydrologic and hydraulics evaluation. The Administrator's Advisory Council (AAC) has questioned this study - its reliability, accuracy, and credibility. This memo responds to the AAC comments on pages 10 and 11 of their 10/9/08 report.

Paragraph 1 (Page 10)

Although the prioritization parameters appear reasonable, some consideration should be given to working from downstream to upstream if whole-scale stormwater conveyance system improvements are contemplated. Bottlenecks downstream may continue to cause flooding problems upstream even with new upstream improvements in place. As the AAC report recommends, a total system study should be completed which can help set priorities for future system improvements.

Paragraph 2 (Page 11)

The AAC noted what they perceived to be discrepancies in the drainage study for Boone's northeast area. The following provides comments to help clarify these points.

Level of service – The level of service chosen for a study area is dependant on a number of factors. As the northeast area drainage study discusses, the 5-year storm event was chosen because that appears to be the general level of service available from the existing conveyance system serving the City. Providing conveyance for a 10-year service level, for instance, when the downstream system can only handle a 5-year flood could be considered to be a poor choice of dollar expenditures. If full-scale downstream upgrading is being considered, however, such expenditures may be prudent. In any case, it is rare to design conveyance systems for more than a 10-year level of service, as the additional costs are rarely thought to be worth the decreased flooding risks. Although

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rarely evaluated for primary system conveyance, larger floods such as the 100-year storm should be evaluated for secondary conveyance systems or flood protection.

Methodology and rainfall factors – There are many methodologies and stormwater management parameters available to be used in studies such as this. The complicated nature of this study suggested the use of a methodology that was developed for block by block evaluation of a storm sewer system in an urban setting. The ILLUDAS (ILLUDRAIN) methodology used meets these needs along with pond storage capabilities helpful in this situation due to the presence of stormwater ponds in this area. Similarly, different hydrologic (rainfall) data are available for reference and use within the various methodologies. The rainfall data used in this study comes from solid hydrologic sources that are used throughout the country on studies such as this. The difference between different sets of rainfall data from different sources would be minimal resulting in no change to the study findings, recommendations, or related designs.

Factual data – The questions about the results and factual data at the end of this paragraph are somewhat unprofessional to this writer and suggest a strong bias, a lack of understanding of hydrology and engineering, and a misconception of Foth's dedication to serving the best interests of the City.

Paragraph 3 (Page 11)

Part of this question relates to the level of service parameters previously discussed. Although the pond has the capacity to store runoff from a 100-year event, getting all of that runoff into the pond would be a costly undertaking. As previously stated, good engineering practice rarely includes sizing the primary conveyance system to pass the runoff from a 100-year storm event. So, as previously stated, the study chose a 5-year event (again, because the downstream conveyance system had no more than a 5-year capacity), and the stormwater pond and system components were evaluated for a 5-year event. At present, peak flows from the 5-year event won't even make it into the pond due to the undersized system now serving the area.

The discharge from the pond is recommended in the study to be restricted to far less than the 5-year event flow. So, although the flow into the pond is estimated based on the 5-year flood, the outlet will be restricted to less than a 1-year storm event flow which provides significant relief to the downstream system. And, the study also recommends improvements to greatly decrease the frequency and magnitude of flooding in upstream areas tributary to the pond. It should be noted, that upsizing the recommendations in the study to a 10-year level of service for areas upstream of the pond may be a consideration to provide a higher level of service for those areas which are buffered by the pond from the limited capacities of the downstream system.

Paragraph 4 (Page 11)

It is certainly reasonable to design final conveyance systems with future development in mind. This issue should be discussed with the City as part of the final design process. Sizing to convey

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peak runoff from the 100-year flood, however, should only be considered after careful evaluation, as such unusual design would add large costs for relatively rare event protection.

Paragraph 5 (Page 11)

The improvement to the stormwater pond outlet modification should be a top priority as it is easy and relatively inexpensive to implement and will provide some relief to the downstream conveyance system. This would not be futile, as the pond can control significant flow under existing conditions.

Paragraph 6 (Page 11)

It would seem appropriate to make the improvements to the eastern drainage basin conveyance systems to not only bring more flow under the control of the pond, but to provide flooding relief to these areas. This should be a higher priority than the flow diversion from the west areas. It should be cautioned, however, that both of these alternatives include deepening portions of the stormwater pond to different levels. As such, if both alternatives will be completed at some time, it would be prudent to deepen the pond to the final elevation at the outset so no additional costs are needed in this regard upon implementation of a subsequent alternative.

Summary

The drainage study for the northeast area of Boone is a solid engineering evaluation using suitable methodologies and hydrologic parameters. The level of service and other study judgements were based on existing system performance, Foth's understanding of the City's needs and hoped for outcomes, and the physical condition of the area based on past plans, visual inspection, and field survey. The results of the study provide planning level improvement alternatives that will better utilize the existing west stormwater pond to provide relief to the existing downstream conveyance system and relieve flooding in the upstream areas east of the pond.

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**Foth Infrastructure & Environment, LLC
Meeting Notes**

**Administrator's Advisory Council Meeting
City of Boone**

Date: September 5, 2008

Location: City Hall Auditorium

Present: Doug Ernst and Wayne Schwartz – Foth Companies
Joe Pundzak, Bill Sharp, Steve McCoy, Glenda Lass, Virgil Lass,
Chris Miller, Mike Tungesvik and Wayne Rouse

Absent: Denny Hamman, Mark Prokop, Norton Stolte

Excused: n/a

Notes By: Douglas Ernst

Distribution: Luke Nelson and Nick Kuhn

Topics Discussed:

- I. Storm Water Drainage Studies
- II. Sanitary Sewer Plan of Action
- III. City Engineering Services
- IV. Engineering Practice and Standards

Committee Questions:

1. Do you work for the city, or for an engineering firm? Foth is the engineering firm hired by the City 2004. We are under contract to provide city engineering services.

2. How are studies commissioned? Who does it, what process is used? The three drainage studies were authorized by the City Utility Committee, which is comprised of City Council members. The need for a study arises from an identified City issue, which then is budgeted for in the capital improvements program.

3. Are studies updated on a periodic basis? No, upon completion of the study there is traditionally a recommendation as to how achieve a resolution to the issue.

4. How are studies paid for? City budget, or on an as completed basis? The studies are usually budgeted for in the capital improvement program similar to a project, although as with the recent drainage studies they can be the result of an emergency response.

5. *How are the boundaries established for a specific study?* As with any project, a study has a scope identifying the purpose and need, which in turn sets the limits or boundaries.

6. *When a study is done for a specific area, are the surrounding areas considered? To what extent?* Yes, all contributing factors are considered, including the surrounding areas having an impact on the study area.

7. *What are the specific rainfall rates used to determine drainage adequacy?* The current standard design practice states that a 5-yr rainfall event for the storm sewer pipe and 100-yr rainfall event for detention basins, which has been adopted by the city.

8. *How are the city codes for new projects affecting the sewer problems?* The city codes require detention for new commercial development. Also the project development process requires plan submittals for city review and a certified drainage study be prepared by a licensed engineer.

9. *How can new construction be added to a drainage area where problems already exist? If the city codes allow this, to happen, are the city codes being applied/interpreted incorrectly, or are they simply inadequate?* Yes, the drainage impacts should be identified in the drainage study for the development, which for new construction in theory reduces the rate of runoff. For the work that we do, all City codes are being applied/interpreted and enforced correctly across the board.

10. *What is the cost of a lift station? Are there areas of Boone that need to have them installed?* This question was not discussed at the meeting. The cost can vary greatly, as for sanitary sewers \$100k for small areas and \$250k for larger areas. With respect to storm lift stations, these can run upwards of a \$1 million dollars. The sanitary lift station needs are usually identified as a result of servicing development properties for which gravity sewer service is not possible.

11. *What is your personal opinion as to the effectiveness of increasing the size of the 22nd and Linn and Lowell retention ponds?* Our professional opinion is that it will work as identified in the report.

12. *What are the major problems in the areas of high call/complaint volume as noted by the city?* The primary issue identified is sanitary sewer backup during major rainfall events.

13. *What is your suggestion for a starting point to handle these areas?* The initial phases of the sanitary trunk sewer improvements are already underway, although there is a need for additional improvements upon completion of the trunk sewer replacements. The city needs to complete a storm sewer study of the entire city, which could be completed in quadrants.

14. *Are you considering the runoff of the farm fields adjacent to residential areas when doing the studies?* Yes if it contributes to the drainage area being studied.

15. *The estimated cost of a study of the sanitary and storm sewers for the full city of Boone was noted at approximately \$255,000. How does that compare to the three recent studies completed on specific areas? What was the cost of each study? How were you commissioned to do the three recent studies?* The additional \$255k study is the next part of the sanitary sewer study (sanitary only), which will consider the larger collector system issues beyond the replaced

trunk sewers. This is the next step to identifying additional solutions to the city's collection sewer systems.

All studies are ordered by the City. The work completed for the three recent drainage studies can be eventually combined into the overall storm sewer study for the entire city. These three initial studies cost \$12-15k each (fringe studies), although it should be noted that interior parts of the city will be more difficult due to the lack of records and having more underground sewer systems to review.

16. What would it take for you to recommend a moratorium on new construction in an area?

This would be an item for council consideration, although should be given careful consideration prior to potential implementation. If the sanitary doesn't have sufficient capacity, as was the case for water service in west Boone, than this action may be necessary. As for storm water, there can be detention requirements imposed on new development that would improve upon the undeveloped condition and be of benefit to the city's stormwater drainage issues.

17. In your opinion, what affect will the current three phase sewer program have on the drainage problems? None, the sanitary sewer system is independent of the storm water drainage problems.

18. In your opinion, what is the effectiveness of the cities current approach to solving the current drainage problem? The three phase approach. Our professional opinion is that the course of action being taken by the city is on track to resolve the sanitary sewer and storm water issues. The issues being experience by the City of Boone are not uncommon for cities with aging infrastructure. These problems were not created overnight, therefore will take a significant investment by the city to resolve them.

19. When do you go back and recommend expansion of the current system? If designed by today's standards, the design takes into consideration the full build on both storm and sanitary sewer systems.

20. How much expansion do you plan for in all new build? The complete development is considered.

21. Is there any value to the old studies? Yes, the same conclusions were developed with respect to the sanitary sewers. The previous studies identified the need for a larger trunk sewer system and reduction of storm water entering the entire city-wide system, as well as the need for the second sanitary sewer study and future improvements.

22. It appears that the Sewer systems have three major areas of concern. Current adequacy, repair and maintenance (includes expansion), and new construction. Who is responsible to monitor and recommend changes. The sanitary sewer system adequacy has been determined by the studies and engineer reviews. The repair and maintenance is part of the public works department responsibilities. All new construction is engineer inspected and built in accordance with prepared plans/specifications. Also note that all new construction requires Iowa DNR construction permits prior to commencement of work.

23. What, exactly, are crossovers? If they were installed deliberately, should they be documented on an engineering drawing or map somewhere? This was common practice long

ago (80-100 yrs) to hook storm sewer to sanitary sewer systems. The current practice is for the city public works to remove crossover connections when found.

Key Discussion Items:

- a.) Engineering Studies. The advisory council needs additional information as to the purpose and need for completion of engineering studies (i.e. Sanitary Sewer Study, \$255k and Sewer Management Plan). Their concern is that completed studies are shelved with no consideration given to recommendation for action and another study completed years later.

The advisory council appears to be focusing on identifying sewer improvement solutions that would be part of the next sanitary collection study (e.g. pipe liners was mentioned and approach development to solving major hot spots first). There was mention of a plan of action that Indianola is currently implementing to resolve storm water infiltration into their sewer collection systems. There appears to be a misunderstanding of the future steps being considered and solutions being considered by the advisory council without a plan of action.

- b.) City Engineering. The discussion centered on engineering operations within the city (consultant contract, project development, supervision, lines of communication and authority, etc.). It would be beneficial to review the City CIP with the group and discuss the process for development of this long range improvement plan.
- c.) Development Reviews and Code Enforcement. There were several questions and discussions on review of development plans for compliance, specifically with respect to site plan review and drainage.
- d.) Urban Stormwater Drainage. The group could benefit from any available education materials, as to how systems are sized with respect to various storm events.

These key discussion items were discussed and questioned in great detail, therefore additional clarification and follow-up would be beneficial for the group.

Action Items:

- a.) Review Northeast Area Drainage Study to determine cost/benefit of upsizing east flow collection system to handle 10-yr storm event, as requested by Virgil Lass. (Assigned to Wayne Schwartz)

NOWData - NOAA Online Weather Data

BOONE (130807)

Extremes

Highest Daily Precipitation (inches)

Days: 1/1 - 12/31

Length of period: 1 day

Years: 1904-2008

Rank	Value	Ending Date
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1	6.06	7/9/1993
2	5.92	8/20/2007
3	5.30	5/30/2008
4	4.95	8/29/1907
5	4.38	5/9/1990
6	4.22	9/19/1926
7	4.19	8/7/1925
8	4.09	6/25/1968
9	3.98	5/13/1970
10	3.89	9/30/1919

Official data and data for additional locations and years are available from the Regional Climate Centers and the National Climatic Data Center.