PGH2O Pittsburgh Water & Sewer Authority

November 1, 2015

Ms. Arletta Williams
Executive Director
ALCOSAN
3300 Preble Avenue
Pittsburgh, PA 15233

RE: Starting At The Source
How Are Region Can Work Together For Clean Water
Technical Report Summary
August, 2015

Dear Ms. Williams:

Pittsburgh Water and Sewer Authority (PGH_2O) is pleased to submit the attached comments regarding your Starting At The Source Technical Report Summary, dated August 2015.

Our comments focus on specific technical issues that we believe may have a material impact on a reader's interpretation of the report, and its conclusions.

We welcome the opportunity to discuss these comments with you and your staff. We are confident that an open dialogue will create mutually beneficial CSO and stormwater management opportunities. Moreover, our respective rate payers will all receive a lower cost to achieve the regional water quality desired.

Please contact us at your convenience to discuss these matters.

Sincerely,

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PGH2O REVIEW COMMENTS

Related To Report Entitled

Starting at the Source – How Our Region Can Work Together for Clean Water

Technical Report Summary, Dated August 2015

As Prepared By ALCOSAN

REPORT ISSUE/STATEMENT	PAGE SECTION	EXPLANATION/COMMENT	SUGGESTED ACTION
Summary Of Report		**Stated Assumptions, Limitations, Conditions**	
Overflow Reduction	7	How much additional overflow reduction is required beyond the planned volume? Would GI BMP offer additional benefit?	Review Cost of Additional CSO Reduction using Grey vs. Green Alternatives
Funding Private GI Sites	12	ALCOSAN Funding of Private GI sites may offer substantial opportunities for Additional Abatement	Review the potential for ALCOSAN Funding of GI or other source reduction on Private Lands
General Approach		**Stated Assumptions, Limitations, Conditions**	
1. Barrier to ALCOSAN funding of stormwater collection system improvements	P. 2-1 p. 2-7	The report describes limitations and drawbacks of ALCOSAN implementing GSI. The salient issue appears to be the inhibition to intercept stormwater in municipal collection systems.	Assess if the barrier to ALCOSAN investment in municipal stormwater management can be removed.
2. ALCOSAN GSI roles and responsibilities	p. 2-8	The overall relationship between each of the major entities in the Allegheny County Region need clarity	Consider Development of Region-wide Integrated Program
3. GI Inventory Analysis	p. 2-11 p. 2-16	100+ Inventoried GI Projects have been implemented, including Pittsburgh Stormwater ordinance. The overall benefits of these projects need to be assessed.	Perform detailed assessment of the CSO and flooding benefits of the Inventoried GI Projects.
4. Private Impervious Surface Runoff to public ways	p. 3-6	How has the statement “some limited runoff” from Impervious Surfaces reaches the rights of way been documented? This conclusion seems to contradict findings in many other urban areas, where it is significant.	Review basis of conclusion, and provide details of analysis for comparison to other urban areas

5. Hydraulic soil permeability and conductivity	p. 3-9	How have these soil parameters been established for the modeling effort? Have in situ testing results been used to confirm the values used?	Review the Soil Parameters used in modeling to assure nominal range of average values are considered.
6. BMP Loading ratio assumptions	p. 3-10	Describing 5:1 Loading ratio assumption is described as high performance can be misleading. Loading ratios exceeding 20:1 have been built and monitored.	Review the basis of Loading ratio assumptions, assess if a range of values would provide greater insight.
7. BMP Dewatering Time	p. 3-11	The 24 hour dewatering time appears inconsistent with traditional GI design of 48 hours. Value of GI would be significantly greater. Design of BMP's with 72 hour dewatering time has been determined viable by PWSA based on PA DEP BMP Guide.	The value of GI should be re-evaluated using a range design parameters.
8. Cost per square foot of constructed GI	p. 3-12	Table 3-4 asserts that the cost of GI per square foot is inversely proportional to the loading ratio (impervious area: GSI Area). Analysis of built project data indicates that the opposite is typical.	More clearly define basis of analysis, provide data to confirm claim.
9. Private Property Redevelopment rate assumptions	p. 3-17	Private property redevelopment rates appear low and limit the redevelopment to 2046 (planning horizon in the federal CD). This may inhibit the potential benefit of green infrastructure directed by new development ordinances	Consider a greater rate scenario/evaluation of the impact of 30-50 years of GI implementation on private property
10. Private Property Redevelopment rate assumptions	p. 3-17	Given that much of the GSI implemented would need to occur on private lands to make significant reductions in overflow volume and frequency, redevelopment rate is an important consideration. Assuming a uniform rate for the entire service area may under or over-represent the redevelopment rates and this rate is likely much higher for the City of Pittsburgh and selected other communities	Suggest including the impervious area managed by each scenario in addition to the overall % managed.

11. Cost Data Sources	p. 3-14	The source of the cost data is unclear. Is it based upon one project from each of 2 peer cities, or a range of data? Cost per acre of GSI constructed is misleading as a means of extrapolating costs and performance, as the capture volume criteria can vary considerably.	Consider recasting data as cost versus performance eg, cost/gallon of runoff managed, cost per impervious acre managed
12. National Cost Data Comparison	p. 3-14	Figure 3-7 is unclear. Is graph comparing the ACT tool assumptions for GSI costs with the range of costs for these programs or just two selected projects?	Clarify analysis, expand to program-wide basis to assess nominal cost range.
13. Population Growth Assumptions and redevelopment rate assumptions	p. 3-16	The report states that population growth would be expected to correlate with the redevelopment rates. However, it is likely the population growth correlation with new development or redevelopment would be at different rates, dependent upon the nature of the community and location. GSI is highly likely to be a major investment in the redevelopment projects.	Consider developing analysis of population growth based upon a broader range of variables, not a uniform rate for all of Pittsburgh area.
14. CD Performance Measures and Risks	p. 3-19	Report states that because of the difficulty in understanding and addressing RDII/GWI that creates risk that CD performance measures won't be met so we should go with a conveyance and treat approach.	Need to refer to USEPA recommendation for Source Control, and ongoing studies will significantly modify compliance risk of the grey systems conveyance capacity and overflow volumes.
15. Municipal Feasibility Studies	p. 3-19	"significant majority ... recommended increased conveyance to the ALCOSAN system, and in a few cases this also included new storage facilities." These municipal feasibility studies were written prior to any considerations for GI and source control.	Need to continue statement to refer to USEPA recommendation for Source Control and ongoing studies may significantly modify the

			conveyance and overflow volumes.
16. GSI Storage	p. 3-24, Table 3-9	It appears that GSI storage is based ontotal impervious area and not Directly Connected Impervious Area (DCIA). DCIA only should also be considered.	Consider impact of DCIA only on GSI storage.
17. Cost Assumptions	p. 3-25 FIG 3-13	The published cost ranges for implementation for GI appear to vary within the report; the relative use of GI types should be clarified, and the basis for selecting retrofits for 100 percent of the GSI projects skews the costs higher than experienced elsewhere. Also, assumption of one CSS connection per quarter acre is unsupported.	Verify what elements are included in the estimate costs per acre, including the individual connections to the CSS or drain systems.
18. Cost assumptions	p. 3-30	Assuming that all GSI will be constructed at taxpayer expense appears unreasonable, particularly as existing stormwater and future ordinances will likely require all development and redevelopment meet a specified code.	Consider assigning costs for GSI redevelopment as a requirement not to be paid by taxpayer expense.
19. Overall value of CSO reduction to Water Quality	p. 3-34	Pittsburgh's response to the Clean Water Act, and all regulatory initiatives relies solely on the reduction of CSO overflow volume. Has an analysis of removing the 3.5 B gallons of CSO been compared to integrated approaches that address multiple WQ requirements?	Consider developing an integrated water quality program which recommends action and investment based upon comparison of other water quality improvements to the benefits of CSO reduction.
20. Assignment of Costs	p. 3-36	The reports assertion of being "blind to who would pay for source controls" does not consider the importance of cost impacts and affordability to low income ratepayers if significant costs result from developer	Consider assessment of cost assignment to various economic groups to assess the potential impacts to

		investments.	ratepayers.
21. Cost Assumptions	p. 3-37	Sizing and costs of retrofits assumptions appear conservatively high.	Consider comprehensive compilation of cost data from existing programs.
22. Outfall Wastesheds considered	p. 3-39	The Outfall Wastesheds analysis is based upon 19 outfalls that show significant GSI potential. Was the value of the other 29 outfalls considered?	Evaluation of all wastesheds and outfalls may yield more GSI value.
23. Level of GSI required to Achieve CSO Compliance	p. 3-42	Conservative performance assumptions regarding GSI benefits to size and costs compared to new gray infrastructure may have artificially increased the net GSI costs.	Consider scaling back GSI in those wastesheds or CSO's areas where costs are higher than GSI implementation in other wastesheds/outfalls
24. GSI versus Sewer Separation Strategies	p. 3-53	The report does not assess the value of Sewer Separation Source Reduction as an alternative to GSI.	Consider the range of source reduction options to ensure that the lowest cost solutions are applied as appropriate. With proper planning, source reduction strategies can reduce costs.
25. Treatment Costs	p. 3-57	Treatment costs were factored into analysis of GSI projects, but not into the GSI evaluations.	Assess the equity of cost and other comparisons
26. Triple Bottom Line Benefits	p. 3-58	Given the significant operational cost savings, the analysis should consider the overall costs of sewage treatment—facilities construction and operations.	Consider Full Triple Bottom line assessment to be included in these decisions.
27. Municipal Opportunity Assessment & Potential Projects	Section 4	The project concepts are based upon nominal comparison to published experiential data	Consider planning level design and cost estimates of cost so their value relative to consent decree objectives can be assessed

			for comparison to the "Proposed Grey Projects"
28. Municipal Opportunity Assessment & Potential Projects	Section 4	The cost consideration does not develop GI projects so that expectations can be clarified in terms of what various project types can yield in terms of cost, runoff reduction, overflow reduction, and improved aesthetics.	Consider limited focus on specific BMP types and accurately estimate the Pittsburgh Area GI project type costs.
29. Triple Bottom Line Assessment	--	Assessment of the socio-economic benefit and water quality benefits of LID options is warranted.	Consider triple bottom line factors (secondary benefits) as part of the net benefits of GI BMP's by assigning values as defined by US EPA backed analysis.
30. Conceptual Municipal Projects	p. 4-6	Planning by GSI type only does not provide clear insight into the ability of the various land types to accept GSI in any of its forms. Larger, more regional GSI concepts do not appear to be considered. Larger basins, wetlands, and regional-type facilities constructed in parks, vacant lands and open space settings can be very cost effective.	Consider benefits of these projects, including CSO reduction and GI/LID cost reduction.
31. Conceptual Municipal Projects	p. 4-6	Larger basins, wetlands, and regional-type facilities constructed in parks, vacant lands and open space settings can be very cost effective.	Clarify the relative amount of private vs public lands assumed for the program.
32. Long Term Private Developer Impacts	p. 3-32	The report does an excellent job of accounting for GSI installed by future private developers within the county. The report states the following: *"Redevelopment is assumed to affect 0.3% of impervious cover per year over the course of the WWP implementation (through 2046). At this redevelopment*	Using this analysis, private development GSI would account for 1,110 Ac of privately controlled GSI; this acreage and associated cost savings would

		rate, runoff from approximately 10% of the impervious cover in the combined sewered area would be managed through stormwater ordinance driven GSI at a rough order-of-magnitude value to the rate payers of $370 million."	nominally be factored into the overall cost analysis.
33. No business case evaluation comparing the capital and life-cycle costs and benefits of the conveyance & treatment to source control with reduced conveyance & treatment alternative.	Section 3.1.2	I/I reduction indicates that significant amounts of dry weather groundwater infiltration (GWI) and rainfall-derived inflow and infiltration (RDII) enter the sewer system. More than 60% of the dry weather flow at the WWTP is estimated to be GWI. However, ALCOSAN's study does not perform a business case evaluation comparing the capital and life-cycle costs and benefits of the conveyance & treatment alternative to source control with reduced conveyance & treatment.	When GWI and RDII are significant contributors to overflows, performing this type of business case evaluation is recommended by the Water Environment Federation and a step-wise process is included in their recent Guide for Municipal Wet Weather Strategies, second edition, published in 2013.
34. Stormwater capture and removal scenario	General	GI stormwater capture and removal scenario uses the captured stormwater to be removed from the CSS and routed through a shallow storm sewer system to a waterway or area of high infiltration capacity.	The costs and benefits of this type of stormwater handling strategy are being evaluated as part of the PWSA City-wide GI Assessment, and are likely applicable elsewhere in the ALCOSAN service area
35. I/I reduction scenarios	p.3-16	The study concludes that large scale GI and source	The study conclusions need

	p. 3-25	control are not cost-effective. The study suggests that a large scale GI would cost $1.65 billion and only achieve 25% of the wet weather discharge reduction necessary. Same with source control - $607 million in cost for only 14% overflow reduction.	to be reviewed once the City of Pittsburgh and other regional municipal GI / Source reduction studies are complete.
36. I/I reduction scenarios	p. 3-28	Assuming "100% of the sewers in an area must be rehabilitated in order to achieve the assumed RDII reduction." leads to high per gallon costs for I/I reduction.	Consider an assessment based upon the existing I/I flows estimated from each communities' LTCP, and recognize the continuous requirement to maintain and rehabilitate sewers due to EPA's CMOM requirements.
Strategy Development			
37. Nominal Range of GSI use in LTCP	P 2-5	GSI component of LTCP ranged from 1.4% to 8.7% for Louisville, Cleveland, and St. Louis. Recent programs in DC and elsewhere are pursuing 30% allocated to GSI.	Focus any such "framing" of likely green program participation on more recent programs only.
38. The Report states *"For a given acre of impervious area controlled by GSI, 95% of the impervious area would be controlled by a combination of bioretention, subsurface infiltration, and porous pavement; and 5% would be controlled via green roofs."*	p 3-24	While this may seem like a small number for green roofs, when put in the perspective of the total cost for each scenario it is a much larger percentage. The first type of installation (bioretention) is much more cost effective than green roofs ($287k per acre compared to $821k per acre, respectively). This increase in cost results in green roofs being 13% of the total cost under the 50% impervious acre management	Consider eliminating green roofs as a core GI abatement method, to rely on other less costly approaches.

39. The Report asserts that $ cost / sf of constructed GI increases with loading ratio (impervious area: GSI area).	P 3-12– Table 3-4	Analysis of built project data indicates that increasing loading ratio will typically lower cost / acre managed as shown in Table 1, Figure 1 and Figure 2.	Clarify this relationship by utilizing additional built BMP data.
40. DCIA Controlled By GSI Estimates	Table 3-9	The impervious area controlled by GSI is categorized by "Impervious Combined Area Controlled by GSI" and "DCIA Controlled by GSI". In this table, the DCIA value is smaller than the Impervious Combined Area Controlled value. The values seem to suggest that there is non-connected impervious area being controlled by GSI in these model simulations	Consider Limiting GSI to control DCIA in the combined system, and not total impervious combined area (as appears to bedone in the report)
41. Greening of Gray Facilities	General	Typically the construction of gray facilities includes budgets for surface restoration of disturbed land areas that can become cost effective locations to also deploy green infrastructure.	Suggest that the cost benefits of a greening gray infrastructure strategy be incorporated.
42. Source Control Analysis	p. 3-41	ALCOSAN reviewed 19 CSOs and found that green/source control is cheaper at 14/19.	Consider identifying the nature of CSO's and determine how source control can be applied to other CSO basins.
43. Gray Before Green	p. 3-43	Study notes that once WWTP expanded and initial tunnels built we will have a better idea of system performance.	Current EPA approach focuses on construction of only the key core WWTP components and operational efficiency while Source Control benefits are assessed.
44. Flow Reduction First	p. 3-44	"regulatory agencies have also indicated that flow	Current EPA approach

		reduction needs to become a high priority for the region."	focuses on construction of only the key core WWTP components and operational efficiency while Source Control benefits are assessed.
45. Flow Reduction First	p. 7-4	"The regulatory agencies are keenly focused on establishing municipal flow reduction plans that will reduce the amount of stormwater and groundwater that reaches municipal collection systems."	This statement conflicts with various statements before it. Consider review of report for consistency.
46. Design Period Used	p. 3-44	Study notes the different design periods used by the localities as well as approximately $250M proposed community projects. Not clear if these projects have been incorporated into the various study alternatives.	Clarify the extent to which these projects represent the panoply of proposed municipal projects.
47. Design Storm Selection	p. 3-45	Study notes that for SSS it used one overflow every 2 years (no definition of 2-year design storm) but "facilities in the WWP were conservatively sized to eliminate all overflows from a 2-year design storm simulated for both summer and winter periods."	Has a specific design storm been required by USEPA? Please clarify
48. Streamflow Evaluations	p. 3-57	All four PWSA direct stream inflow evaluations concluded that removing the streams was not cost-effective.	PWSA is currently reviewing the potential costs and benefits of stream removal for individual catchments as part of the ongoing Citywide Studies and offsetting costs by incorporating parks and transit planning efforts.

49. Stormwater Related Issues	p. 6-11	Report states that Coraopolis and Sunbury "jumped the gun" on imposing storm water fees before having statutory authority. ALCOAN asserts that it needs a charter change to address stormwater management services. A potential discussion issue.	Consider a separate section regarding the influence of stormwater management to the overall CSO/SSO compliance requirements. References should focus on the TBL benefits to local communities resultant from stormwater control through GI and Source Control.
50. Intermunicipal Trunk Sewer Transfer	p. 6-21	ALCOSAN will only take intermunicipal trunk sewers if they meet "inspection and spot repair requirements" of the PADEP and ACHD orders.	Consider reflecting the terms of actual agreements with Municipalities.
CSO Abatement Estimates			
51. High performance GSI techniques.	P 3-34	This primarily discusses the amount of CSO reduction realized by increasing the drain down time of the GSI from 24 hours (all previous results based on 24 hours) to 72 hours. The report states the following *"The high performance simulation assumptions result in a 17% reduction in CSO volume to waterways…"* 72 hours is well within design norms across the country. Significant cost savings can be realized by accounting for increased 72 hour drawdown of GSI.	This added level of CSO control should be factored into the Cost per Gallon reduction analysis.
52. GI stormwater capture and removal scenario		Where the captured stormwater is removed from the CSS and routed through a shallow storm sewer system to a waterway or area of high infiltration capacity. This scenario would likely significantly change the results of ALCOSAN's study	The costs and benefits of this type of stormwater handling strategy are being evaluated as part of the PWSA City-wide GI Assessment, which

			information can be captured for ALCOSAN use.
53. Disconnection of existing streams and stream/river water intrusion	--	Both of these inflow opportunities could offer low cost CSO reduction and numerous TBL benefits.	The costs and benefits of this type of stormwater handling strategy are being evaluated as part of the PWSA City-wide GI Assessment, which information can be captured for ALCOSAN use.
54. Zero typical year overflows to sensitive areas.	p. 3-58	Is this a significant CSO reduction for the program? Does USEPA require to achieve "0" especially when we can't afford high levels of control elsewhere. This requirement may warrant a reevaluation of overflow frequency.	Consider the resultant water quality impacts associated with a lesser specified overflow frequency and lower volume.
55. Key Gray Right-sizing Conclusions	P. 3-59.	"The results of the Green-Gray alternative with down-sized regional tunnel segments indicated that none of the proposed regional tunnel segments can be eliminated. ... The Ohio and Allegany River tunnels segments and the Chartiers Creek crossing could be marginally reduced in tunnel diameter and still meet equivalent water quality performance. For the Monongahela River, Saw Mill Run and Lower Ohio River segments, more appreciable tunnel diameter reductions were possible	Consider review of this conclusion based upon the results of ongoing Citywide and Regional Source Reduction Studies, including demonstration project results.
GI Cost Estimates			

56. Geographic/Regional Construction Cost Differences	General	Regional Construction Cost Differences, as well as urban versus "suburban" can be substantial and impact the cost comparisons of capital projects.	Consider geographic cost adjustments based upon National Data.
57. Geographic/Regional Construction Cost Differences	General	Basing cost estimates upon major (Multimillion population) metropolitan area experience may bias costs, based upon the design approach, and other factors	Consider using a broader selection of such programs; at least 25 such programs exist in the USA
58. Cost analysis appears to be based upon imprecise "unit" cost comparisons	P 3-14, Fig 3-7	Clarify if the costs included represent a range of costs from the peer cities compared or just 2 projects. Cost / acre of GSI constructed is misleading as a means of extrapolating costs and performance.	Consider recasting the table as cost vs. performance e.g. cost / gallon of runoff managed and the cost / impervious acre managed
59. Cost per acre Greened	P 3-25, Fig 3-13	The figure indicates a cost of $314,000 / acre overall, which is inconsistent with the assumptions in Table 3-4 showing a range of $226,000 - $287,000 for implementing GSI.	Suggest that the report clarify which GSI types are to be used in relative proportion. e.g. green roofs typically make up a small percentage of the projects that are implemented.
60. Presumed National Comparison	P 3-14	It is unclear if this graph is comparing the ACT tool assumptions for GSI costs with the range of costs for these programs or two selected projects.	Clarify the source of GSI costs to represent nationwide projects.
61. GI BMP construction costs	Fig 3-7	The GI BMP construction costs assumed by ALCOSAN appear to be the second highest costs and approximately 84% higher than the comparison cities.	The costs include a high end range from GI installations in Onondaga County. If you take out this high end range number from Onondaga County,

			the average costs from the other cities for $25/ft as compared to the $46/sq ft ALCOSAN applied
62. GI BMP Cost Allocation	p. 3-31	Assumes all GI will be constructed at ratepayer expense.	Major communities (such as Pittsburgh) already have requirements in place requiring private sector and developer contributions.