PROJECT GROUNDWORK your pipeline to clean water	**METROPOLITAN SEWER DISTRICT OF GREATER CINCINNATI** **FINAL** **MEETING SUMMARY**	**DIN:**
		Project ID: 11140010
		Page: 1 of 3

Project Name: SSO 700 Integrated Watershed Action Plan

Meeting Date:	2/11/2015	Meeting Time:	7:30 AM	Location:	CH2M HILL Office

Meeting Manager: Dave Meyer

Scribe: Dan Hill | Timekeeper:

Objective: **Steering Committee Meeting**

This meeting of the Steering Committee for the SSO 700 Integrated Watershed Action Plan (IWAP) was to review the role of the committee throughout the duration of the IWAP project. The project scope and schedule was also reviewed to solicit suggestions and answer questions from committee members. Current status of the project and ongoing data collection efforts were also discussed.

Attendees (see attached sign-in sheet):

Hamilton County Monitor
- Dave Meyer
- Jeff Proctor
- Brandon Vatter
- Karen Ball

Hamilton County
- Brian Bohl, Soil & Water Conservation Dist.
- Todd Long, Engineering
- Steve Johns, Planning & Development
- Brian Wamsley, Planning & Development

MSDGC
- Andy Spurgeon
- Biju George
- MaryLynn Lodor
- Leisha Pica
- Matt Spidare

CH2M HILL
- Frank Duran
- Don Cuthbert
- Dan Hill

Watershed Jurisdictions
- Jeff Agricola, Springdale
- Bob Ashbrock, Reading/CACC
- Richard Osgood, Sharonville
- Gordon Perry, Blue Ash
- Patrick Ross, Reading

Other Entities
- Glen Vonderembse, Ohio EPA
- Bruce Koehler, OKI Regional Council of Governments
- Kara Scheerhorn, Mill Creek Watershed Council of Communities
- Marilyn Wall, Sierra Club

Topic	Discussion
Introductions	Dave Meyer (DM) led the introduction of the meeting and reviewed the background of the project. H apologized on behalf of Commissioner Hartmann who had planned to be at the meeting but was ill. Staff from the consultant team, County Monitor, Hamilton County, MSDGC, municipalities, and other organizations attended. See attached for a copy of the meeting presentation slides. Frank Duran (FD) reviewed the meeting agenda, the current composition of the steering committee, and the planned role for the steering committee. Of the five major municipalities in the study area, four are currently represented (Blue Ash, Reading, Sharonville, and Springdale) on the Steering Committee. The team requested support from the Steering Committee to obtain a commitment from a representative of the fifth municipality (Evendale) to join the Steering Committee. Steering Committee meetings are planned to be held quarterly.

Topic	Discussion
	The key roles of the committee are to maintain a community-based perspective on the plan and to ensure that the final alternative is not an engineering solution but one that meets the needs of the affected communities. Maintaining communication and support from the committee will be critical for the SSO 700 IWAP to earn support from Regulators.
IWAP Overview	FD provided an overview of the IWAP process and how it relates to the East Branch Mill Creek/SSO 700 watershed. The study area, a combination of the MSDGC-defined sewershed and the hydrologically defined watershed, has been developed and reviewed by MSDGC/County. The study area boundary contains 9 CSOs, 11 SSOs, and various issues related to sewer backups, sewage surfacing, overflowing manholes, and water ponding in streets. Water quality and habitat has also been impaired along the Mill Creek and tributaries. An integrated approach to these various issues impacting water quality will lead to a collection of gray, sustainable, and watershed-level solutions for pollution abatement at the lowest cost.
Project Scope and Schedule	Overall, the project is in the first steps of the process, which involve data collection and public outreach. Further steps to be taken over the next six months include analysis of data gaps, and modifications and updates to two models: the hydraulic model simulating the wastewater collection system and the EFDC model simulating the water quality in Mill Creek and tributaries. Coordination with watershed jurisdictions through the rest of February and March will be key in collecting the necessary data for model updates. The study area boundary represents 12% of MSDGC's total service area, and is bound by the Butler-Hamilton County line to the north. It was discussed that Butler County would be a welcome addition to the Steering Committee as issues there will contribute to the boundary condition at the northern border of the study area. Butler County may have results from an ongoing water and soil study that could aid the project. Downstream boundary conditions of MSDGC interceptor levels were also discussed. The study area boundary does contain portions of the Mill Creek Interceptor, but projects will focus on reducing the water load on the SSO 700 facility primarily in the upper portions of the study area. The hydraulic model is able to model backflow conditions where the Mill Creek Interceptor is included in the study area. Discussion of the data collection included Bruce Koehler's mention of a USGS study on rising aquifer levels in and around Evendale. Subsequent to the meeting, he forwarded this study to the consultant team. Brian Bohl mentioned the Hamilton County Soil & Water Conservancy District's available datasets on water quality with near-real-time results. The consultant team will coordinate with him on acquiring relevant portions of that data. Current water quality sampling data received by the consultant team is from MSDGC's Division of Industrial Waste historical sampling and from the Midwest Biodiversity Institute's 2011 study of Mill Creek and its tributaries. MSDGC and the County have planned to unveil a public website so that data collected by the consultant team, along with other project deliverables, can be made available to the members of the Steering Committee ahead of quarterly meetings. This website can be modeled after current MSDGC public outreach websites. Other steps remaining in Phase 1 of the IWAP include: • Collection of water quality samples and if necessary, additional flow data; • Updates and calibration of hydraulic and water quality models; • Pollution source identification, evaluation of collection system performance and response of waterbodies; • A draft summary report.

Topic	Discussion
Jurisdictional Meetings	Meetings with the various jurisdictions of the watershed is a key next step in the project. This is planned for the remainder of February and March. Jurisdictions should expect communication directly from the County Commission to initiate these meetings. A general data request will be included so that among other things, new and/or planned projects that will affect water quality in the jurisdiction can be accounted for in the hydraulic and water quality models.
Action Items	• County to communicate with jurisdictions for scheduling of meetings; • Jurisdictional meetings to be held with consultant team; • County and consultant team to develop project website to increase project data access for Steering Committee members.

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Metropolitan Sewer District of Greater Cincinnati

Meeting Attendance Sheet

Project ID:	11140010
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Subject: SSO 700 Integrated Watershed Action Plan

Meeting Date/Time: 2/11/2015 7:30 AM

Meeting Manager: Dave Meyer

Location/Room: CH2M Hill Office

Name	Company	Phone	Email	Signature
Patrick Ross	City of Reading	513-376-7501	PROSS@LEAPINFOHIO.ORG	
Todd Long	HamCo Engrs	513-946-4250	Todd.Long@hamilton-co.org	
Bruce Koehler	OKI Regional Council of Govt's.	513-691-7675	bkoehler@oki.org	
STEVE JOHNS	HAMILTON COUNTY	513-946-4455	steve.johns@hamilton-co.org	
Gordon Perry	Blue Ash	513-745-8545	gperry@blueash.com	
Richard Osgood	Sharonville	513-563-0033	rosgood@sharonville	
Kara Scheerhorn	Mill Creek Watershed Council	93-563-8800	kscheerhorn@millcreekwatershed.org	
Brian Worsley	Ham Co Planning + Dev	946-4496	brian.worsley@hamilton-co.org	
	HCSWCD	772-7645	brian.bohl@hamilton-co.org	

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Name	Company	Phone	Email	Signature
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Don Cuthbert	CH2M Hill	519 90-50	don.cuthbert@ch2m.com	
Andrew Spurgeon	MSD	244-3919	andrew.spurgeon@cincinnati-oh.gov	
Matt Spidare	MSD	513-557-7080	matt.spidare@cincinnati-oh.gov	
Karen Buell	Ham Co MSD	513557-5977	hamilton-co.org	
Bom Ashbrock	CACC	513-563-0767	rjvjashbrock@fuse.net	
Glen Vonderembse	Ohio EPA	9372856033	glen.vonderembse@epa.ohio.gov	
LEISHA PICA	MSD	513-244-398	leisha.pica@cincinnati-oh.gov	
M Wall	Sierra Club	513 226-1235	marilyn.wall@sierraclub.org	
Jeff Agricola	Springdale	513 346-5520	JAgricola@Springdale.org	
Jeff Proctor	HMM			

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Name	Company	Phone	Email	Signature
M Meyer	MSDGC	244 5535	(daughter on Sue Sorry!	

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January 30, 2015

Subject: SSO 700 Watershed Action Plan – Upcoming Steering Team Meeting, February 11

Dear Steering Team Member,

Thank you for agreeing to serve in the development of the SSO 700 Integrated Watershed Action Plan (IWAP). In the last six months since the SSO 700 "large group" meeting, the internal team (MSD and the County) have been busy finalizing the scope of the CH2M Hill contract, and are now ready to bring this scope forward to the Steering Team for discussion and input. Attached is the draft Scope of Work for your review ahead of the next Steering Team Meeting.

The meeting has been scheduled for **February 11 at 7:30am at the offices of CH2M Hill (10123 Alliance Road, Suite 300, Cincinnati, Ohio 45242).** This meeting should last approximately one hour, and the internal team will remain after the meeting for further discussion and questions.

As you know, SSO 700 is an integral project to MSD and Hamilton County, and your continued commitment to this effort is critical to ensuring the project's success. I appreciate your contributions as a Steering Team member and look forward to joining you on February 11.

Sincerely,

Greg Hartmann

Greg Hartmann
President, Hamilton County Board of Commissioners

SSO 700 WATERSHED PLANNING
STEERING COMMITTEE MEETING
FEBRUARY 11, 2015
7:30 am to 8:45 am
AGENDA

I. Welcome/Introductory comments by Commissioner Greg Hartmann
II. Introductions
III. Update on project status and schedule
IV. Role of Steering Committee Members
V. Review of project scope.
VI. Wrap-up/Action Items

EXHIBIT A

Scope of Work

Project Approach

CH2M HILL will utilize the Integrated Watershed Action Plan (IWAP) Work Plan (Attachment A) to perform the tasks to complete Steps 1 through 11 of the IWAP Work Plan for the SSO 700 watershed. The objectives of this work are to maximize improvement to water quality and meet the Consent Decree and Final WWIP SSO and CSO control requirements. To achieve these objectives, CH2M HILL, Hamilton County and the Metropolitan Sewer District of Greater Cincinnati (MSDGC) will characterize the various sources of pollution and the roles they have in impairments in the SSO 700 watershed and identify an optimum combination of cost-effective and affordable gray infrastructure, green infrastructure and watershed-based controls for the watershed.

This Scope of Work will be accomplished in two primary phases. Phase 1 will include accomplishing Steps 2 through 4 of the IWAP Work Plan. Phase 2 will include accomplishing Steps 5 through 9 and Step 11 of the IWAP Work Plan. Step 1, Stakeholder Involvement, and Step 10, Regulator Involvement, will occur concurrently throughout both Phases 1 and 2 of the scope of work. Only Phase 1 of the IWAP is included in this scope.

Phase 1 Scope of Work

TASK 1.0: PROJECT ADMINISTRATION

Step 1 and Step 11 of the IWAP Work Plan are included under Task 1.0.

TASK 1.1: Project Management

CH2M HILL will prepare a Project Management Plan identifying key technical and project management personnel, their roles and responsibilities as assigned by task, for the duration of the contract. Include cost-loaded schedule using Primavera or approved scheduling software. Include a plan that spells out the type, frequency, media and distribution of team and public communication. Submit electronic and hardcopy versions of updated project deliverables and schedules as requested by the MSDGC Project Manager.

CH2M HILL will include contract management plans defining scope and lines of communication for sub-consultants, as applicable.

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of draft Project Management Plan within three weeks of the Notice to Proceed. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 1.2: Project Meetings

CH2M HILL will attend project meetings held with MSDGC and the County to discuss status of the project, technical findings, content of deliverables, schedule, and budget. The project meetings will include one kickoff meeting, 14 monthly status meetings (through the end of Phase 1), and separate stakeholder, steering committee, and regulator meetings. The project kickoff meeting will include CH2M HILL's key technical and project management personnel, MSDGC staff and County staff. The kickoff meeting shall define lines of communication, protocol, project goals and objectives, critical success factors, project scope of work, a specified list of deliverables and a completion schedule. CH2M

HILL will attend additional MSDGC progress meetings as requested by the MSDGC Project Manager to assist in reporting project status.

Stakeholder focused meetings will include:

- One meeting to review the IWAP Work Plan with the stakeholders and receive and incorporate their comments into the overall scope of work.
- One meeting to review scope of work with the steering committee and receive and incorporate their comments into the overall scope of work.
- Follow-up meetings with each of the jurisdictions to gather information on existing problem areas, known pollution sources, community priorities and available data within each of the political jurisdictions. It is assumed some meetings can be consolidated for a total of 10 meetings with the impacted jurisdictions.
- Regular meetings with the stakeholder steering committee (to be developed) during the IWAP development to inform and gain input and general consensus on the findings, outcomes and overall direction of the IWAP. Quarterly meetings are anticipated (assume 6 meetings).
- Summaries of each meeting, including attendees list, issues discussed and actions required shall be documented for submittal to MSDGC and the County.

Regulator focused meetings will include providing updates to Ohio EPA, USEPA Region 5, and ORSANCO, at key intervals throughout the work to keep them informed and help set the stage for an affordable Integrated Watershed Action Plan program that meets the Consent Order, Final WWIP and CWA requirements. Quarterly updates shall be expected (assume 6 meetings).

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of draft minutes for meetings with stakeholders and formal meetings with MSDGC specified herein within one week of the completed meeting date. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 1.3: Quality Assurance and Quality Control

QA/QC (quality assurance and quality control) shall be provided by CH2M HILL utilizing competent staff in accordance with CH2M HILL's comprehensive Quality Control guidelines. A Quality Control Document will be submitted to MSDGC and will be subject to the approval of MSDGC.

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of draft Quality Control Document within three weeks of the Notice to Proceed. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 1.4: Risk Management

CH2M HILL will provide project-level risk management in accordance with MSDGC's Risk Management Guidelines. CH2M HILL will develop a process to identify and manage risks through the planning stage. Risk Management shall include, at a minimum, the following items:

- Risk Register
- Qualitative Risk Assessment
- Quantitative Risk Assessment
- Recommended Risk Management Plan
- Risk Response Planning
- Risk Monitoring and Control Methodology

The project schedule shall indicate updates, workshops, or other methods CH2M HILL intends to utilize to manage project risk and to exploit risk management opportunities.

The initial risk assessment of the project and a preliminary risk register will be developed during the kickoff meeting with project stakeholders.

Deliverables: CH2M HILL will provide MSDGC and the County with hard copy and electronic versions of a Risk Management Plan and will continuously update and submit revisions to the plan through project execution. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 1.5: Schedule

All work as described in this Phase 1 scope of work for Tasks 1.0 through 3.0 shall be completed by January 31. 2016. Phase 2 tasks (not scoped herein) shall be completed no later than April 30, 2017 to allow for sufficient time for BOCC approval and submittal to the Regulators by June 30, 2017.

TASK 2.0 WATERSHED AND SOURCE CHARACTERIZATION

Step 2 of the IWAP Work Plan is included under Task 2.0.

TASK 2.1: Watershed Selection and Delineation

CH2M HILL will obtain the boundary of record for the selected watershed from the MSDGC Project Manager. A review of USGS 12-digit hydrologic unit boundaries and MSDGC's watershed boundaries show the study area to extend approximately from where Mill Creek crosses West Galbraith Road in the south (limit of CSO 572 catchment area) up to the headwaters of Sharon Creek near West Chester Road to the north. This area includes the USGS Sharon Creek-Mill Creek subwatershed and excludes the USGS East Fork Mill Creek-Mill Creek subwatershed which lies almost entirely in Butler County.

CH2M HILL will further evaluate the watershed boundary delineation using geographic information systems (GIS) in addition to field verification as required. CH2M HILL will determine the boundary changes/modifications caused by existing drainage infrastructure, where applicable and will provide a GIS shape file and a summary of any proposed modifications to the boundary of record to MSDGC and the County for validation and approval. GIS shape files shall include delineation of both sewershed and watershed areas. The sewershed shall not include Glendale which shall be considered a point source at the WWTP discharge. The Glendale stormwater system shall be included in the watershed documentation.

Deliverables: CH2M HILL will provide MSDGC and the County a GIS shape file of sewershed and watershed delineations/boundaries for review and approval. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 2. 2: Data Collection

CH2M HILL will develop and submit to MSDGC a list of requested background data. CH2M HILL will research and compile existing documents, including but not limited to 305(b) and 303(d) listings, watershed studies, community plans, infrastructure as-built documents, existing surface water or point discharge source water quality data, compilation of existing pollution sources, existing water quality problem areas, and data related to the watershed in support of the IWAP. As a basis, the data list attached to this document (Attachment B) will be used.

Deliverables: CH2M HILL will submit a Data Request Technical Memo. CH2M HILL will provide MSDGC and County with an online Data Library via CH2M HILL's SharePoint services that includes the collected data and other relevant documentation.

TASK 2.3: Site Visits

CH2M HILL will conduct an initial site visit (may require more than one day) with MSDGC and County staff familiar with the project area as necessary to visually identify, characterize and document: the physical, chemical and biological integrity impairments in the watershed, the pollution sources and discharges, and assess the technical feasibility of water quality based strategies for the existing site conditions, as well as current and planned land use.

Conduct additional site visits as necessary to verify and monitor existing site conditions in support of the IWAP Work Plan (Attachment A).

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of a Technical Memorandum - Watershed Site Conditions, documenting observed physical, chemical and biological integrity impairments. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 2.4: Inventory and Gap Analysis

CH2M HILL will identify the watershed surface runoff channelized routes, sanitary and storm sewer collection systems, other man-made pollution sources (e.g., septic systems, etc.), water quality data and other applicable data available for the watershed. Analyze, collect and summarize all the available data from this task as well as Task 2.3, QA/QC the data, perform a gap analysis, and provide recommendations and a plan to fill data gaps as needed (i.e. additional surface water quality monitoring, additional flow monitoring, geomorphology, additional collection system and water quality models development, etc.). The recommendations will also be utilized to direct the Water Quality Sampling Program.

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of a Technical Memorandum - Inventory and Gap Analysis. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 2.5: Water Quality Data Collection Program – Optional Task[1]

This is an optional task that MSDGC and the County may decide to include as part of this scope of work depending on the outcome and recommendations of the Inventory and Gap Analysis, Task 2.4. Generally, this task includes the performance of collection system, outfall and surface water data collection programs as needed to fill the gaps identified by the Inventory and Gap Analysis, Task 2.4.

Based on the results of previous tasks, CH2M HILL will submit a detailed Water Quality Data Collection Program scope of work and level of effort to MSDGC and County staff for review and approval. The purpose of the Water Quality Data Collection Program is to support the updating and/or development of existing and new watershed and surface water quality models to accomplish the Steps as described in the IWAP Work Plan (Attachment A). An allowance has been provided for this optional task which must be separately approved by the County and authorized by the MSDGC Project Manager in writing before any effort may be performed under this task. The allowance shown in Exhibit B is based on an approximate level of service provided by the CH2M HILL team, but also assumes a significant role in

[1] *This task shall be funded and authorized through a task order modification.*

sampling collection and laboratory analysis by MSDGC and others, depending on the final scope of the Water Quality Data Collection Program.

Generally, the scope of this task is anticipated to include:

- *Development of a Quality Assurance Project Plan (QAPP) consistent with the project Quality Control Document and Risk Management Plans.*
- *Ten (10) in-stream surface water quality sampling locations within the watershed.*
- *Twenty (20) outfall or surface channel discharge flow and water quality sampling locations within the watershed. Outfalls shall be stormwater, CSO and SSO outfalls.*
- *Collection of samples for ten (10) wet weather events.*
- *Collection of samples for four (4) dry weather events.*
- *Collection of influent and effluent water quality samples at the SSO 700 Storage & Treatment Facility during operational modifications.*
- *Duration of data collection program to be determined based on the needs of the monitoring effort as well as the overall IWAP schedule.*

Deliverables: None required currently; to be determined based on detailed scope of work to be submitted after completion of Task 2.4.

TASK 2.6: Watershed Water Quality Models Update & Development

Task 2.6.1: A watershed model and a surface water quality model will be required for the development of the IWAP. An Environmental Fluid Dynamics Code (EFDC) surface water quality model of the Mill Creek was developed in 2012 as a part of a regional Ohio River Water Quality Model project. CH2M HILL will review the EFDC model and associated watershed models to identify its representation of the SSO 700 watershed, its applicability to supporting the development of an IWAP, any calibration and validation deficiencies, shortfalls in existing source data used, and other potential gaps in the existing models. CH2M HILL will coordinate its activities under this task with other water quality modeling efforts being undertaken by MSDGC. In a technical memo format, CH2M HILL will provide recommendations to MSDGC and the County for using and updating the EFDC and watershed models or developing new models as necessary to meet industry best practices for calibration and validation and to accomplish the IWAP Work Plan (Attachment A). The recommendations will also be utilized to direct the Water Quality Data Collection Program (Task 2.5).

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of the Technical Memorandum – Watershed Water Quality Models Gap Analysis and Update Assessment. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

Task 2.6.2: Once the Watershed Water Quality Models Gap Analysis and Update Assessment Technical Memorandum has been reviewed and accepted by MSDGC and the County, CH2M HILL will submit to MSDGC and County a detailed scope and estimated level of effort for additional water quality model development, calibration and validation based on the accepted recommendations in the technical memorandum for proceeding with watershed and surface water quality modeling to characterize existing conditions and evaluate the water quality benefits and standards compliance that may be realized by the implementation of controls in the SSO 700 watershed. Once the detailed scope of work and level of effort for the water quality model development is approved by MSDGC and the County, CH2M HILL may proceed with this task. An allowance has been provided for this task which must be

separately approved by the County and authorized by the MSDGC Project Manager in writing before any effort may be performed under this task.

Deliverables: CH2M HILL will provide a detailed scope of work and estimated level of effort for water quality model development based on the results of Task 2.6.1 and previous tasks. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days. Other water quality model deliverables to be determined based on agreed upon detailed scope of work to be submitted after completion of Task 2.6.1.

TASK 2.7: Hydraulic Model Update & Development

Task 2.7.1: A validated and calibrated hydraulic model will be required for the development of the IWAP. CH2M HILL will review the existing SWMM collection system (both combined and sanitary systems) hydraulic model to identify its representation of the SSO 700 watershed, its applicability to supporting the development of an IWAP, any calibration and validation deficiencies as compared to MSDGC modeling standards, shortfalls in existing flow monitoring and source data used, and other potential gaps in the existing models. The model calibration and validation review shall also include the following:

- Assess the abilities of the model to properly account for the amount of I/I entering the sewer system due to antecedent moisture from changing ground soil moisture conditions and back to back storm events.
- Field verify the existence of approximately 50 upstream manholes that are predicted to overflow by the current hydraulic model. CH2M HILL shall coordinate field inspection program with MSDGC (to be performed by MSDGC) as part of the model calibration and validation review to document and verify these or other manhole overflow locations, and the frequency of overflow.
- Compare areas of known sewer backups (from existing MSDGC records) (SBUs) against model predictions. Areas where the model predicts SBUs shall be compared to backup complaints and basement elevations to confirm model accuracy. If necessary, working with MSDGC crews, field verify basement backup probability.
- Compare the representation and operation of the SSO 700 Storage & Treatment Facility (STF) in the model against actual field operating data to confirm if the hydraulic model accurately represents the STF field operations, flows and volumes.

This review will include the currently available flow and rain monitoring data collected to-date in the SSO 700 watershed and assess its completeness and any gaps. This review will also assess the need to develop a calibrated and validated storm sewer system model of the existing storm sewer system or if the watershed models can be accurately used to assess the pollutant loadings from storm water runoff.

In a technical memo format, CH2M HILL will provide recommendations to MSDGC and the County for additional flow monitoring data collection and locations, updating the collection system model to meet MSDGC modeling standards and industry best practices for calibration and validation and to accomplish the IWAP Work Plan (Attachment A).

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of the Technical Memorandum – Watershed Collection System Hydraulic Models Gap Analysis and Update Assessment. CH2M HILL will provide MSDGC and County with hard copy and electronic versions of a Technical Memorandum – Storm Sewer System Model Needs Assessment. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

Task 2.7.2: It is anticipated that the collection system hydraulic model will require additional development, recalibration, and validation and that additional flow monitoring will be required. Once the Watershed Collection System Hydraulic Models Gap Analysis and Update Assessment Technical Memorandum has been reviewed and accepted by MSDGC and the County, CH2M HILL will submit to MSDGC and County a detailed scope and estimated level of effort for additional collection system hydraulic model development, recalibration and validation based on the accepted recommendations in the technical memorandum. If the analysis also recommends that a storm sewer system model is required, and that MSDGC and the County agree with this recommendation, CH2M HILL will submit to MSDGC and County a detailed scope and estimated level of effort for development of a storm sewer system model, including model development, calibration and validation. County will coordinate storm sewer system modeling with the appropriate storm water utility/district.

Once the detailed scope of work and level of effort for the collection system hydraulic model development, recalibration, and validation, and storm sewer system model development (if recommended) is approved by MSDGC and the County, CH2M HILL may proceed with this task. An allowance has been provided for this task which must be separately approved by the County and authorized by the MSDGC Project Manager in writing before any effort may be performed under this task.

As part of the collection system hydraulic model development effort, it is anticipated that CH2M HILL will update the calibration and validation of the existing sewer collection system hydraulic model (SWMM) to include, but not necessarily limited to, the following:

A. Use additional flow and overflow (activations and volume) monitoring data in the collection system and at the SSO 700 Storage & Treatment Facility (STF), as needed to fill in any gaps as agreed to by MSDGC and the County in order to calibrate and validate the hydraulic model to MSDGC modeling standards. The model calibration shall include antecedent moisture as needed to properly account for the amount of I/I entering the sewer system from changing ground soil conditions and back to back storm events. To accomplish this, CH2M HILL may use the Aquifer module within SWMM or an alternate equivalent method (RTK analysis) with the approval of MSDGC and the County.

B. Coordinate/update the model calibration and validation with the SSO 700 STF field operations including the operation changes that will be performed. Review flow data collected by others after the STF operation changes. This data includes quarter-hourly data on the operation of the STF relative to flows pumped, stored, treated and overflowed. Perform necessary model runs to confirm and quantify the overflow reduction benefits of the STF operation changes.

C. Based on the review performed in Task 2.7.1, update model to reflect the actual manholes/SSOs that are overflowing based on field inspection evidence CH2M HILL shall coordinate field inspection program with MSDGC (to be performed by MSDGC) as part of the model calibration and validation to document and verify these or other manhole overflow locations, and the frequency of overflow.

D. Based on the review performed in Task 2.7.1, update model to reflect actual areas of known sewer backups (from existing MSDGC records) (SBUs) against model predictions as part of the model calibration and validation. Areas where the model predicts SBUs shall be compared to backup complaints and basement elevations to confirm model accuracy. If necessary, working with MSDGC crews, field verify basement backup probability.

E. Compare measured overflow volumes at the SSO 700 STF and other CSOs (if accurate overflow volumes are available) with modeled overflow volumes.

Assumptions: Performance metrics for CSOs is a typical year analysis. A design storm and typical year continuous simulation analysis is used for SSOs. These assumptions will be coordinated with the water quality model analyses, as the need for a typical period of rainfall record (beyond just the typical year) may be needed when calculating & analyzing water quality model results. Typical Year Analysis requires a Hydrologic and Hydraulic Model (SWMM) that will model continuously. Flow monitoring and flow monitoring data collection activities are not included in this task (see Task 2.7.3) .

Deliverables: CH2M HILL will provide a detailed scope of work and estimated level of effort for collection system hydraulic model development, recalibration, and validation, and storm sewer model development (if recommended) based on the results of Task 2.7.1 and previous tasks. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days. Other hydraulic model deliverables to be determined based on agreed upon detailed scope of work to be submitted after completion of Task 2.7.1.

Task 2.7.3: Flow Monitoring Data Collection Program – Optional Task[2]. This is an optional task that MSDGC and the County may decide to include as part of this scope of work depending on the outcome and recommendations of Task 2.4 and Task 2.7.1. Based on the results of previous tasks, CH2M HILL will submit a detailed Flow Monitoring Data Collection Program scope of work and level of effort to MSDGC and County staff for review and approval. The purpose of the Flow Monitoring Data Collection Program is to support the updating and/or development of existing and new collection system models to accomplish the Steps as described in the IWAP Work Plan (Attachment A). Due to the unknown scope and level of effort which may be required for the Flow Monitoring Data Collection Program, no allowance has been included in this task order. No work may be performed by CH2M HILL under this task unless separately approved by the County and authorized by the MSDGC Project Manager in writing. The Program, when authorized, may be performed by CH2M HILL, as well as MSDGC staff and others, depending on the final authorized scope of the Flow Monitoring Data Collection Program.

TASK 3.0 IDENTIFY POLLUTION SOURCES & USE TOOLS TO EVALUATE COLLECTION SYSTEM RESPONSE & WATERWAY RESPONSE[3]

Step 3 and Step 4 of the IWAP Work Plan are included under Task 3.0.

Based on the outcomes of Task 2, CH2M HILL shall characterize the pollutant source contributions to the watersheds and prepare pollutant mass balance pie charts for the pollutants and pollution sources found to be impairing the waterways as described in Steps 3 & 4 of the IWAP Work Plan (Attachment A). The pollutant source categories to be characterized and evaluated in this task (bacteria, BOD/DO, nutrients, etc.) shall be defined based on the outcomes of previous tasks and the capabilities of the watershed and surface water quality models approved by the MSDGC and the County and updated/developed by CH2M HILL.

A. *Confirm that the hydraulic, watershed and surface water quality models developed in Task 2 have been developed and/or updated to meet calibration and validation industry standards and sufficient collection system and surface water data has been collected to inform analysis and decision-making.*
B. *Confirm the need to analyze in-stream water quality over a typical period of rainfall beyond just the typical year. While the typical year may be representative of the rainfall in the watershed, it may not necessarily be representative of the in-stream flows and water quality, therefore a longer typical*

[2] *This task shall be funded and authorized through a task order modification.*
[3] *This task shall be funded and authorized through a task order modification.*

period of rainfall may be needed to understand the in-stream water quality and pollutant source contributions.

C. *Apply the collection system model to determine the baseline flows and overflows from the sanitary and stormwater collection systems and the associated inputs into the surface water quality models. The model will be applied for a typical year, a summer recreational period (May to October) within the typical year, a design storm, and a typical period of rainfall in this analysis.*

D. *Apply the watershed models to calculate other pollutant source contributions to the surface water quality models for the typical year, a summer recreational period (May to October) within the typical year, a design storm, and a typical period of rainfall in this analysis.*

E. *Apply the surface water quality models with the inputs from the collection system and watershed models in a component analysis to characterize existing (baseline) impacts on in-stream water quality, habitat and standards compliance that each pollutant source is having on the waterways and aquatic environment. The pollutants and associated pollutant sources impairing the waterways from meeting water quality standards or other assessment criterion (for pollutants that don't have water quality standards, like phosphorus) shall be analyzed and quantified. Other measures of impairment may be considered for expressing impact if they better articulate the desired information (e.g. pollutant contributions by source). The models will be used to characterize existing water quality standards compliance with metrics such as percent of time or days of compliance/non-compliance for a typical year, a summer recreational period (May to October) within the typical year, a design storm, and a typical period of rainfall in this analysis.*

F. *Allocate the pollutant loadings to each pollutant source to develop pollutant and pollution source pie charts for each pollutant impairing the waterway. Determine relative contributions from the pollution sources to in-stream water quality standards (or target concentrations) exceedances, and their relative contribution to aquatic environment and habitat impacts.*

G. *Utilize the pollutant pie charts to rank and compare the pollutant sources impairing the waterway. Identify the critical conditions affecting the waterways and the watershed pollution sources.*

H. *Identify which pollutants and estimate how much of the pollutants are from MSDGC versus from other sources.*

I. *Remaining data gaps identified with this work will be discussed and supplemental data will be collected if appropriate based upon an approved scope and budget.*

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of a Technical Memorandum – Characterization of Relative Impacts of Pollutant Sources on Water Quality Compliance. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

TASK 4.0 SUMMARY REPORT[4]

CH2M HILL shall prepare a summary report documenting the findings, results and outcomes from each of the above Tasks. The Summary Report shall include the separate technical memos prepared for Tasks 2 and 3 to document the water quality and hydraulic model review, update, and development process.

Deliverables: CH2M HILL will provide MSDGC and County with hard copy and electronic versions of a Summary Report documenting the overall findings and incorporating Technical Memoranda as attachments. MSDGC and the County shall provide review comments and/or approval within ten (10) calendar days.

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[4] *This task shall be funded and authorized through a task order modification.*

Attachment A

Integrated Watershed Action Plan

For SSO 700 Watershed

Work Plan*

March 31, 2014

Submitted by Metropolitan Sewer District of Greater Cincinnati on behalf of Hamilton County and the City of Cincinnati to the Regulators on March 20, 2014

***Subject to Approval by the EPA**

Purpose:

The purpose of this document is to identify measures to meet the SSO and CSO volume reduction requirements of the Final Wet Weather improvement Plan (Final WWIP), as part of Hamilton County's and the City of Cincinnati's Consent Decree, through an Integrated Planning approach, while selecting holistic projects that will also provide the best water quality improvements possible and maximize the benefits of the investment for the rate payers.

It is expected that the result of the SSO 700 Integrated Watershed Action Plan (Integrated WAP) will be revisions to the Final WWIP to identify new or revised projects/measures which will meet the overflow reduction requirements in the Final WWIP, with an eye to cost-effectively maximizing water quality standard compliance. Projects identified for future construction by the Metropolitan Sewer District of Greater Cincinnati (MSD), a County Sewer District formed under Ohio law, in the final Integrated WAP report will be proposed to the U.S. EPA, Ohio EPA, and ORSANCO (Regulators) for review and approval. Regulator-approved projects would then become part of a revised Final WWIP with specific and enforceable performance and design criteria and milestone dates.

Regulator-approved projects will comply with applicable Federal and Ohio law, including restrictions on the use of County Sewer District funds under Ohio Revised Code Chapter 6117, and any applicable provisions of the 1968 Agreement between the Board of County Commissioners (County) and the City of Cincinnati (City), as amended. Project funding will come from MSD, except where third-party funding sources are available (such as Ohio Department of Transportation, or other state or federal grants) or where local community interests require funding by local jurisdictions rather than by MSD (such as for amenities).

This Work Plan identifies the process by which the SSO 700 Integrated Watershed Action Plan (Integrated WAP) will be developed. Eleven action steps are listed below. These action steps will be followed in the preparation of the SSO 700 Integrated WAP. The approximate watershed boundary for the SSO 700 Integrated WAP is shown in Figure A.

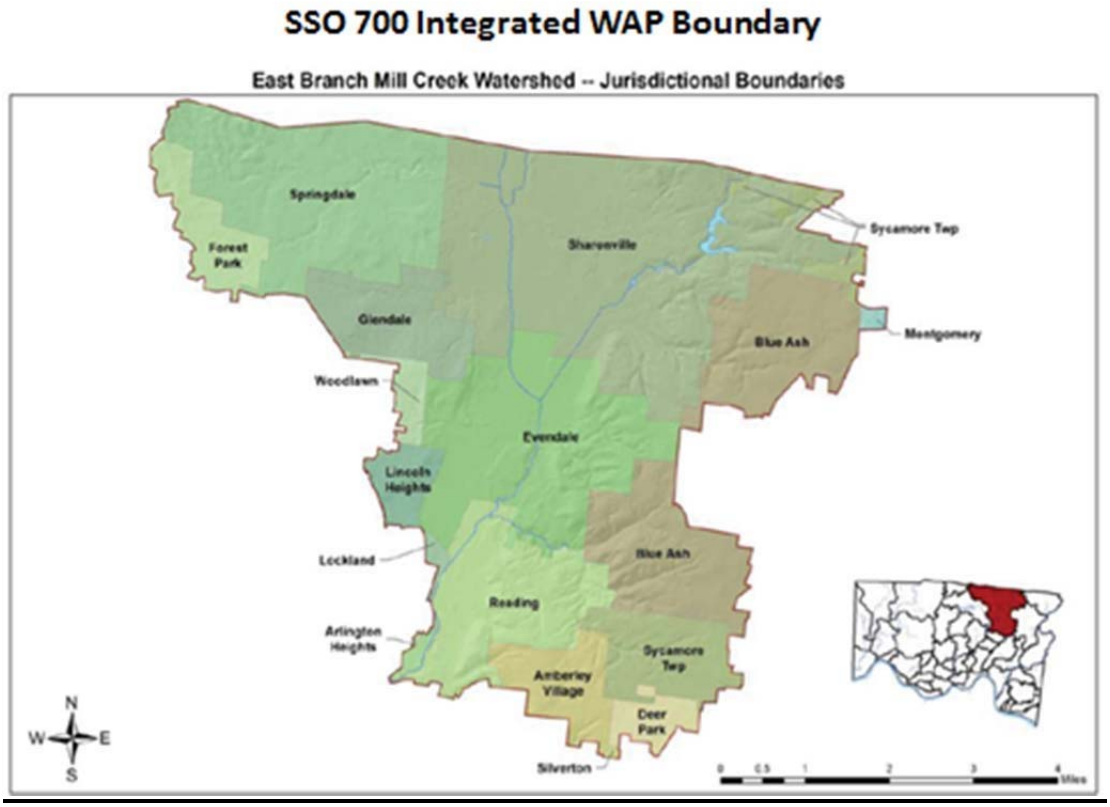


Figure A - Approximate watershed boundary for the SSO 700 Integrated WAP.

Background

The Integrated WAP approach is based upon the principles and elements espoused in EPA's Integrated Planning Framework and Section 208 of the Clean Water Act (CWA). USEPA supports integrated planning, which takes into account multiple sources of surface water pollution, including that from combined and sanitary overflows, stormwater, and other sources, and their relevant regulatory requirements, in order to identify and, where feasible, construct projects which provide comprehensive pollution abatement solutions, including the use of green infrastructure. For MSD, the Integrated Planning approach is designed to cost-effectively meet the obligations of the Final WWIP, Consent Decree, and CWA. One intended result of the Integrated WAP will be to prevent, when possible, MSD spending once to construct volume-only control obligations (under the Final WWIP) and then spending again (twice or more) to meet existing (and future) water quality non-impairment obligations (under the Consent Decree and CWA). The Integrated WAP approach thus has the potential to benefit both the environment and ratepayers.

Introduction to Integrated Watershed Action Planning

What is meant by an Integrated WAP?

The end goal of the Clean Water Act is to maintain and restore the chemical, physical and biological integrity of the US waterways in order to ultimately make them "fishable and swimmable" and safe in which to recreate. These goals will require a long term commitment to CWA compliance investments, in order to achieve the water quality goals and maintain long-term compliance with those goals. Sewer overflows during wet weather events—while an important source of waterway pollution—are not the only source of pollution affecting our waterways. Pollution sources such as dry weather pollution, stormwater runoff, and legacy pollutants, other than wet weather overflows are alone causing non-attainment with water quality standards. Data shows that fecal coliform levels in stormwater runoff typically far exceed recreational season criteria thresholds.[1] As a result, some approaches to overflow controls (e.g., full separation of stormwater) may cause or contribute to violation of applicable water quality standards, unless these other pollution sources are also controlled.

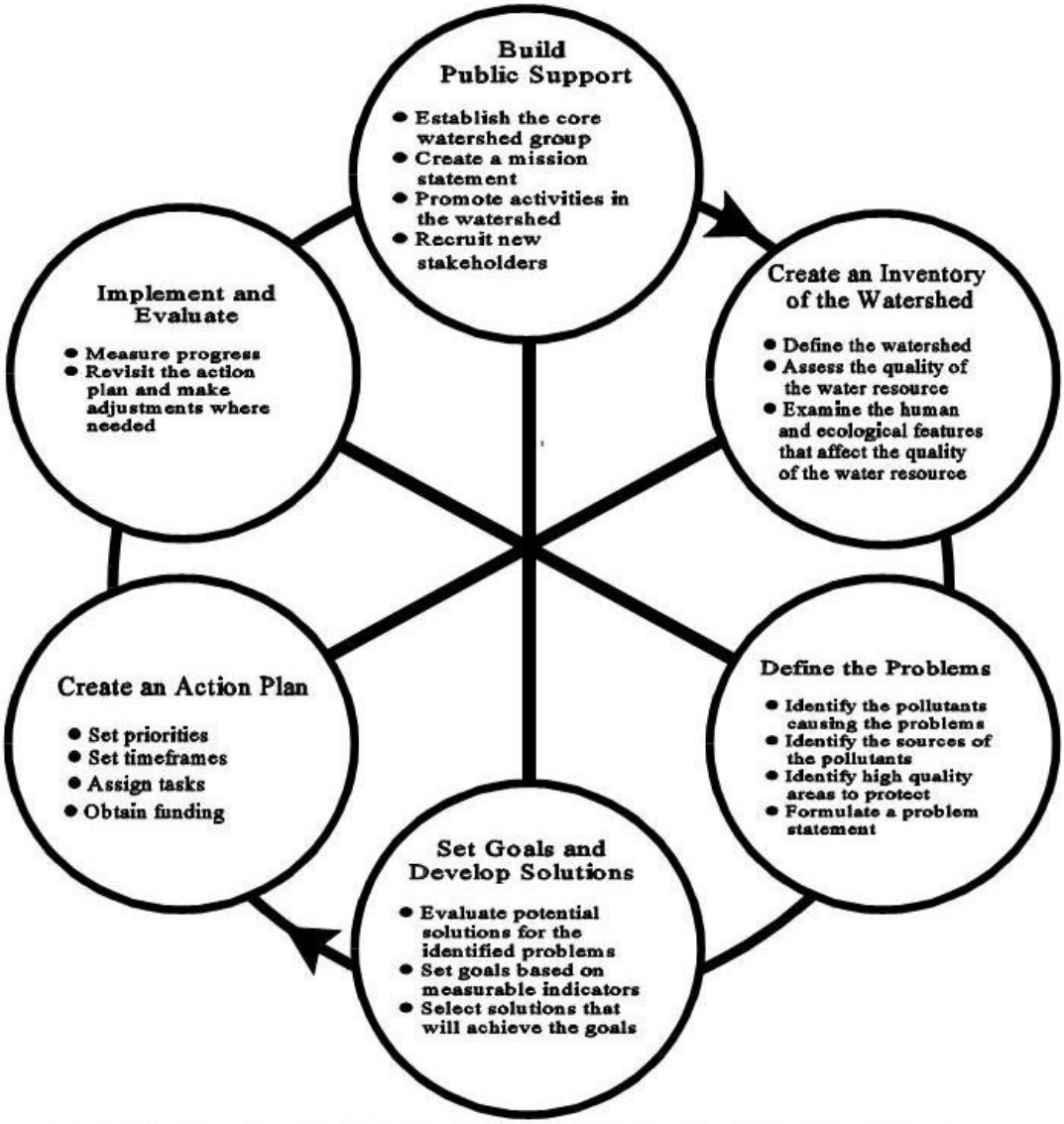
The principles and elements contained in EPA's Integrated Planning Framework and Ohio EPA's Guide to Developing Watershed Action Plans dictate a broad pollutant abatement program to address such water quality impairments. Ohio EPA's WAP Guide states:

> *"The watershed approach refers to a comprehensive effort to address multiple causes of water quality and habitat degradation in a watershed. It is a process that emphasizes prioritizing problem areas and developing comprehensive, integrated solutions by involving stakeholders from both inside and outside of government."*

Figure 1 exemplifies the WAP approach.

[1] MSD CSO Long Term Control Plan Report, April 2006, Volume II, Sections 6 and 9

Figure 1.3 Implementing the Watershed Approach



Watershed groups often start at the top of the wheel by building public support and then move clockwise. A group is likely to travel around the wheel several times, with each cycle building upon the information and experience gained previously. The "spokes " connecting each step to the center illustrate that the process does not always proceed in one direction, and that the steps are interrelated. Information gained at one step may lead the group to move to another step in the process. For example, information gained during the inventory step ma y lead the group back to seeking new stakeholders.

Figure 1 – Watershed Action Planning Process from Ohio EPA Guide, June 1997

Integrated Watershed Action Planning will evaluate the various sources of pollution in a given watershed, including SSOs and CSOs, put them into context with one another, and develop the optimum combination of gray, green, and watershed-based controls on the various pollutant sources to comply with the Consent Decree and Final WWIP (as it may be revised), yet also cost-effectively maximize in-stream compliance with water quality standards and watershed health improvements. It is this broader, holistic approach that distinguishes "integrated planning" from more limited types of planning. See Figure 2 below.

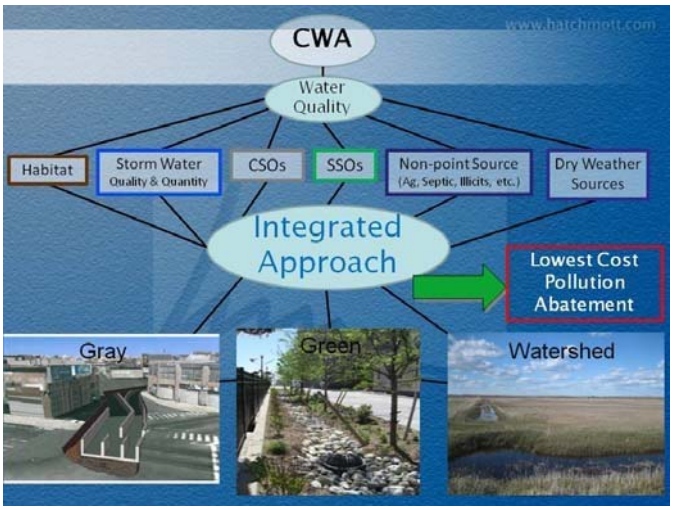


Figure 2. *Integrated WAP focuses on the most cost-effective pollution abatement projects/measures while also providing faster and more comprehensive water quality improvement.*

Integrated WAP Generic Work Plan Action Steps

Each Work Plan for a specific Integrated WAP will be based upon USEPA's Integrated Planning Framework and the Ohio EPA's Watershed Action Planning process, and will consist of the following major action steps:

1. Public Outreach & Involvement

A comprehensive stakeholder involvement and decision-making process will be developed (that will build upon the stakeholder involvement developed during the LMCPR and other stakeholder processes) and be implemented throughout the duration of the Integrated WAP process. For example, political jurisdictions and environmental stakeholders in the SSO 700 watershed have attended two sessions to learn about a potential Integrated IWAP impacting their 10+ communities, share information, and gain agreement on participation on a steering committee to help shape and accomplish the Integrated WAP.

Other key elements of Step 1 of the Integrated WAP are:

- Regular meetings during the Integrated WAP development to inform and gain input and consensus on the findings, outcomes and overall direction of the Integrated WAP.
- Reviewing, helping to develop/shape, and endorsing the Integrated WAP work plan and scope of work
- Meeting to identify the problem areas, known pollution sources, and available data

within each of the political jurisdictions

- Identifying priorities to be used in project selection and ranking
- Helping select and rank specific projects
- Identifying external funding sources where appropriate or necessary

2. Watershed & Source Characterization

Step 2 will identify in each watershed the water quality and key pollution sources. This information can then be used to determine which projects can best meet Final WWIP obligations *and also meet Consent Decree and CWA* obligations. Utilizing existing and new water quality data and overflow information, relevant pollutants and impairments in the watershed will be identified and characterized as described below:

a. Identify impairments and/or other adverse impacts in the waterways in order to answer the question: Why is the waterway not meeting WQS? (i.e., combined overflow-based bacteria levels are too high, metals are toxic to biota, flash flows are too high to support habitat or poor habitat, etc.). Evaluate MSD and non-MSD contributions to WQS issues. Utilize existing water quality data collected to-date from Ohio EPA, MSDGC, TMDLs, other watershed stakeholders and hydraulic and water quality models developed to-date.

b. Prepare and perform in-system, in-stream and outfall monitoring and water quality sampling programs as needed to supplement/fill-in gaps in data.

c. Update the calibration & validation of MSD's existing hydraulic and water quality (both watershed and in-stream) models and build new models, where needed, to meet industry standards to reflect the collected water quality and flow data.

d. Identify pollution parameters of concern and other stressors to the watershed system in order to answer the question: What pollutants in the waterway are causing the water body to not meet WQS or threshold criteria? Evaluate MSD and non-MSD pollutant contributions to WQS issues. See Figure 3.

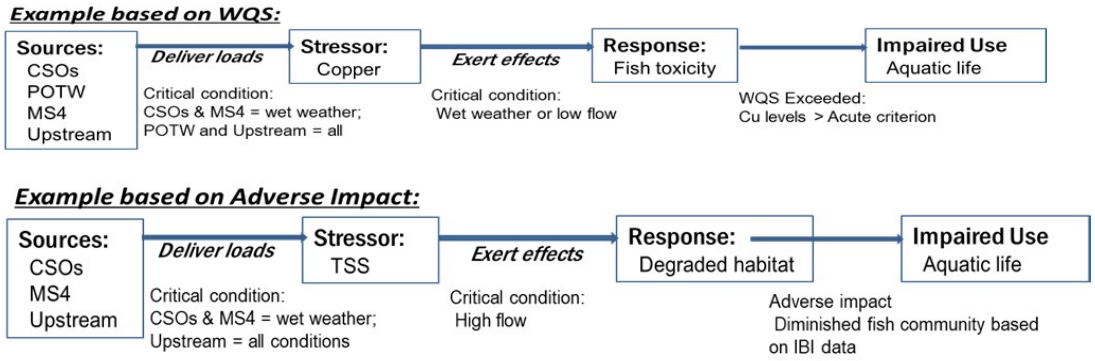


Figure 3. *Watershed Characterization to identify Pollution Sources & Impacts.*

3. Identify Pollution Sources in Local Waterways

Step 3 will first identify in detail the primary potential pollutant sources and their relative loadings in order to answer the question: What does the waterway's pollutant pie chart for each pollutant of concern look like? This step will be performed in conjunction with Step 4 described below.

Next, relevant pollution sources are then further examined to rank their individual water quality impacts. See Figure 4 below.

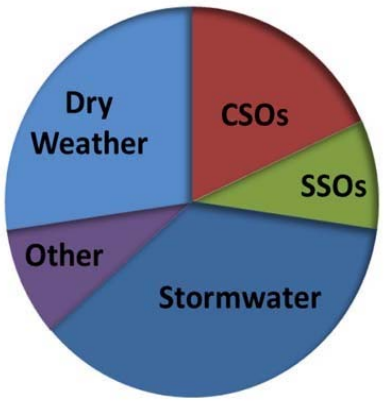


Figure 4. *Pollution Sources of Concern Pie Chart based on pollutant loadings to waterway.*

4. Evaluate Collection System Response & Waterway Response

Step 4 will begin with confirming that the hydraulic and water quality models developed in Step 1 have been developed and/or updated to meet calibration and validation industry standards and sufficient in-system and in-stream data has been collected for sound decision-making.

The hydraulic and water quality models will be used to determine the flows and overflows in the sanitary and stormwater collection systems and the associated inputs into the water quality models. The watershed models will also provide the other pollutant source contributions to the in-stream water quality models. The water quality models will be run with the inputs from the collection system and watershed models to understand the baseline (current) effects on in-stream water quality standards compliance and the impacts that relevant pollutant sources are having on the waterway and aquatic environment.

The outcome of this step will be an understanding of the pollution sources (MSD CSO/SSO sources versus non-MSD), their relative contribution to in-stream WQS exceedances, and their relative contribution to aquatic environment impacts so that the sources can be put into context with one another. Included in this analysis will be identifying critical conditions affecting waterway and watershed sources in order to answer the questions: What conditions are the waterway most sensitive to and what are the associated sources? And, which of these sources are from MSD versus from other sources? Remaining data gaps identified with this work will be discussed and supplemental data collected when appropriate.

5. Source Context & Select Optimized LOC for each Pollutant and Source

Once the sources of pollution and their relative impacts are known, then these sources can be put into context with one another, including CSOs and SSOs, to select the optimum level of control for each pollutant and pollutant source. For example, pollutants impairing the waterway can be evaluated to determine the optimum level of control in order to maximize compliance with in-stream water quality standards or in-stream target concentrations (where a water quality standard may not currently exist).

This analysis is performed for each pollutant source and pollutant impairing the waterway. Utilizing the in-stream sampling data and the water quality models, with and without background sources, the more stringent level of control is selected. For each pollutant source and pollutant impairing the waterway, the water quality analysis consists of three phases:

1) Run the models with all sources of pollution (with background sources) (assume, however, that SSOs have been eliminated). Evaluate the control level for the selected pollutant source where "no additional water quality benefit" occurs due to the pollutant loads from other sources;
2) Run the models with ONLY the pollutant source, such as CSO overflows (without background sources) and evaluate the control level where "water quality standard compliance" occurs; defined as remaining pollutant source discharge would not cause or contribute to in-stream water quality standard exceedances; and
3) Compare the levels of control identified from Step 1 and Step 2 and select the highest (e.g. most restrictive) level of control.

This analysis is performed for the relevant pollutant sources and pollutants impairing the waterway, including MSD overflows. For example, pollutants such as Bacteria, Nutrients, TSS, Temperature, Habitat loss, etc., and the associated sources, such as CSOs, SSOs, stormwater runoff quantity and quality, dry weather sources, legacy pollutants, etc., impairing the waterway can be evaluated to determine the optimum level of control for setting a remaining discharge volume in order to maximize compliance with in-stream water quality standards or in-stream target concentrations (where a water quality standard may not currently exist).

The results of this step are a listing of the optimal level of control for each pollutant source.

6. Identify Cost-Effective Gray, Green & Watershed Controls

Once the optimum level of control is determined for each relevant pollutant source in Step 5, then the range of gray, green, and watershed-based projects can be identified to reduce the extent and duration of pollutants in order to ultimately achieve the optimum level of control identified. The range of projects will incorporate financial cost-effectiveness to identify high and low cost-to-benefit projects, and where applicable identify the responsible entities and owners.

A large variety of potential projects may be identified in each Integrated WAP. Among the categories of such projects are the following, with a more detailed list attached as Attachment 1.

- ✓ Focused sanitary and storm collection system improvement projects such as:
  - I/I Reduction at same time as structural renewal
  - Illicit (sewage) discharges identification and removal
  - Flooding & Basement Backup Solutions
- ✓ Creek and River water intrusion prevention
- ✓ Green infrastructure & source control projects, such as bioretention, green streets, downspout disconnection, etc.
- ✓ Constructed wetlands
- ✓ Other Source Controls
  - Dry Weather Sources
  - Legacy Pollutants
  - Possible WQ Trading opportunities
- Large Scale Gray Infrastructure to balance the above identified projects with the remaining volume reduction requirements to meet the SSOs and CSOs in accordance with the Consent Order and Final WWIP.

Initial projects will be identified and the capital and operating cost estimates will be developed. Projects that control CSOs, SSOs, stormwater, dry weather sources, and other pollutant sources can then be equitably compared and ranked against one another based upon common metrics such as increase in in-stream water quality standards compliance, increase in attainment of in- stream target concentrations, volumetric pollutant abatement reductions, and other environmental related benefits.

In order to evaluate multiple projects, graphical tools may be used to chart/plot the relative water quality benefits associated with addressing each pollutant source and a comparison of each project's pollutant reduction benefits as they relate to in-stream water quality and volume reduction. These types of methods will be performed in order to assist in the ranking of projects. See Figure 5 below for an example.

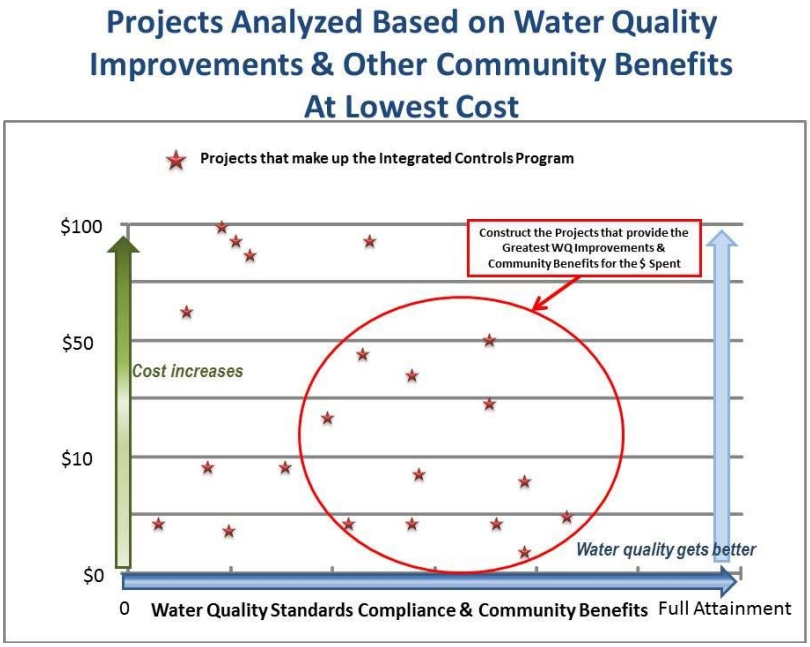


Figure 5. *Project comparison & development to identify projects that maximize improvement to in-stream water quality standards compliance at the lowest cost.*

In this manner, cost-effective high water quality benefit projects can be identified for the watershed and ranked by cost and benefit utilizing comprehensive water quality tools. The volumetric impact of each project, or group of projects, will be determined and included in the overall evaluation. The nature of integrated watershed action planning utilizes tools such as models to regularly analyze results to ensure that resources are spent wisely and that priorities are met. A robust stakeholder involvement program will be conducted during this step and throughout the Integrated WAP to prioritize projects. This stakeholder input will be used to inform the project selection process and prioritize scheduling for selected projects.

By its nature, Integrated Planning involves a comprehensive review of pollutant sources. This is highly beneficial to understand how projects relate to water quality as well as volume controls. It is expected that pollutant sources, other than CSOs and SSOs, and stormwater will be found to contribute to water quality impairment, and, in some cases to the volume of MSD overflows (i.e., stormwater flowing into the MSD sanitary system; groundwater and creeks flowing into the combined system). The integrated approach will thus also identify projects to address non-MSD sources of pollution. As noted above, MSD's financial responsibility is bounded by Ohio law (and may be subject to the applicable provisions of the 1968 Agreement) and thus some projects may be wholly or partially the responsibility of third parties (such as municipal stormwater). For Final WWIP purposes, only those projects (or parts of larger projects identified in an Integrated WAP) to be performed by MSD will result in proposals for Regulator approval.

For example, opportunities for addressing a pollutant source within a local upstream political jurisdiction may provide more water quality and community benefits and be more cost-effective than addressing a downstream pollutant source. In this case, MSD may find it more beneficial to facilitate abatement of the upstream pollutant source in partnership with the upstream political jurisdiction. To avoid confusion, stakeholders have been informed (during early SSO 700 stakeholder meetings) and will be reminded that MSD will fund only projects that provide CSO

and/or SSO overflow reductions with relevant water quality benefits, and that some or many political jurisdictions may not receive an Integrated WAP project within their community. Where some benefit to local political jurisdictions may exist, above and beyond the basics of CSO and SSO overflow abatement, the Integrated WAP project evaluation analysis will identify the pollutant source "owners", impacts/benefits to the local community, possible governmental policies/legal strategies needed, and alternative funding sources available in order to implement the identified projects. Attachment 3 describes the types of projects which may result in changes to the Final WWIP.

The results of this step include a listing of projects with volumetric (Final WWIP requirement) and water quality (Consent Decree/CWA) impacts.

7. Select and Rank Final Projects

Step 7 will result in a prioritized ranking of projects identified in Step 6. The ranking process will use a comprehensive comparison of relevant metrics:

1. Volume control of overflows
2. Water quality impacts
3. Costs
4. Other environmental benefits
5. Feasibility, and
6. Reliability

The projects that provide greatest compliance with the Final WWIP and Consent Decree requirements, address water quality standard impairment (focusing on MSD's CSO and SSOs), and maximize relevant other environmental benefits will then be selected for project ranking. Prioritized ranking will, as in the past, inform scheduling of project construction.

A graphic example of how projects may be compared can be seen in Figure 6 below. The example provides an insight into the benefits of integrated planning: it allows for long-term cost-effective solutions to water quality impairments via a review of volume-based as well as water-quality based projects. Application of water quality as an evaluation criterion could thus result in the potential selection of a project to address a source with relatively low volume, but relatively high water quality impairment. These "small volume but high impact" projects would be ranked low if volume were the only or primary criterion.

The results from this step will allow the County and City—in cooperation with the other political jurisdictions and stakeholders—to address the most pressing public health, water quality, and environmental protection issues first while still meeting the obligations of our Consent Order and Final WWIP.

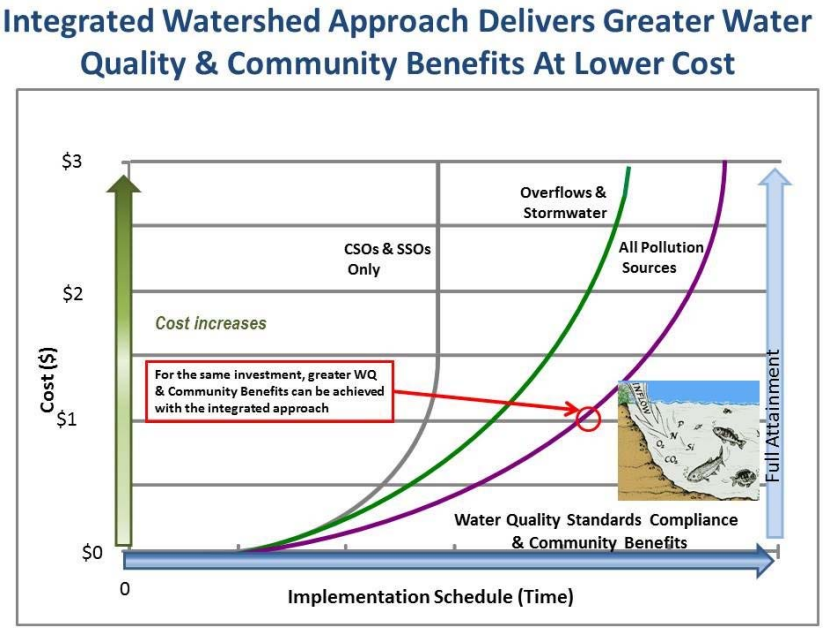


Figure 7. *An integrated watershed action plan provides greater water quality improvement and community benefits at an equal or lower cost as compared to a traditional LTCP.*

8. Existing Final WWIP versus Integrated WAP

As individual projects (or groups of projects) are identified and ranked in Steps 6 and 7, they will be continuously compared to any existing projects under the Final WWIP. In Step 8, this comparison will be formalized. The Integrated WAP will identify those Final WWIP projects to be modified or replaced due to proposed Integrated WAP projects. Then, a comparison of the Final WWIP project(s) and the proposed Integrated WAP projects will be made using the metrics identified in Step 7 (volume, water quality impacts, costs, other environmental benefits, feasibility, and reliability). The comparison will also consider the relative impact of the remaining pollutants—including the duration (time) and extent (miles) of water quality improvements, and the resultant need for, and prioritization of, additional abatement activities, and whether such pollutants arise from the MSD system or not.

9. Integrated Watershed Action Plan Implementation Schedule Development

Step 8 will result in the development of a proposed schedule for implementation of the Integrated WAP projects being proposed for Regulator approval. The schedule will include milestone dates for PTI Submittal, Start Construction, and End Construction. If the Integrated WAP is substantially completed prior to June 30, 2017, the projects and schedules will be included in the Phase 2 Schedule due on that date pursuant to the Final WWIP.

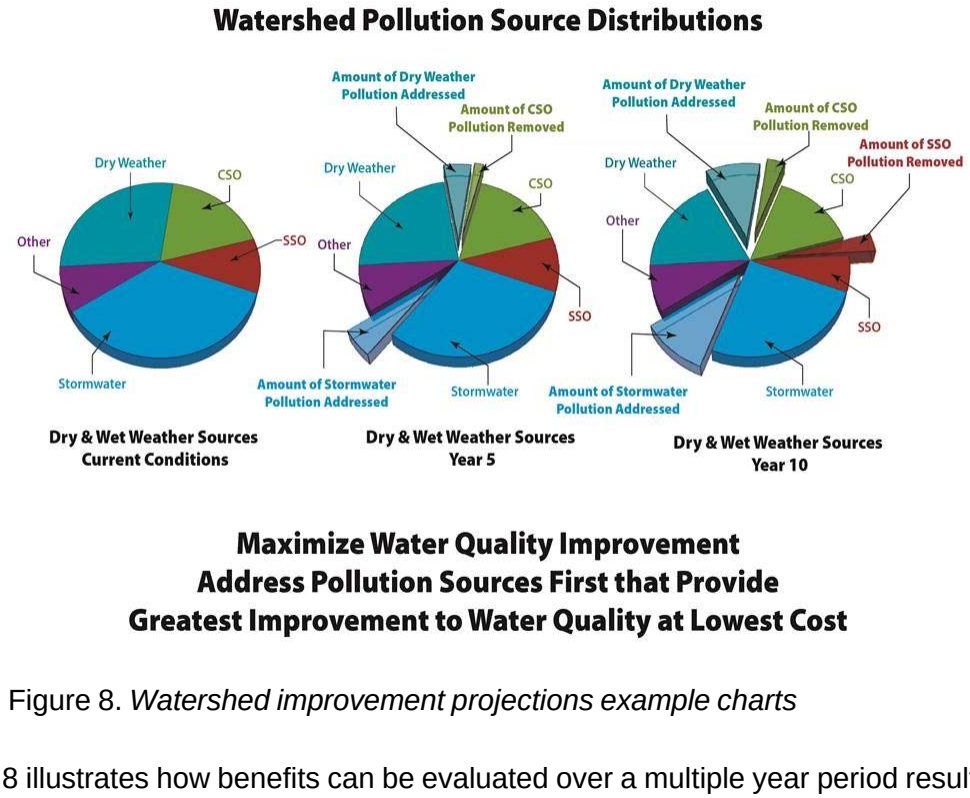


Figure 8. *Watershed improvement projections example charts*

Figure 8 illustrates how benefits can be evaluated over a multiple year period resulting from project implementation.

10. Regular Regulator Involvement

The County and City will provide updates to the Regulators at key intervals throughout the Integrated WAP action steps identified above to keep them informed and help set the stage for potential revisions to the Final WWIP.

11. Final Integrated WAP Report

The final step will be the submission of a final report to the Regulators. The report will summarize the work conducted in Steps 1-10 above. The report will include, at a minimum, the following information:

- Watershed boundaries and relevant topographic and physical information
- Existing WWIP projects (if any) in watershed and relevant performance criteria
- Communication with political jurisdictions and key stakeholders (Step 1)
- Watershed and source characterization (Step 2)
- Pollution source identification (Step 3)
- Evaluation of collection system and watershed responses (Step 4)
- Source context and identify optimized levels of control by pollutant and source (Step 5)
- Identify and evaluate project options (Step 6)
- Select and rank final projects, with recommended projects, benefits, and costs (Step

7)
- Compare proposed project(s) with existing Final WWIP project(s) (Step 8)
- Schedule of project implementation, including Milestone Dates (Step 9)
- Summary of communications with Regulators (Step 10)
- Summary of proposed Integrated WAP projects, benefits, costs, and implementation schedule
- References

Closing

We believe that the overflow reduction requirements of the Final WWIP can be met while providing greater in-stream compliance with water quality standards and watershed health improvements. The method to achieve this goal is Integrated Watershed Planning; which will build on the lessons learned from prior watershed planning efforts for the LMCPR. MSD began water quality evaluation efforts by basin in 2011 and is continuing this work to provide water quality data for the IWAP. The resulting Integrated Watershed Action Plans will include a focus on volume (under the Final WWIP), but also include a focus on addressing water quality impairment. The result of the IWAPs should provide cost-effective alternatives to existing Final WWIP projects, while meeting volumetric requirements and address water quality impairments within the watershed.

As stated in the Ohio EPA Watershed Action Plan Guide,

"Addressing one pollutant source at a time may appear to be the simplest approach. Most agencies and groups specialize in one land management activity; therefore, concentrating on one segment of the population makes documenting progress in installing controls or changing behavior easier. The one-source-at-a-time approach rarely results in clean water. What often happens is that one problem is "cleaned up," while others become more evident. The public perceives that its money has been wasted, and support for the project fades."[2]

The Integrated WAP approach will prevent this outcome and result in a comprehensive identification and evaluation of green, gray, and watershed projects which address volume requirements but also focus on the water quality impairment reductions required by the Consent Decree and CWA.

[2] A Guide to Developing Local Watershed Action Plans in Ohio, Ohio EPA, June 1997.

Attachment 1

List of potential project types and examples

This list is a partial summary list of the types of projects which may arise from an Integrated WAP but is not a limited set of such types of projects. These projects may be implemented by MSD or other owners of infrastructure.

1. **Sanitary and storm collection system: generally low cost/high impact improvement projects to include:**

   - **Asset Management Projects**
     i. I/I reduction projects by renewing existing sewers and structures within the sewershed.

     ii. I/I reduction projects through private source removal, such as lateral renewal, downspouts, driveway drains, and sump pumps disconnections.

     iii. Identification and removal of Illicit (sewage) discharges into the storm sewer system. Coordinated with the Hamilton County Stormwater District and local jurisdiction MS4s.

   - **Flooding & Basement Backup Solutions**

     i. New sanitary or stormwater infrastructure to address local flooding and basement backups while also reducing stormwater entering the sanitary or combined sewer systems to reduce/eliminate SSOs and CSOs

     ii. I/I reduction projects through private source removal, such as downspouts, driveway drains, and sump pumps disconnection.

   - **River & Creek Water Intrusion elimination to eliminate dry weather CSOs, sewer exfiltration, and reduce/eliminate wet weather overflows**

     i. Relocation of interceptor regulators to higher elevation,
     ii. Raising weirs,
     iii. Adding gates/valves on the end of outfalls,
     iv. Relocating sewers and manholes out of the creeks and streams,
     v. Renewal or replacement of sewer infrastructure to seal from water intrusion

2. **Green Infrastructure & Source Control opportunities analysis & projects**
   a. Review of sewershed and land use for GI and stormwater disconnection opportunities and projects coordinated with existing flooding and hydromodification, basement backups, existing pollutant sources, and SSO and CSO locations.

   b. Technologies to be utilized in both the combined and separate sewer systems include, but not limited to:

      - Street-load and hillside/existing creeks stormwater separation with water quality and quantity treatment with GI best management practices, also increases base flow to local waterways
      - Retrofit of existing detention basins to bioretention for infiltration and slow release,
      - New bioretention,
      - Constructed wetlands,
      - Green Streets
      - Rain gardens,
      - Bioswales,
      - Stormwater tree trenches

- Downspout or other private property source disconnection
- Re-naturalization of streams and creeks (day-lighting),
- Streambank restoration
- Removal of low head dams due to sewer infrastructure to improve aquatic habitat, fish passage and prevent creek or stream intrusion into the sewers.
- Public/private partnerships for retrofits or associated with new/redevelopment to address new and existing impervious areas and associated stormwater runoff to the waterways or combined sewer system

c. **Funded GI O&M Program**. Just as with any new gray infrastructure that is constructed a robust and funded operation and maintenance (O&M) program is required for green infrastructure and source control. If the County proposes to implement GI or source control projects, the County understands that it is responsible for the long-term O&M. The County will either directly maintain that GI or work with local watershed partners to operate and maintain the GI. Routine inspection programs will be developed and funded for this O&M in a similar fashion to how MSD currently and routinely inspects its sewer system and gray infrastructure assets.

3. **Gray Infrastructure** – The Integrated WAP approach recognizes that the total CSO and SSO volumetric control requirements may not be obtained simply with upstream gray, green and watershed-based controls and projects. The Integrated WAP will identify the optimum and affordable combination of these upstream watershed controls coupled with downstream gray controls, such as: storage, conveyance and treatment (either remote or at the WWTP) to attain the required volumetric control as identified in the Final WWIP, meet the water quality based requirements of the Consent Decree, and maximize in-stream water quality improvements.

   The potential gray infrastructure measures that will be considered include, but are not necessarily limited to:

   - Adjustment of sizing of gray infrastructure technologies already determined in the Final WWIP
   - Storage within the SSO and CSO watersheds to address localized peak flows, including:
     - Remote storage tanks
     - Inline storage
     - Storage at treatment facilities
   - High rate treatment facilities
     - Ballasted flocculation (based on Actiflo™),
     - Non-ballasted high rate clarification (based on DensaDeg),
     - High rate filtration (based on WWETCO high rate compressible media filter),
     - CoMag Magnetite Ballasted Systems (based on Siemens systems),
     - Chemically Enhanced High Rate Treatment,
     - Vertical shaft treatment technology
   - Increased storage and conveyance capacity
     - Relief sewers,
     - New larger interceptors,
     - Tunnels
   - Increased WWTP capacity
   - Partial separation of stormwater systems from existing combined systems
   - In isolated areas, pursuing full separation

4. **Other Source Controls.**

Examples include, but are not limited to:

a. **Dry Weather Source Elimination.**

Example dry weather source elimination projects could include, but not be limited to:

i. Repair and/or replacement of existing sanitary and storm sewers contributing to dry weather bacteria or other source pollution through deterioration or exfiltration;

ii. Extending sewers to failing private sewage disposal systems to connect the local properties. MSD has an existing sewer assessment program in-place that can be utilized and/or modified as needed;

iii. Disconnection of private properties connected to the storm system;

iv. Partnerships with local jurisdictions to address localized dry weather sources and access grants or other funding opportunities

b. **Legacy Pollutants Reduction.**

Legacy pollutants for the purpose of this document are defined as pollution sources other than sanitary or stormwater associated infrastructure. Examples could include, but not be limited to:

- existing industrial sites,
- abandoned landfills,
- abandoned industrial sites,
- contaminated groundwater,
- channelized streams or waterways.

The County will provide the leadership needed to address these legacy pollutants through:

i. Identification and relative quantification of the various sources within the watersheds as part of the water quality and watershed characterization work to understand their relative contribution to the waterway pollution;

ii. Partnerships with local watershed groups to access state and federal grants and funding for site cleanups, stream restoration, and/or conservation easements;

iii. Public/Private partnerships to clean-up existing sites for new or redevelopment;

iv. Identification of where the legacy pollutants may be entering the sanitary and stormwater infrastructure and entering the waterways via overflows or otherwise. Disconnection of these sources to properly address and minimize/eliminate the pollutants from reaching the waterways.

Attachment B
Data Collection Sources

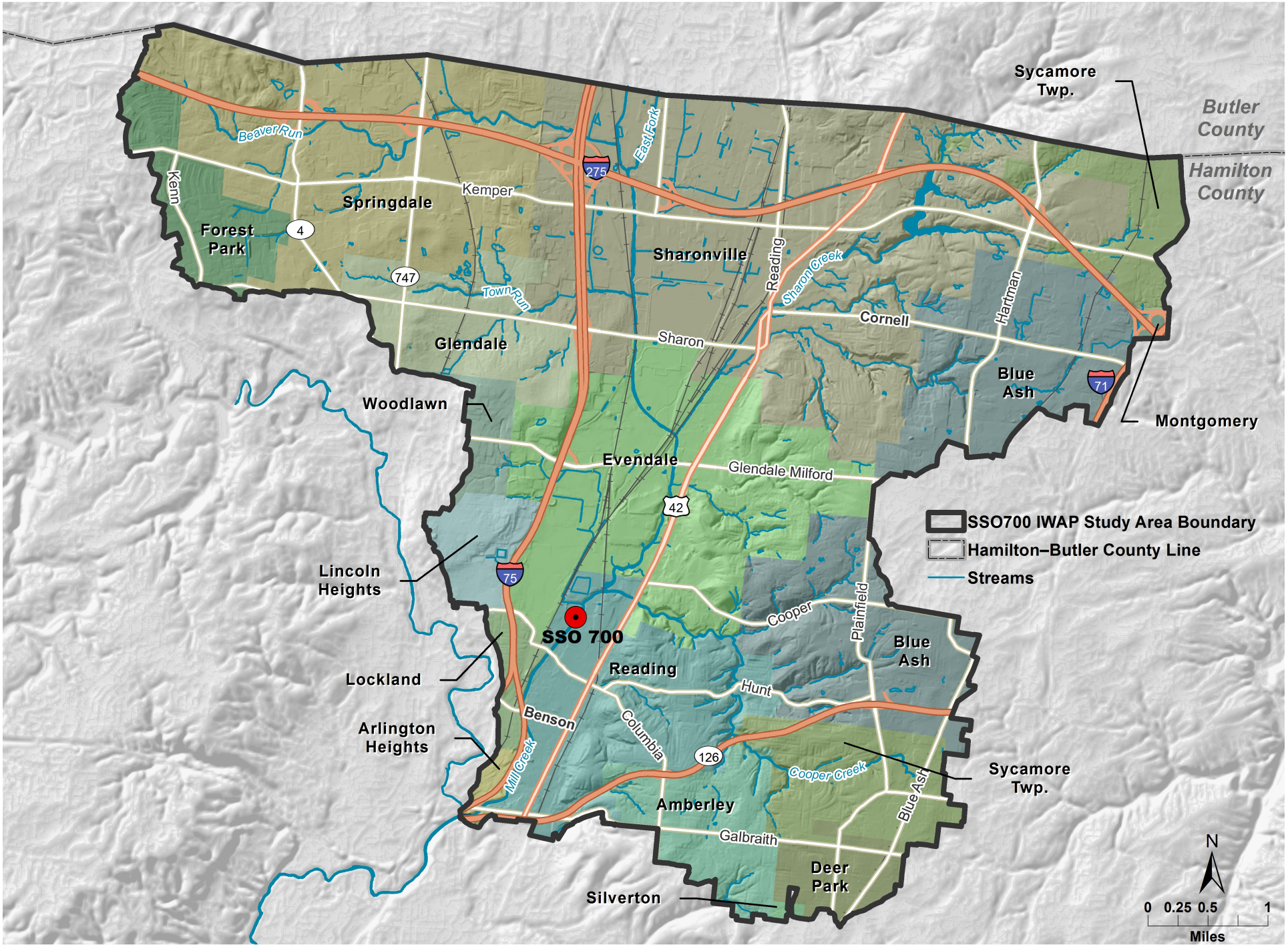
Data Collection List

To include, but not necessarily be limited to:

1. All available GIS planimetric data (i.e., roads, topography, aerials, parcels, etc.)
2. All available GIS Asset data, including sanitary and combined sewers and structures, storm sewers and structures, sanitary and storm pump stations, water mains, SSOs, CSOs, storm water outfalls, etc.
3. Land Use and Land Cover, impervious and pervious surfaces, non-sewered areas
4. Receiving streams and tributaries, water quality standards for these waterways, and known pollutants impairing the waterways
5. Water supply sources
6. Cultural and historical assets
7. Existing water quality and physical and aquatic habitat sampling data and results
8. Existing green infrastructure
9. Existing NPDES discharges and other known pollutant discharges
10. Existing landfills, industrial sites, contamination sites and other known or suspected pollutant sources
11. Known problem areas for flooding, basement backups, stream degradation from stakeholders

East Branch Mill Creek-SSO 700 Watershed Integrated Watershed Action Plan
Preliminary Draft Schedule

	2014	2015				2016				2017	
INTEGRATED WATERSHED ACTION PLAN	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**
Task 1.0 Project Administration											
1.1 Project Management Plan											
1.2 Project Meetings											
Status Meetings (monthly)		X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
Jurisdictional Meetings											
Steering Committee (quarterly)		X	X	X	X	X	X	X	X	X	X
Regulatory (quarterly)		X	X	X	X	X	X	X	X	X	X
1.3 QA/QC Plan											
1.4 Risk Management Plan											
Task 2.0 Watershed and Source Characterization											
2.1 Watershed Selection and Delineation											
2.2 Data Collection											
2.3 Site Visits											
2.4 Inventory and Gap Analysis											
2.5 WQ Data Collection Program											
2.6 WQ Model Update and Calibration											
2.7 Hydraulic Model Update and Calibration											
2.7.3 Flow Monitoring (if needed)											
Task 3.0 Identify Pollution/Evaluate System Response											
Task 4.0 Summary Report						1/31/2016					
Prepare Draft Integrated WAP											
Potential Projects Identification & Selection											
Cost estimating											
Final Project Suite Selection											
Finalize Plan & Seek BOCC Approval											4/30/2017
Submittal to Regulators											6/30/2017
Regulator Review & Approval											


Sycamore Twp.
Butler County
Hamilton County
Montgomery
Springdale
Forest Park
Kemper
Beaver Run
Kenn
East Fork
Sharonville
Reading
Sharon Creek
Hartman
Cornell
Sharon
Town Run
Glendale
Blue Ash
Woodlawn
Evendale
Glendale Milford
Lincoln Heights
SSO 700
Cooper
Plainfield
Blue Ash
Reading
Hunt
Lockland
Benson
Columbia
Arlington Heights
Mill Creek
Cooper Creek
Blue Ash
Sycamore Twp.
Amberley
Galbraith
Deer Park
Silverton
4
747
275
42
75
126
71
SSO700 IWAP Study Area Boundary
Hamilton–Butler County Line
Streams
N
0 0.25 0.5 1
Miles

CH2MHILL

SSO 700 INTEGRATED WATERSHED ACTION PLAN

Steering Committee Meeting

February 11, 2015

METROPOLITAN SEWER DISTRICT of greater CINCINNATI

CH2MHILL®

WELCOME

- Watershed planning as part of proposed Final Remedy Plan for SSO 700. (Process began in late 2012).
- Commissioners support watershed planning because of potential to have **visible, positive impacts** on our local communities.
  - Gray solution = **$230 million, with no localized benefits.**

THANK YOU

- Watershed planning offers us the opportunity to:
  - Handle issues at their source.
  - **Improve the water quality of entire watershed.**
- We can **enhance our community and save money** through this integrated watershed planning effort.
- SSO 700's watershed = **12% of the MSDGC service area.** A big opportunity!

Your participation is critical to our collective success! Thank you!

AGENDA

- Role of Steering Committee & Requested Commitment
- Overview of Integrated Watershed Action Plan
- Project Scope and Schedule
- Jurisdictional Meetings
- Questions

ROLE OF THE STEERING COMMITTEE

STEERING COMMITTEE COMPOSITION

- City of Blue Ash
- City of Reading
- City of Sharonville
- City of Springdale
- Groundwork Cincinnati
- Hamilton County Engineers Office
- Hamilton County Planning & Development
- Hamilton County Soil and Water Conservation District
- Hillside Trust
- Mill Creek Watershed Council of Communities
- Ohio Department of Transportation
- OKI Regional Council of Governments
- Sierra Club

ROLE OF STEERING COMMITTEE

- Demonstrate diverse and balanced community-based project support.
- Provide critical input from the local perspective on all aspects of the study, including scope.
- Communicate with public and private stakeholders in your communities.
- Act as a sounding board for the IWAP Team as the eyes and ears of the community.
- Ensure that the final solution is not simply an engineering solution but meets the needs of the affected communities.
- Directly assist in the selection of the suite of projects that will comprise the watershed plan submitted to the regulators.

WHAT IS THE COMMITMENT?

- The commitment is expected to be no more than 4 hours per month.
- Involvement will be:
  - Meeting with the project team
  - Helping get people involved
  - Reviewing information provided to the steering committee
- Anticipate meetings once per quarter or semi-annually, as required.

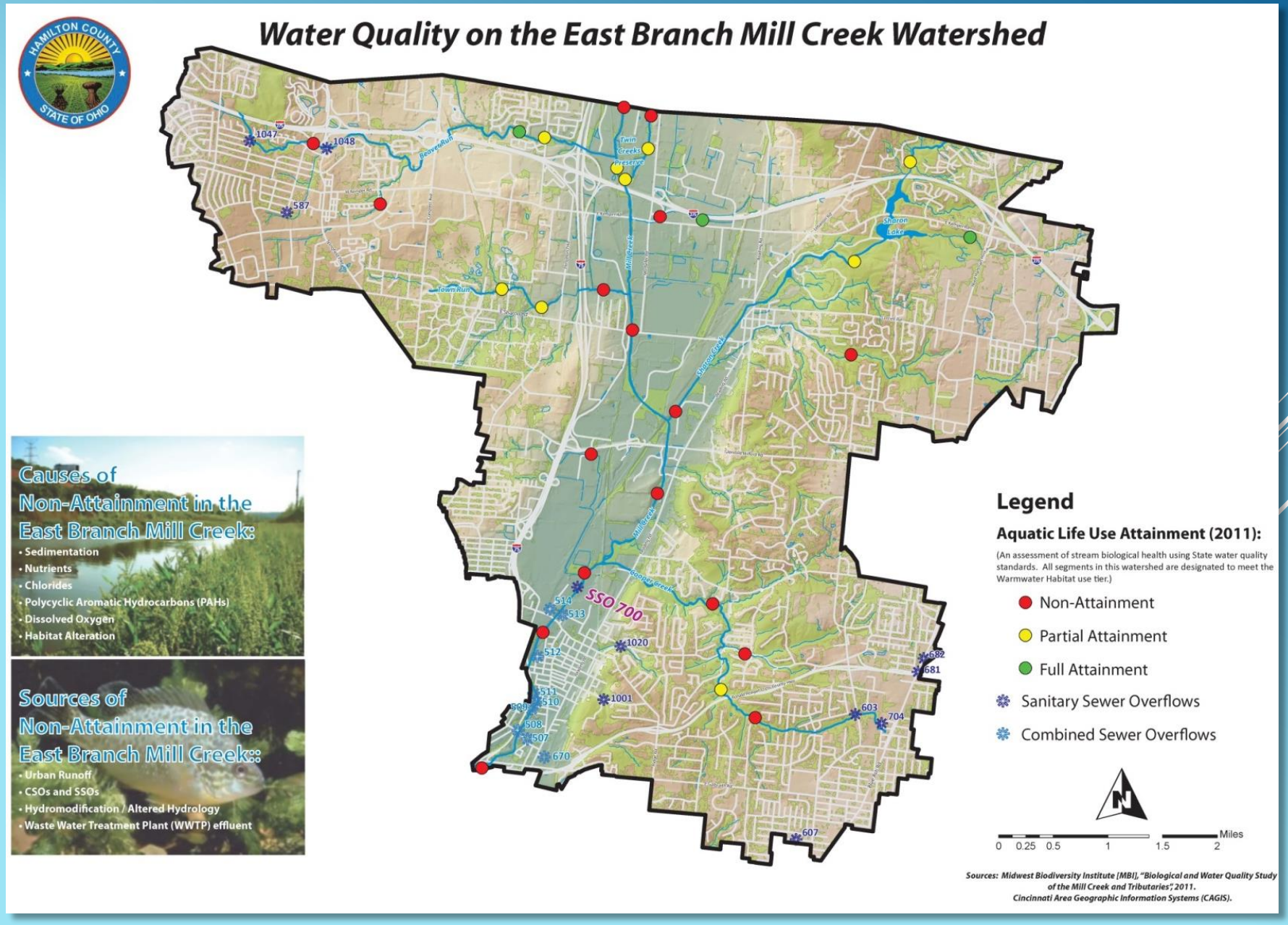
COORDINATION WITH REGULATORS

- County/MSD will meet with Regulators quarterly.
- Regulators concerned that the affected political jurisdictions will not cooperate to develop and implement the IWAP.
- Steering Committee support is critical to earning Regulator support.

OVERVIEW OF INTEGRATED WATERSHED ACTION PLAN

WATERSHED ISSUES

- 9 CSOs and 11 SSOs, including SSO 700
- Water quality and habitat impairment in the Mill Creek and its tributaries
- Sewer backup complaints
- Sewage surfacing or manholes overflowing
- Water ponding in streets
- Legacy dry weather pollutants



TAKING AN INTEGRATED WATERSHED ACTION PLAN (IWAP) APPROACH

CWA

Water Quality

Habitat

Storm Water Quality & Quantity

CSOs

SSOs

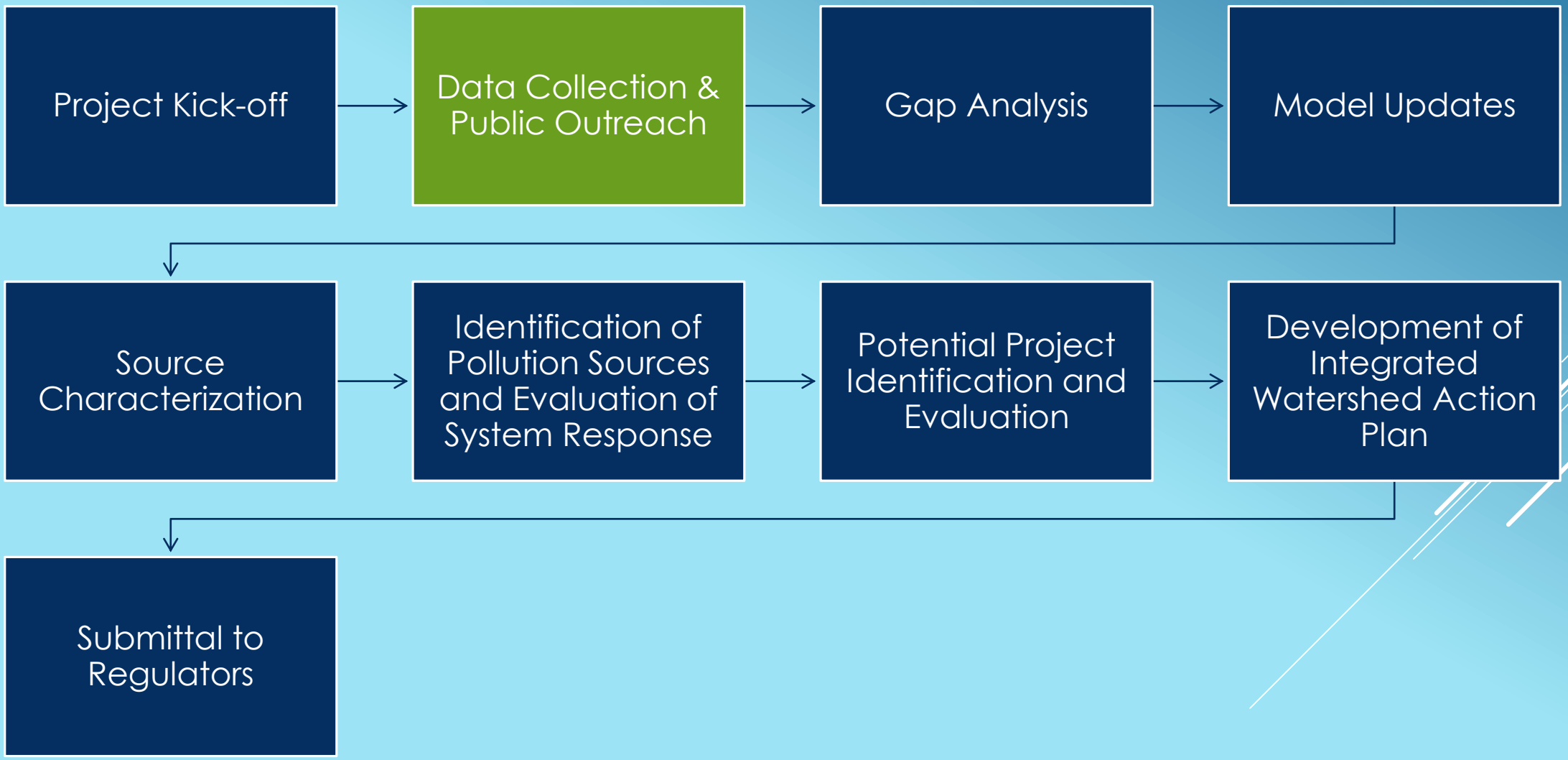
Non-point Source (Ag, Septic, Illicits, etc.)

Dry Weather Sources

Integrated Approach

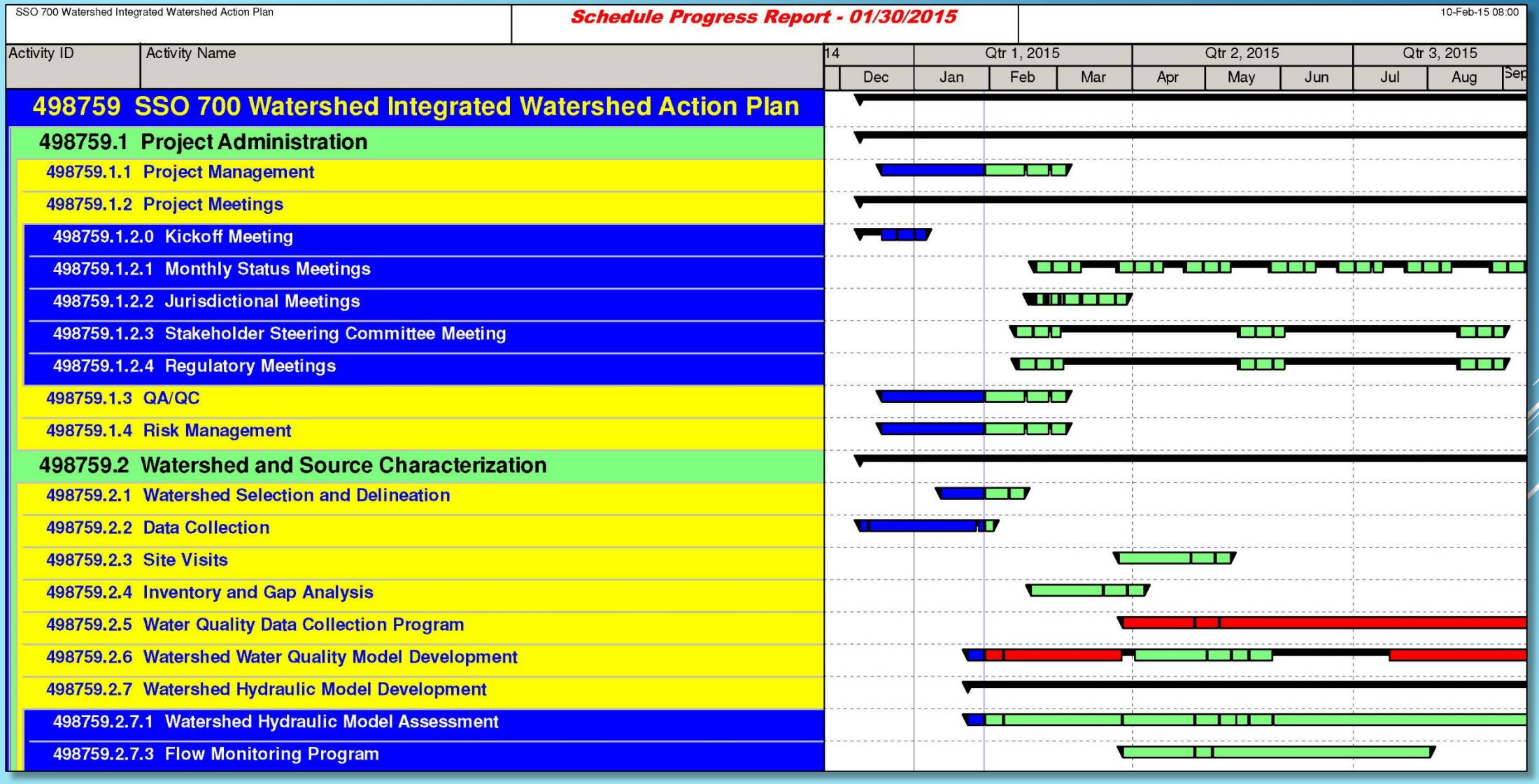
Lowest Cost Pollution Abatement

WHERE WE ARE IN THE IWAP PROCESS



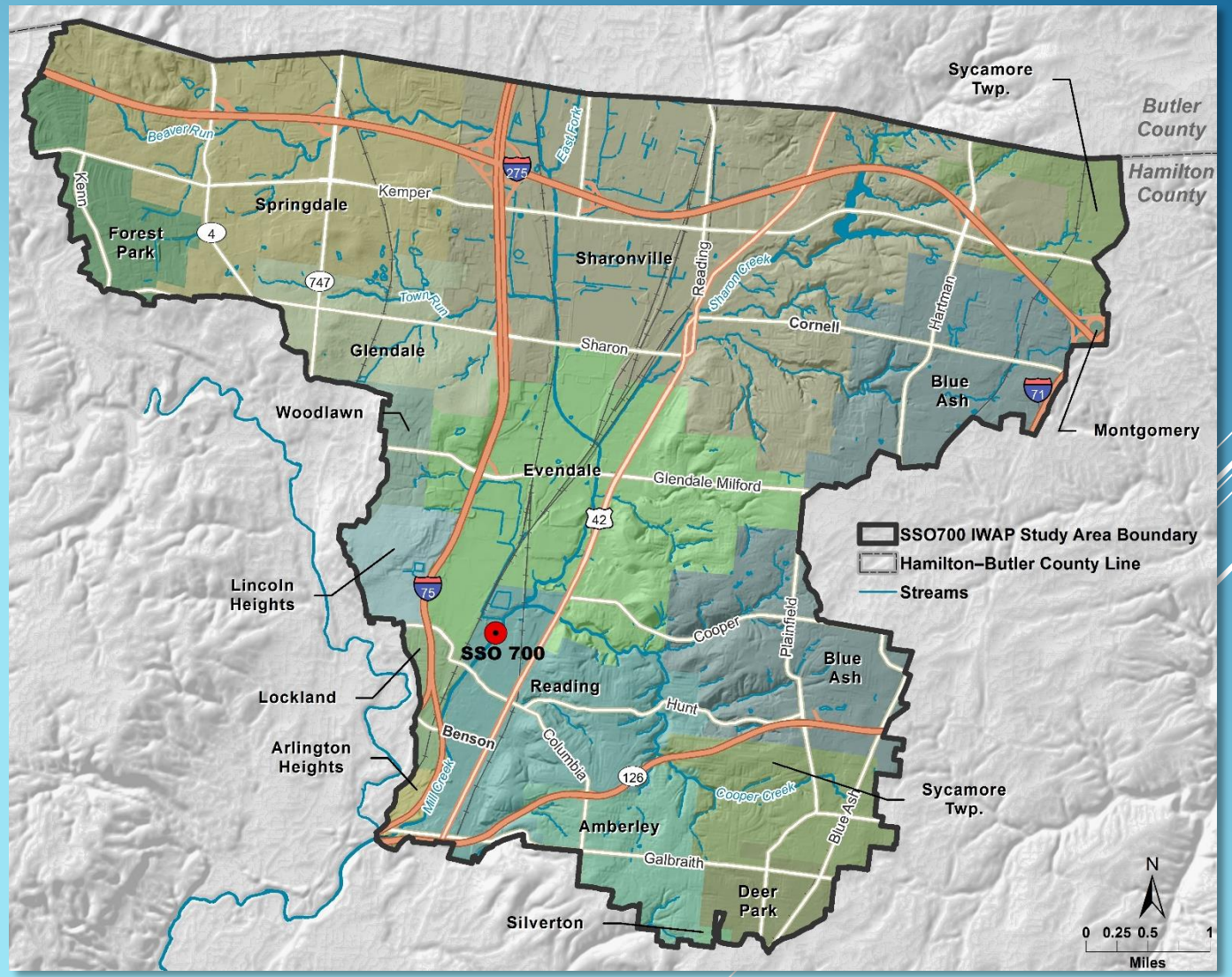
PROJECT SCOPE AND SCHEDULE

THE NEXT 6 MONTHS…



STUDY AREA BOUNDARY

- Sewershed: MSDGC's East Branch Mill Creek Sewershed (12% of MSDGC's Service Area)
- Watershed:
  - Comprised of portions of two USGS HUC-12 watersheds: Sharon Creek & East Fork Mill Creek
  - Bound to north by Hamilton-Butler County line for this study.
- Study Area Boundary: Combination of sewershed and watershed boundaries

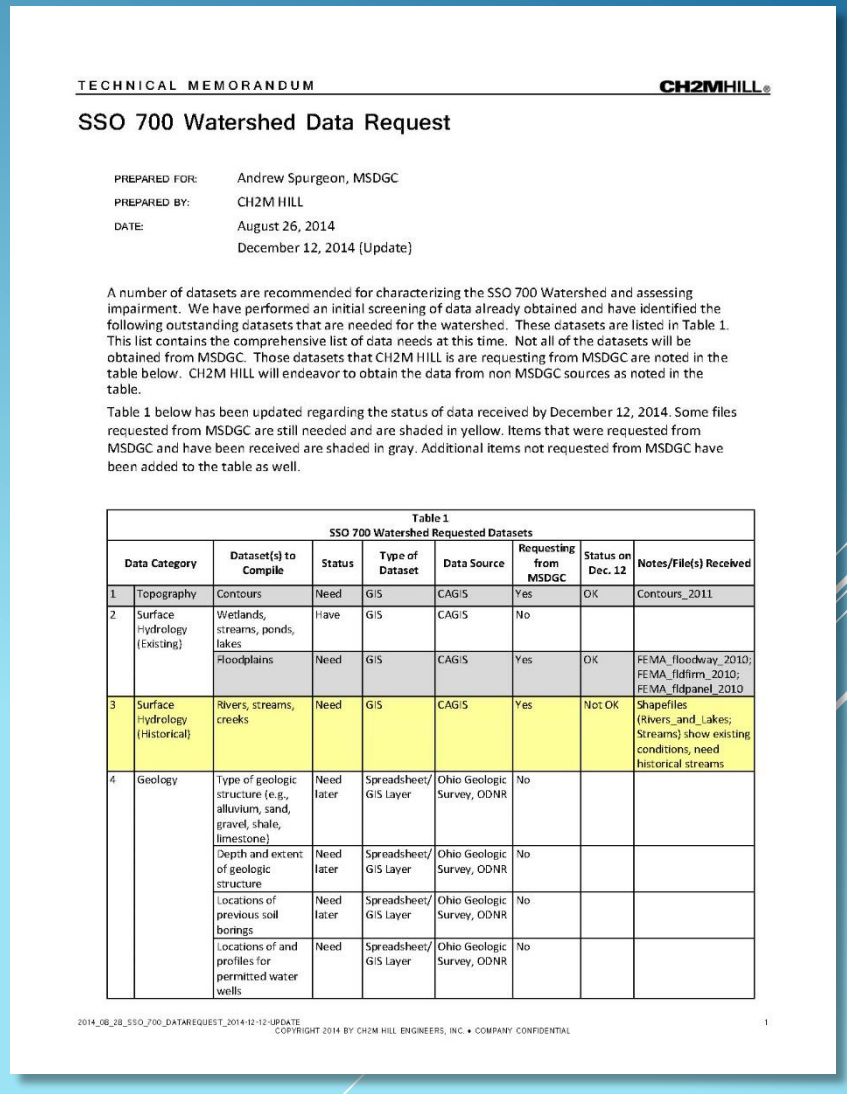


POLITICAL JURISDICTIONS IN THE STUDY AREA

- Amberley Village
- Arlington Heights
- Blue Ash
- Deer Park
- Evendale
- Forest Park
- Glendale
- Lincoln Heights
- Lockland (Partial)
- Montgomery
- Reading
- Sharonville
- Silverton (Partial)
- Springdale
- Sycamore Township
- Woodlawn (Partial)

DATA COLLECTION

- Wide range of data collection needs summarized in Data Request Technical Memorandum:
  - Natural Systems: Topography, Surface Hydrology, Soils and Geology
  - Built Systems: Land Use, Land Cover, Sewers, Infrastructure,
  - Receiving Water Characteristics
  - Potential Pollutant Sources
  - Hydraulic Modeling Resources: System-wide Model, Flow Data, Rainfall Data
  - Water Quality Modeling Resources: WQ Model, WQ monitoring data, stream geometry
- Majority of critical data has been received from MSDGC and other sources.
- In the process of developing a public website link to key deliverables



TECHNICAL MEMORANDUM CH2MHILL

SSO 700 Watershed Data Request

PREPARED FOR: Andrew Spurgeon, MSDGC
PREPARED BY: CH2M HILL
DATE: August 26, 2014
December 12, 2014 (Update)

A number of datasets are recommended for characterizing the SSO 700 Watershed and assessing impairment. We have performed an initial screening of data already obtained and have identified the following outstanding datasets that are needed for the watershed. These datasets are listed in Table 1. This list contains the comprehensive list of data needs at this time. Not all of the datasets will be obtained from MSDGC. Those datasets that CH2M HILL is are requesting from MSDGC are noted in the table below. CH2M HILL will endeavor to obtain the data from non MSDGC sources as noted in the table.

Table 1 below has been updated regarding the status of data received by December 12, 2014. Some files requested from MSDGC are still needed and are shaded in yellow. Items that were requested from MSDGC and have been received are shaded in gray. Additional items not requested from MSDGC have been added to the table as well.

Table 1
SSO 700 Watershed Requested Datasets

	Data Category	Dataset(s) to Compile	Status	Type of Dataset	Data Source	Requesting from MSDGC	Status on Dec. 12	Notes/File(s) Received
1	Topography	Contours	Need	GIS	CAGIS	Yes	OK	Contours_2011
2	Surface Hydrology (Existing)	Wetlands, streams, ponds, lakes	Have	GIS	CAGIS	No		
		Floodplains	Need	GIS	CAGIS	Yes	OK	FEMA_floodway_2010; FEMA_fldfirm_2010; FEMA_fldpanel_2010
3	Surface Hydrology (Historical)	Rivers, streams, creeks	Need	GIS	CAGIS	Yes	Not OK	Shapefiles (Rivers_and_Lakes; Streams) show existing conditions, need historical streams
4	Geology	Type of geologic structure (e.g., alluvium, sand, gravel, shale, limestone)	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Depth and extent of geologic structure	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Locations of previous soil borings	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Locations of and profiles for permitted water wells	Need	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		

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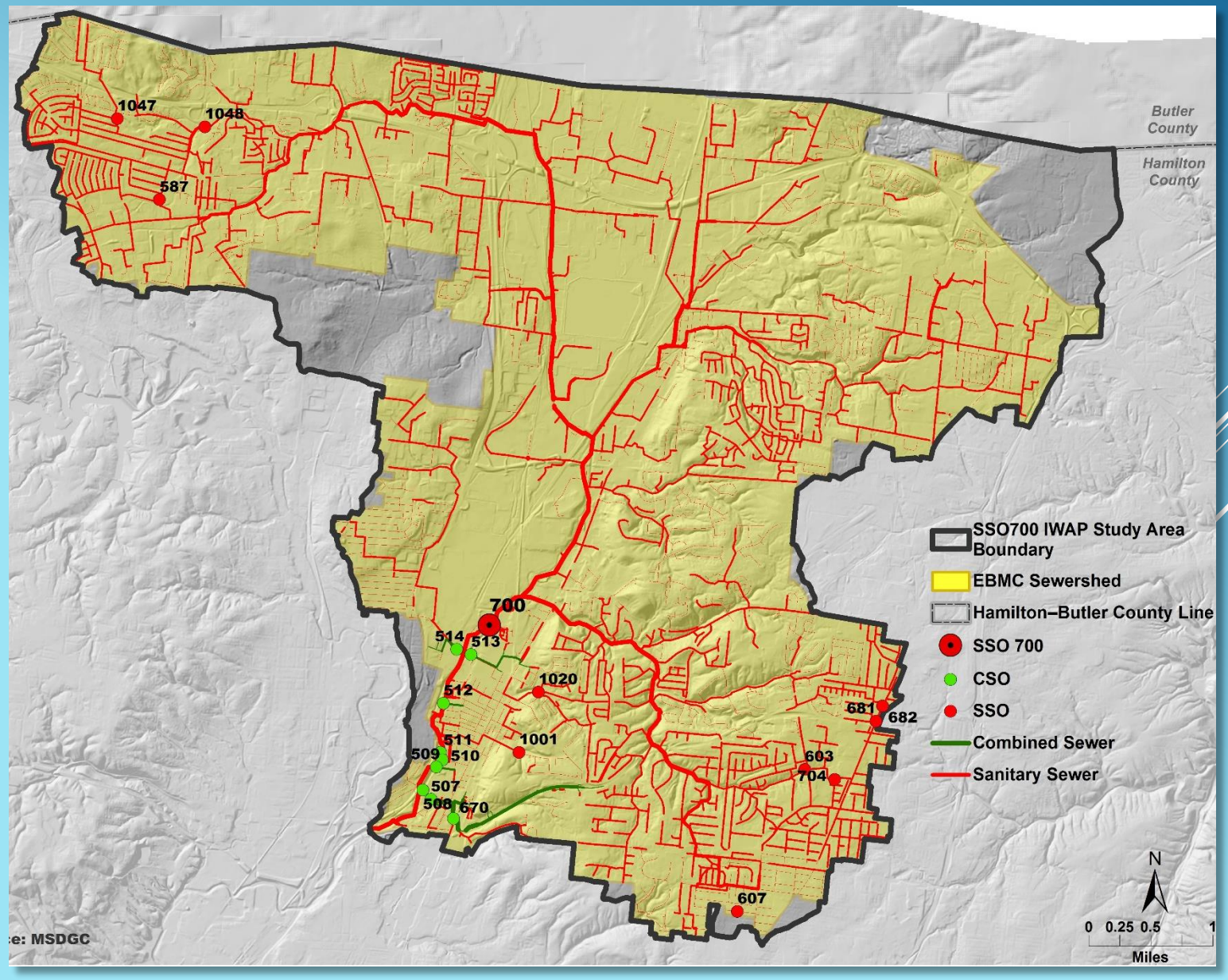
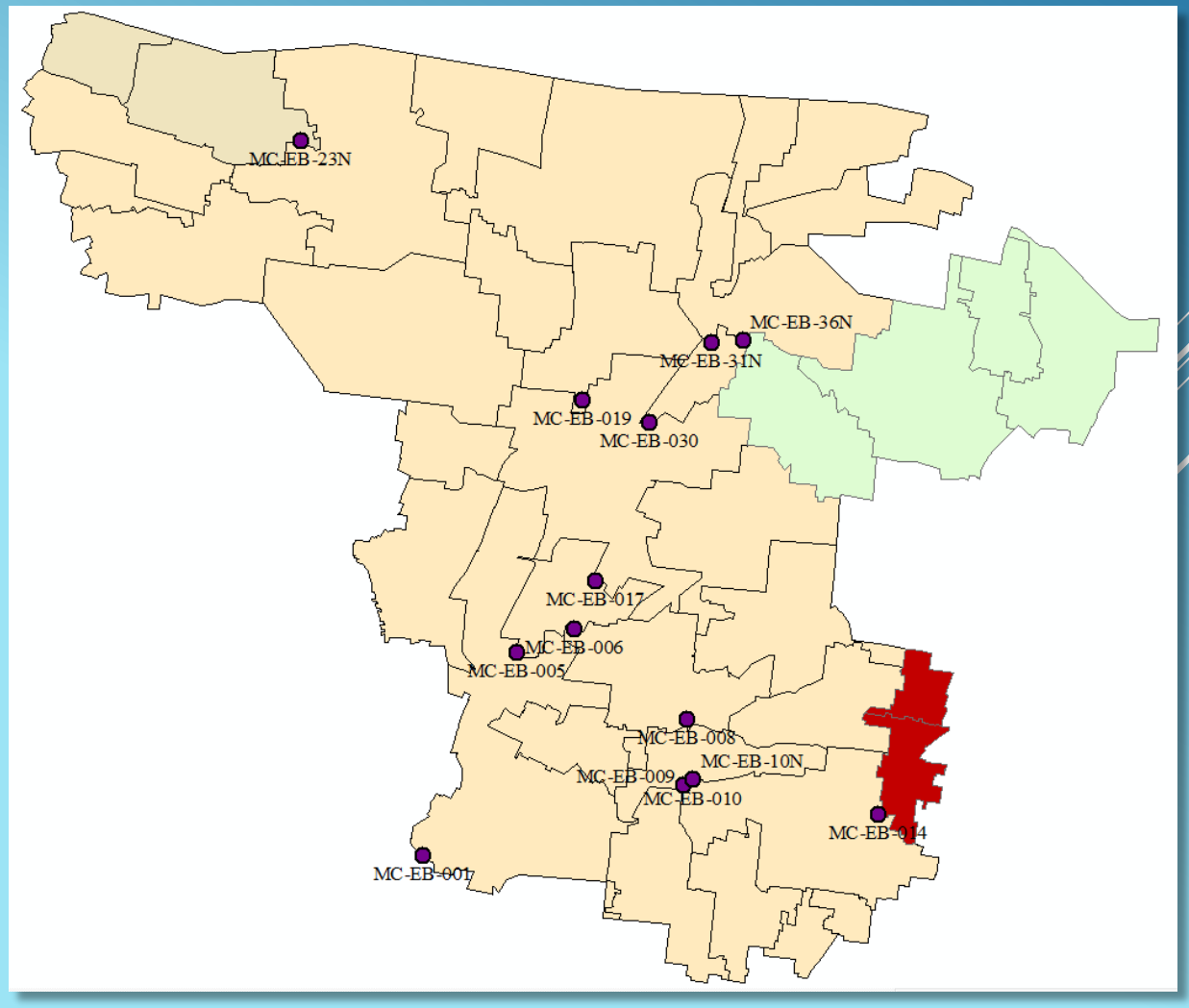
INVENTORY AND GAP ANALYSIS

- Review and summarize data received.
- Identify gaps in data and recommend a plan to fill the data gaps.
- Document data and gaps in Inventory and Gap Analysis Technical Memorandum



HYDRAULIC MODEL ASSESSMENT & DEVELOPMENT

- Project Team working with MSDGC's current Mill Creek System Wide Model.
- Currently evaluating available flow data and identifying time periods to be used for model validation.
- Depending on the outcome of the model validation, model may require calibration.
- Hydraulic model output will ultimately be used as input to water quality model.



WATER QUALITY MODEL ASSESSMENT & DEVELOPMENT

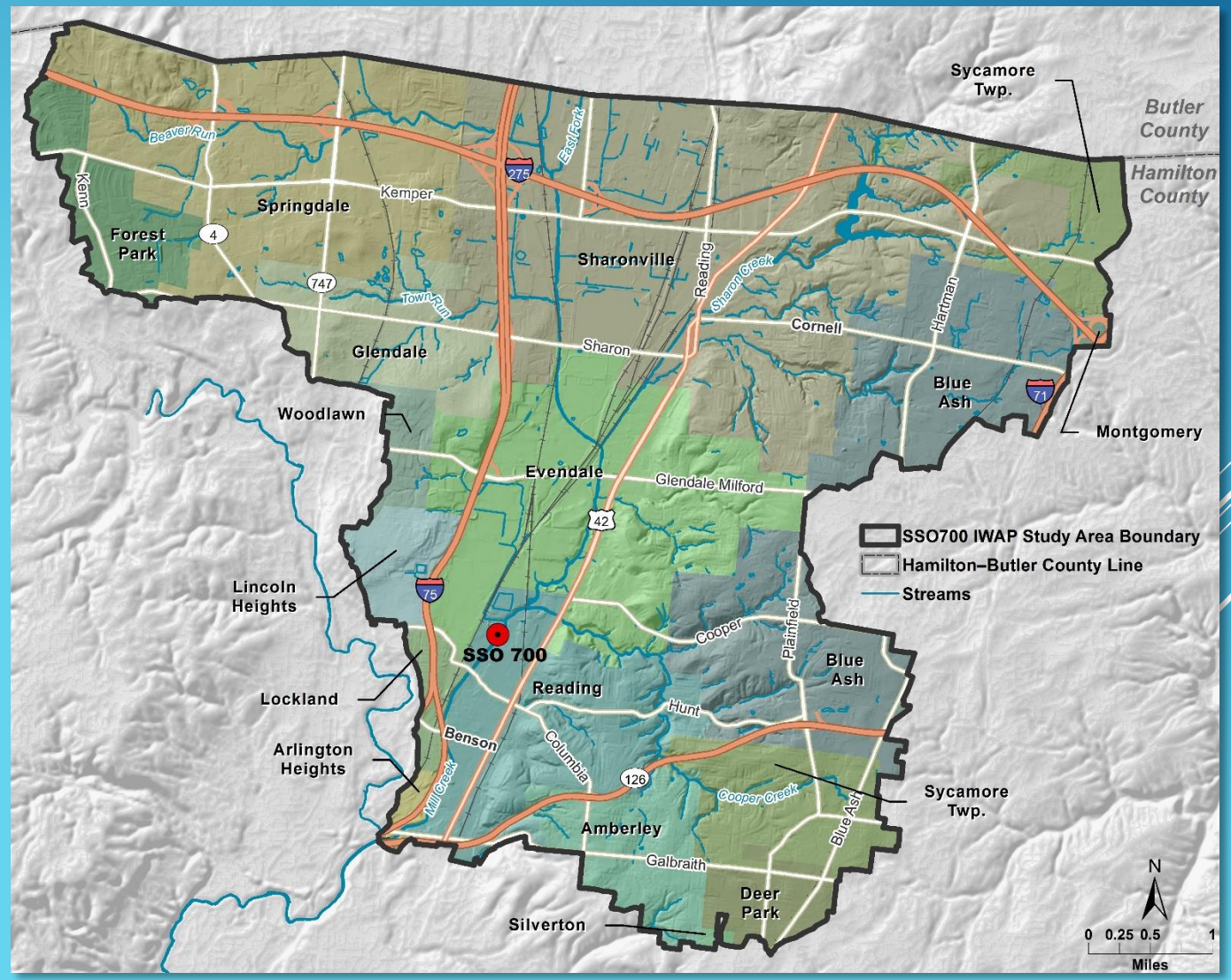
- Project Team evaluating the Environmental Fluid Dynamics Code (EFDC) surface water quality model of the Mill Creek.
  - Developed in 2012 under a regional Ohio River Water Quality Model project.
- EFDC Model will be assessed for resolution in the SSO 700 study area and for applicability for use in the IWAP.
- Water quality sampling will be necessary to improve model calibration
  - Mill Creek Watershed Council of Communities' (MCWCC) sampling data, collected by community volunteers, is available for qualitative validation model.
  - Data to be collected under this study will enhance MCWCC's database of water quality data.

NEXT STEPS IN PHASE 1 OF THE SSO 700 IWAP STUDY

- Collect Field Data
  - Water Quality Sampling
  - Flow Data Collection, if necessary
- Update and Calibrate Hydraulic and Water Quality Models
- Identify Pollution Sources & Evaluate Collection System & Waterway Response
- Draft Summary Report

JURISDICTIONAL MEETINGS

KEY NEXT STEP: MEETINGS WITH POLITICAL JURISDICTIONS IN THE STUDY AREA



POLITICAL JURISDICTIONS IN THE STUDY AREA

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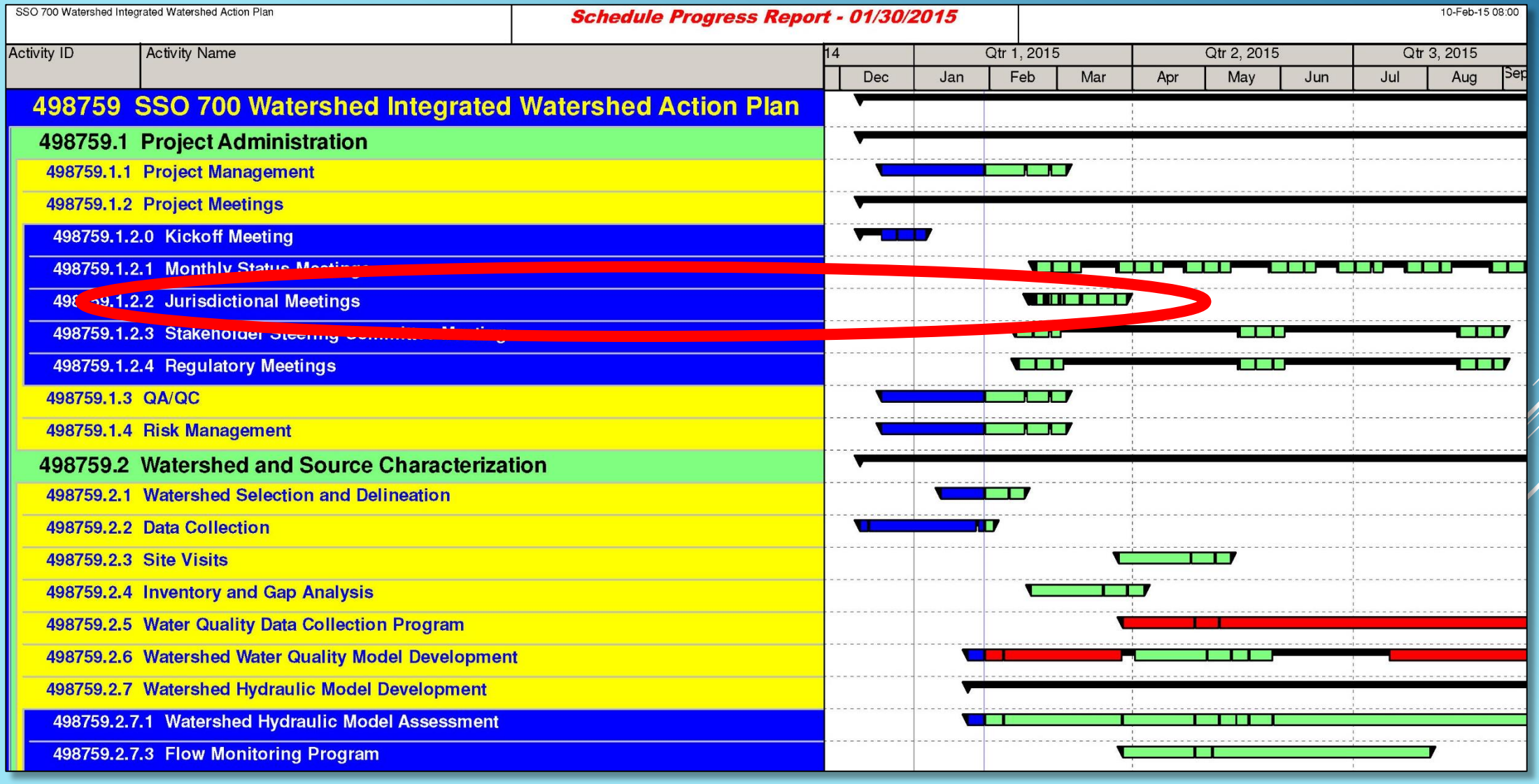
- Lincoln Heights
- Lockland
- Montgomery
- Reading
- Sharonville
- Silverton
- Springdale
- Sycamore Township
- Woodlawn

THE NEXT 6 MONTHS…



JURISDICTIONAL MEETINGS AGENDA/DATA REQUEST

Meeting Agenda

- Provide overview of the SSO 700 IWAP study, process, & schedule.
- Discuss role of political jurisdiction in the project.
- Learn hopes and expectations from the IWAP.
- Receive data that will inform the study.

Data Request

- Existing and future land use data
- Pertinent capital infrastructure work, such as street widening or improvements
- Any knowledge of stream erosion problems, water quality complaints, SBUs, or flooding.
- Storm sewer system maps
- Stormwater rules and/or regulation
- Who owns and maintains the jurisdiction's storm sewer system
- Significant stakeholders or land uses within your jurisdiction

QUESTIONS?