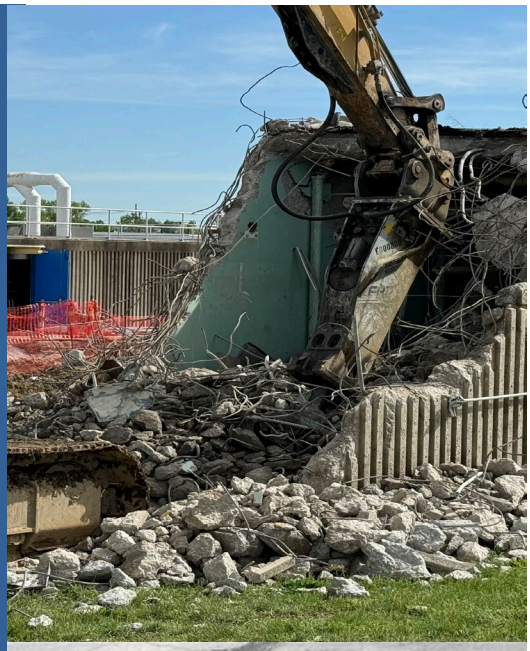
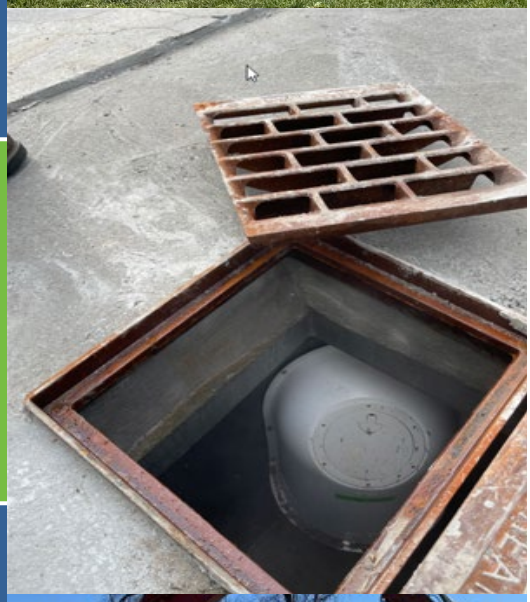
msd
Safe, clean waterways

clAIRity PROGRAM





ODOR MITIGATION

SHORT-TERM ACTION PLAN

FY25 – FY26

Submitted October 14, 2024

Background

Pursuant to the provisions of the Second Amended Agreed Board Order No. 21-01 with the Louisville Metro Air Pollution Control Board, MSD submits this Short-Term Action Plan. Louisville and Jefferson County Metropolitan Sewer District (MSD) is a regional utility for wastewater, storm water, and flood protection services. MSD manages three utilities in one (***#3UtilitiesInOne)*** to provide efficient, effective services to protect the region's people and property. On September 18, 2024, MSD entered the Second Amended Agreed Board Order (ABO) with the Louisville Metro Air Pollution Control Board to focus on odor mitigation in its water quality treatment centers and collections systems. Although odors are a natural part of wastewater and managing it can be challenging, MSD is committed to improving odors within the communities it serves. MSD can only address odors that are within their purview and responsibility. As part of this Short-Term Action Plan, MSD provides a summary of activities conducted during July 1, 2023 and June 30, 2024 to provide additional details on our progress to date. This period represents Fiscal Year 24 for MSD. MSD Fiscal Years start July 1 of each year and conclude on June 30 of the following year.

Fiscal Year 24 (FY24) Update

In FY24, MSD focused on customer communications, odor response, catch basin inspections, catch basin replacements, and other projects as outlined in this section.

Customer Communications

This summer MSD focused its efforts on communications and community outreach with its clAIRity program. MSD sent letters, sent post cards, participated in a segment on MetroTV, presented at the mayor's press conference, and ran an op-ed in the Courier Journal to inform the community on how to contact us, how we respond to odor complaints, and to provide updates on current and future projects for odor mitigation. MSD clAIRity meetings (a total of five were scheduled in 2024; three already conducted and the remaining two scheduled for later October) engaged with customers and answered odor related questions. MSD also reached out to the church community to further communicate with the neighborhoods most impacted. MSD continues to maintain its clAIRity webpage with information pertinent to odors. As is outlined in the ABO, MSD will look for additional opportunities to further enhance its existing webpage and engagement opportunities.

Odor Response

MSD actively responds to odor complaints received from the community. Concerns related to odors are received by phone call, MSD clAIRity webpage, Metro 311, Smell My City, and e-mail. MSD reviews concerns and creates a service request in our system for our employees to investigate. MSD strives to respond within 24 hours from receipt of an odor complaint. This summer MSD changed its protocol when responding to odor reports. If a customer calls to report an odor and provides their name and number, MSD contacts the customer to confirm receipt of the odor report and provide an update on the findings and actions taken. Some of the actions MSD takes to respond to odor concerns include flushing sewer mains and manholes, cleaning and deodorizing catch basins, and replacing missing or damaged catch basin plugs. In addition to these activities performed on site, MSD takes actions to improve odors by adjusting chemical feeds and replacing filter media at our pump stations and treatment facilities.

Catch Basins

Catch basins are curbside openings that collect rainwater and direct it to separate storm or combined sewer systems. As part of its regular maintenance, MSD cleans and maintains catch basins in the combined system. On average MSD cleans nearly 2,300 catch basins a month. Catch basins, especially in the combined system, that are untrapped can allow odors to escape to ambient air. MSD estimates that it has roughly 20,000 catch basins in its combined system.

Catch Basin Inspections

As part of its odor mitigation efforts in FY24, MSD inspected 5,281 catch basins in the combined system and identified those that required repairs and those that should be replaced. Roughly 22% of the catch basins inspected were identified for replacement. The number of catch basin replacements identified by neighborhood is listed in Table B-1. Please note that some of the numbers below differ from the original reports. With a focus placed on maximizing spend on replacing catch basins that could allow odors to escape, further investigations identified additional replacements in some areas and a reduction in others.

Neighborhood	# Inspected	# Identified for Replacement
Park DuValle	319	20
California (including Maple Street)	925	75
Chickasaw	746	79
Shawnee	1142	174
Taylor Berry	817	43
Russell	1332	747
Total	**5,281**	**1,138**

Table B-1

Catch Basin Replacements

MSD is actively working to bid, award, and complete catch basin replacements. In FY24, MSD expended $374,000 to replace twenty catch basins identified in Park DuValle. Replacements in the California neighborhood also began with 15 of the 75 identified catch basins being replaced at roughly $300,000.

Projects

New Biosolids Facility

MSD is updating its facility to include Thermal Hydrolysis Process (THP) technology as part of the U.S. EPA and the Kentucky Energy and Environment Cabinet Consent Decree requirement to improve the ability to treat biosolids at the Morris Forman Water Quality Treatment Center (MFWQTC). THP is a process technology applied in wastewater treatment plants with anaerobic digestion. Thermal hydrolysis exposes sewage sludge to high temperature and pressure to make solids more digestible. The new process will minimize the need to landfill solids and will provide some reduction in odor emissions to neighboring communities. This is a multi-year project projected to be completed in FY28. This year contractors started demolition activities on-site.

Sedimentation Basin Rehabilitation

MSD continued its primary sedimentation rehabilitation project that is part of the U.S. EPA and the Kentucky Energy and Environment Cabinet consent decree requirement. The project includes rehabilitating and replacing the primary sedimentation basins at the MFWQTC. Both influent and effluent channels, the east headworks influent channel, the aerated channel, the bypass channel, will be covered. The improvements to the primary sedimentation basins and the covering of key assets will assist with containing odors and decrease odor emissions in this area of the treatment facility. This is a multi-year project in progress and is projected to be completed in FY26.

Grand Avenue Pump Station

The Grand Avenue Pump Station is at the east end of the Morris Forman service area. This pump station has a dual-bed carbon adsorber system to control odors. Sampling conducted during the Odor Control Master Plan developed by AECOM (identified as pump station #2), indicated that the system was meeting performance requirements, but odor and hydrogen sulfide (H_2S) levels were elevated. MSD investigated the unit and determined the carbon media had reached the end of its useful life. In FY24, MSD replaced the carbon media and levels returned to acceptable ranges. The carbon media for the dual-bed carbon adsorber system was added to the Preventative Maintenance (PM) schedule and will be tested every two years to evaluate its effectiveness and replace if necessary.

In addition to the two year PM, a 6-month check of the system's differential pressure will also be conducted to determine if we are experiencing saturation or clogging indicating the need for a more immediate media change. No further action is required or planned at the Grand Avenue Pump Station.

FY25 – FY26 Planned Projects

This Short-Term Action Plan outlines the projects planned for fiscal years 2025 and 2026. This plan covers odor mitigation activities from July 1, 2024 through June 30, 2026. The projects listed in this Short-Term Action Plan are part of MSD's capital budget that was reviewed and approved by the MSD Board on May 28, 2024. Following finalization of the ABO, the MSD Board was updated on the projects outlined in this Short-Term Action Plan. Any project listed in section I.A.1. of the ABO and not identified in this Short-Term Action Plan will be addressed in the Medium-Term or Long-Term Action Plan. This Short-Term Action Plan is organized into the same four categories as outlined in the ABO which are Treatment, Collection System, Pump Stations, and Catch Basins.

Historical data on odor complaints illustrates that odors are most prevalent in the combined system where both wastewater and stormwater are carried in the same pipes. The combined system is served by the MFWQTC and is designated by the yellow boundary lines in Figure 1. The MFWQTC treats on average 100 million gallons per day. The western part of the service area served by the MFWQTC has reported the highest frequency of odor concerns. MSD's focus for this Short-Term Action Plan will be on the areas most impacted as indicated by the red circle in Figure 2.

Figure 1

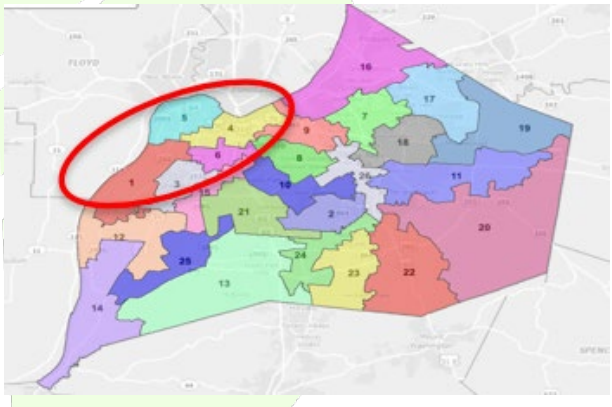


Figure 2

I. Treatment

The treatment category covers projects specific to our Water Quality Treatment Centers (WQTCs). MSD operates five WQTCs in Jefferson County. Wastewater travels from homes, businesses, and properties to these centers before being released into local waterways (Figure 1). The respective WQTC for each project is noted in parentheses in Tables T-1 and T-2. Table T-1 outlines the capital expenditures and projected start and end dates for the planned projects that are part of our consent decree work with the U.S. EPA and the Kentucky Energy Environment Cabinet that support our odor mitigation efforts. Table T-2 outlines the additional odor projects not related to the consent decree with estimated expenditures and projected start and end dates.

Consent Decree Projects	FY25-FY26 Estimated Expenditures (millions)	Projected Start Date	Projected End Date
1. New Biosolids Facility (Morris Forman)	$60.0	In Progress	9/30/2028
2. Sedimentation Basin Rehabilitation (Morris Forman)	$11.5	In Progress	12/31/2025

Table T-1

1. ***New Biosolids Handling Facility / Thermal Hydrolysis Pretreatment (THP)***
   MSD will continue developing its new biosolids processing facility using the Thermal Hydrolysis Process (THP) at the MFWQTC. The project team plans to finalize the THP system design and side stream parameters with the engineer of record in FY25. This is a multi-year project that aims to improve solids handling and reduce odor emissions at the plant and surrounding areas. The final project will include an ammonia scrubber placed upstream of the existing odor control device and a carbon absorber placed downstream. At project completion and after all components are in service and acclimated, performance testing will be conducted on the odor control device to determine effectiveness and next steps, if needed. The project is expected to be completed in FY29 with expenditures of $60 million for FY25 and FY26. The total estimated cost for the life of the project is $255 million.

2. ***Sedimentation Basin Rehabilitation***
   MSD will continue its consent decree work with the U.S. EPA and the Kentucky Energy and Environment Cabinet for the primary sedimentation rehabilitation at the MFWQTC. As stated in the FY24 Update, this project includes rehabilitating and replacing the primary sedimentation basins and covering key assets. This project will contain odorous air and send it to the existing Biological Odor Control (BOC) system for treatment. This project started in FY20 and is expected to be completed in FY26. At project completion and after all components are in service and acclimated, performance testing will be conducted on the BOC to determine effectiveness and next steps, if needed. The projected expenditure for FY25 and FY26 is $11.5 million, with a total estimated cost of $46 million over the life of the project.

Projects (Not Consent Decree related)	FY25-FY26 Estimated Expenditures (millions)	Projected Start Date	Projected End Date
A. Southwest Pump Station Gas Monitoring and Odor Control	$0.8	In Progress	6/30/2025
B. Odor Management Plan (Derek R. Guthrie)	$0.2	In Progress	12/31/2024
C. Hydrogen Sulfide (H_2S) Removal – Digester Gas (Morris Forman)	$8.0	In Progress	6/30/2026
D. Dissolved Air Flotation Thickener (DAFT) Rehabilitation (Morris Forman)	$18.1	In Progress	12/31/2026

Table T-2

A. *Southwest Pump Station Gas Monitoring and Odor Control*

MSD is finalizing a new odor control system at the Southwest Pump Station (SWPS). This system uses a biotrickling filter to treat odorous air, replacing the old carbon adsorption system. In addition to the areas treated by the previous system, the new system includes odorous air from Splitter Structure No. 1 (SP1) and the Dumpster Room. Currently in the acclimation phase, it is designed to remove 99% of inlet hydrogen sulfide when completed. A gas monitoring system will track hydrogen sulfide levels at the inlet and outlet. This technology will help mitigate odors and reduce impacts on the Bells Lane community. At project completion and after all components are in service and acclimated, performance testing will be conducted on the odor control device to determine effectiveness and next steps, if needed. This project began in 2021 and is projected to be completed by June 2025 with an estimated expenditure of $800,000 in FY25 and $2.84 million for the project's life.

B. *Odor Control Management Plan (Derek R. Guthrie)*

MSD contracted with AECOM to conduct a study of odors in our treatment centers and collection systems. Phase 2 of the Odor Control Management Plan work focuses on Derek R. Guthrie in the southern part of our service territory. Consistent with the prior plan developed for the MFWQTC, AECOM will evaluate current performance, identify potential odor sources, evaluate existing odor control systems, conduct sampling, and develop recommendations for treatment technologies. This plan will help identify odor problem areas and suggest solutions, guiding our approach to odor control around the Derek Guthrie Water Quality Treatment Center (DRGWQTC). The project is expected to be complete by December 31, 2024 with an estimated expenditure of $200,000. Once finalized, MSD will review AECOM's recommendations, develop a response, and prioritize actions within budget constraints. MSD will reevaluate the need for identified actions as system improvements occur.

C. *Hydrogen Sulfide (H_2S) Removal – Digester (Morris Forman)*

The MFWQTC has four anaerobic digesters which use naturally occurring microorganisms in the digesters' oxygen free environment to break down organic matter. As the organic matter breaks down, digester gas is produced. Recent sampling found high hydrogen sulfide (H_2S) levels present in the digester gas. To comply with the Federally Enforceable District Origin Operation Permit (FEDOOP), MSD will install a Hydrogen Sulfide Removal System that reduces the hydrogen sulfide concentrations in the digester gas prior to end use. This hydrogen sulfide adsorption system will utilize three (3) or four (4) vessels containing media. As the digester gas passes through the approximately 50,000 pounds of media in each vessel, the hydrogen sulfide in the digester gas reacts with the media. The goal of this project would be to reduce hydrogen sulfide concentrations in the digester gas which will allow use of digester gas to supplement fuel for dryers and reduce the amount of gas flared. The project is expected to be complete by June 30, 2026, with an estimated expenditure of $8 million.

D. *Dissolved Air Flotation Thickener (DAFT) Rehabilitation (Morris Forman)*

The Dissolved Air Flotation Thickener (DAFT) system and its Main Equipment Building (MEB) exhaust at the MFWQTC have been identified as odor sources. MSD will perform a rehabilitation of the DAFT and MEB exhaust. This project will evaluate and determine the best odor mitigation technologies for this area. Improving odors in this process will enhance overall air quality at the MFWQTC. Once the odor device is in service, performance testing will confirm if it meets design specifications. MSD will monitor for odors once the project is complete to determine effectiveness and next steps, if needed. The total spend through FY24 is $950,000. The projected expenditure in FY25 & FY26 is $18.1 million. The project will continue through the end of December 2026 (FY27) and will have expenses in the Medium-Term Action Plan. Total estimated expenditures for the life of the project are $20 million.

II. Collection System

The collection system routes wastewater from homes, businesses, and industries to Water Quality Treatment Centers (WQTCs). MSD operates both combined and separate sewer systems. This Short-Term Action Plan focuses activities on the combined systems. Table C-1 lists the projects to be

completed in this Action Plan within the collection system with estimated expenditures and projected start and end dates.

Projects	FY25 – FY26 Estimated Expenditures	Projected Start Date	Projected End Date
E. Western Outfall Sewer Shed Studies	$200,000	7/1/2024	6/30/2025
F. Ohio River Force Main Technology Study	$50,000	7/1/2025	6/30/2026
G. Grand Avenue Pump Station Chemical Use Study	$50,000	1/1/2025	6/30/2026

Table C-1

E. Western Outfall Sewer Shed Studies

The Western Outfall, a gravity sewer starting in the southwestern central business district, runs west along Broadway toward the Ohio River and then runs south to the MFWQTC. MSD has experienced high odor complaints along this system. AECOM documented in the Odor Control Master Plan that this system tends to run at positive pressure, which causes an increase in the release of odorous air. MSD will conduct a study to determine if changing the pressure in the system to negative will minimize the escape of odorous air. MSD will install a temporary unit along the gravity sewer line to create negative pressure conditions. In addition to the pressure study, MSD will develop a wastewater odor model using the WATS (Wastewater Aerobic / Anaerobic Transformations in Sewers) sewer process model. WATS simulates changes in conditions (i.e., aerobic, anoxic, and anaerobic) within the sewer system to determine the impact on odors. The WATS model will be used to run what-if scenarios to determine the effectiveness of different treatment methods. MSD will review recommendations from both the negative pressure pilot study and the WATS model to identify next steps. Further actions for system improvements will be prioritized within budget constraints. The Western Outfall studies outlined above are projected to be completed in FY25 with an expenditure of $200,000.

F. Ohio River Force Main Technology Study

The Ohio River Force Main runs between the Ohio River and I-71 beginning near US 42 and I-265 and discharges to the Ohio River Interceptor (ORI) in downtown Louisville at Hancock and Main. After discharging into the ORI, wastewater flow is conveyed west towards the MFWQTC for treatment. Previously, MSD utilized the WATS modeling to identify treatment method(s) and location(s) for the Ohio River Force Main. From the result, MSD installed an oxygen injection facility at the Barbour Lane Pump Station and currently feeds Bioxide (calcium nitrate) at Mockingbird Valley to treat part of the force main. MSD will update the WATS model and collaborate with consultant(s) to evaluate the effectiveness of the current treatment practices and explore additional options for increased results further down the force main. MSD will review recommendations and determine the next steps. Further actions identified for system improvements will be prioritized within budget constraints. The Ohio River Force Main Technology Study is projected to be completed in FY26 with $50,000.

G. Grand Avenue Pump Station Chemical Use Study

AECOM recommended a pilot study at the Grand Avenue Pump Station in the Morris Forman Odor Control Master Plan. Currently, Bioxide (calcium nitrate) is used at the Grand Avenue Pump station to minimize sulfides in the Grand Avenue Force Main. Although Bioxide is effective for some part of the sewer system, MSD desires to improve odors further down the force main. The chemical use study will explore alternative chemicals at the Grand Avenue Pump Station and identify options that may be more effective at reducing sulfides and deterring the formation of hydrogen sulfide in the sewer system and provide a larger impact further down the main. MSD will review recommendations and determine the next steps. Further actions identified for system improvements will be prioritized within

budget constraints. The Grand Avenue Pump Station Chemical Use Study is projected to be completed in FY26 with $50,000.

III. Pump Stations

Pump stations are utilized in gravity sewer systems to lift (pump) wastewater to a higher elevation when the route followed by a gravity sewer would require the sewer to be laid at an insufficient slope or at an impractical depth. Lift stations vary in size and type depending upon the quantity of wastewater to be handled and the height it must be lifted. Some MSD pump stations have been identified as sources of odor. Table C-2 lists the project that will be performed in the short-term at an MSD pump station with estimated expenditure and projected start and end dates.

Projects	FY25 – FY26 Estimated Expenditures	Projected Start Date	Projected End Date
H. Starkey Pump Station - Evaluate options for odor mitigation technology	$50,000	7/1/2025	6/30/2026

Table C-2

H. Starkey Pump Station - Evaluate options for odor mitigation technology

The Starkey Pump Station (PS) is on the northern end of the Morris Forman service area, east of downtown and currently lacks odor control technology. Starkey PS has a small footprint with a large volume of air being ventilated which can lead to an increase in odors. Unfortunately, there is limited space for a traditional carbon or biological odor control solution at this pump station. MSD will engage with consultant(s) to assess potential options for odor control treatment systems. MSD will review recommendations and determine the next steps. Further actions identified for system improvements will be prioritized within budget constraints. The Starkey Pump Station project to evaluate odor mitigation technology is projected to be completed in FY26 with a $50,000 expenditure.

IV. Catch Basins

MSD will continue to inspect the catch basins in the combined system with a focus on the target areas identified in Figure 2. MSD will also continue its work to rehabilitate and replace the catch basins listed below in Table CB-1 with estimated expenditures and projected start and end dates.

Projects	FY25-FY26 Replacement #	FY25 – FY26 Estimated Expenditures (millions)	Projected Start Date	Projected End Date
I. Catch Basin Inspections	N/A	$0.6	Ongoing	N/A
J. Catch Basin Replacements				
1. California Neighborhood *	60	$1.3	In Progress	6/30/2025
2. Chickasaw Neighborhood*	79	$1.2	1/1/2025	12/31/2025
3. Shawnee Neighborhood	174	$3.0	10/1/2024	6/30/2025
4. Taylor Berry Neighborhood	43	$0.86	12/1/2024	12/31/2025
5. East Market (Nulu)**	19	$0.40	10/15/2024	12/31/2024

Table CB-1

Grant funded

****Part of Louisville Metro downtown beautification project.***

I. Catch Basin Inspections

MSD is actively inspecting catch basins within the combined system to determine repair needs and identify those for replacement. Repairs are scheduled for completion by MSD field crews while replacement work is bundled into smaller jobs to bid out to contractors. MSD plans to inspect roughly 4,200 catch basins per year. These inspections are the first step to reducing odors from catch basins located at the edge of customer properties.

J. Catch Basin Replacements

Catch basin replacements in fiscal years 2025 and 2026 will be targeted for completion as outlined in Table CB-1. These replacements will include installing trapped catch basins to deter odors from escaping the sewer system.

1. *California Neighborhood*: In the California neighborhood, 925 catch basins were inspected, and 75 were identified for replacement. In FY24, 15 catch basins were replaced, and the remaining 60 will be replaced in FY25 with an estimated expenditure of $1.3 million.

2. *Chickasaw*: In the Chickasaw neighborhood, 746 catch basins were inspected, and 79 were identified for replacement in FY25 and FY26, with an estimated expenditure of $1.2 million.

The replacements in the California and Chickasaw neighborhoods are grant-funded, which could impact their timing.

3. *Shawnee*: In the Shawnee neighborhood, 1,142 catch basins were inspected, and 174 were identified for replacement in FY25, with an estimated expenditure of $3.0 million.

4. *Taylor Berry*: In the Taylor Berry neighborhood, 817 catch basins were inspected, and 43 were identified for replacement in FY25 and FY26, with an estimated expenditure of $860,000.

5. *East Market (Nulu):* Louisville Downtown Development initiated a beautification project in the Nulu area of East Market. To align with this effort and to minimize multiple traffic disruptions for construction work, 19 catch basins in this area will be replaced as part of this project in FY25, with an estimated expenditure of $400,000.

MSD expects to see a decrease in customer odor complaints specific to these catch basins that will now be trapped. However, trapped catch basins that are dry can still release odors. Therefore, MSD will periodically inspect the catch basins and add water as needed to contain odors.

V. Summary

While sewer odors will never be completely eliminated, MSD is committed to reducing their impact on the community. Odor mitigation has been made a priority, with significant funding allocated for the next few years. This Short-Term Action Plan estimates spending over $71 million on consent decree projects (Table S-1) and nearly $35 million on projects not related to the consent decree (Table S-2) that support odor mitigation over the next two fiscal years. Several projects listed in this Action Plan span multiple years, and the estimated expenditures in Tables S-1 and S-2 are totals for fiscal years 2025 and 2026 only.

Summary of Estimated Expenditures
FY25 – FY26

Category		Short-Term Action Plan Projects ***Consent Decree Related***	FY25 - FY26 Estimate Expenditures (millions)
Treatment	1	New Biosolids Facility (Morris Forman)	$60.00
	2	Sedimentation Basin Rehabilitation (Morris Forman)	$11.50
Table S-1		**TOTAL**	**$71.50**

Category		Short-Term Action Plan Projects	FY25 - FY26 Estimated Expenditures (millions)
Treatment	A	Southwest Pump Station Gas Monitoring and Odor Control	$0.80
	B	Odor Management Plan (Derek R. Guthrie)	$0.20
	C	Hydrogen Sulfide (H_2S) Removal- Digester Gas (Morris Forman)	$8.00
	D	Dissolved Air Flotation Thickener (DAFT) Rehabilitation (Morris Forman)	$18.10
Collection System	E	Western Outfall Sewer Shed Studies	$0.20
	F	Ohio River Force Main Technology Study	$0.05
	G	Grand Avenue Pump Station Chemical Use Study	$0.05
Pump Stations	H	Starkey Pump Station - Evaluate options for odor mitigation technology	$0.05
Catch Basins	I	Catch Basin Inspections	$0.60
	J	California Neighborhood Catch Basin Replacements	$1.30
		Chickasaw Neighborhood Catch Basin Replacements	$1.20
		Shawnee Neighborhood Catch Basin Replacements	$3.00
		Taylor Berry Neighborhood Catch Basin Replacements	$0.86
		East Market (Nulu)	$0.40
Table S-2		**TOTAL**	**$34.81**

Conclusion

MSD is committed to completing the projects as outlined in this plan. However, significant increases in project costs, contractor availability, material shortages, or other extenuating factors could impact the timing of these projects. MSD will document any variations to this Short-Term Action Plan in its Mid-Year and Annual reports as changes are identified. A Mid-Year Report will be provided by March 31 of each year, covering progress made between July 1st and December 31st of the prior year. An Annual Report will be provided by September 30 for both fiscal years 2025 and 2026. MSD enhanced its customer communications and odor response efforts during the 2024 Odor Season. MSD will continue to actively respond to odor concerns and explore opportunities to expand its community engagement for the upcoming 2025 Odor Season.