



Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302 • Tel: 303.441.3930 • Fax: 303.441.4856
Mailing Address: P.O. Box 471 • Boulder, Colorado 80306 • www.bouldercounty.org

BOULDER COUNTY PLANNING COMMISSION PUBLIC HEARING

May 17, 2023 at 1:30 p.m.

*Boulder County Courthouse, 3rd Floor,
1325 Pearl Street, Boulder
Virtual and in-person*

PUBLIC HEARING

STAFF PLANNER: Summer Frederick, AICP and Abby Shannon, AICP

Docket SI-04-0001: City of Boulder Water Resource Recovery Facility Periodic Review

Request: Periodic Review of SI-04-0001 docket which approved increased capacity for an existing wastewater treatment facility, improvements enabling compliance with future water quality discharge requirements for nitrates and phosphorous, and improvements to enable the elimination of gaseous chlorine for water disinfection.

Location: 4049 N 75th Street

Zoning: Agricultural (A) and Rural Residential (RR)

Applicant: Erin Neil, PE, City of Boulder Utilities
Christopher Olsen, PE, City of Boulder Utilities

Property Owner: City of Boulder

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SUMMARY AND RECOMMENDATION:

The City of Boulder Utilities Department received conditional approval to expand the existing Water Resource Recovery Facility (WRRF) at 4049 N 75th St in 2004 (SI-04-0001). County 1041 review (Article 8 of the Land Use Code) was required based on the activity constituting a major expansion of an existing sewage treatment facility. In addition to the expansion from 20.5 million gallons per day (mgd) to 25 mgd, SI-04-0001 recognized changes to the way the city treated sewage. The goal of the changes in treatment were, generally, to reduce the need for chlorine as part of the treatment process and to improve the water quality of the effluent. There were many conditions of approval associated with the project and memorialized in Resolution 2004-75 that were applied in order to monitor the project and ensure that it met the ode criteria. One of those conditions required a periodic update every 5 years following the first building permit issued. The first building permit was issued in 2005

and the periodic review hasn't happened... until now!

This first periodic review has been initiated by the City of Boulder's Utility Department's desire to obtain building permits for the upgrades related to phosphorous treatment that were contemplated in the original project.

REFERRALS:

Notice of the Planning Commission public hearing was sent to property owners within 1,500 feet of the subject property. Staff also sent notice to:

- Boulder County Open Space
- Boulder Rural Fire Protection District
- Boulder & White Rock Ditch & Reservoir Co.
- City of Lafayette
- City of Boulder Open Space and Mountain Parks
- Jeffrey Kahn, Lyons Gaddis
- Leggett Ditch & Reservoir Co.
- New Coal Ridge Ditch Co.
- New Consolidated Lower Boulder Reservoir & Ditch Co.

No neighbor or referral responses have been received as of May 9, 2023.

HISTORY:

The City of Boulder established the Water Resource Recovery Facility in the late 1960s. Prior to that time, the city's sewage treatment plant was located off East Pearl Street (before Pearl Parkway was built). This facility has been reviewed by the planners at Boulder County many times over the last 50+ years:

- SU-66-0324: Review and approval of the new sewage treatment plant
- SU-70-0553: Review and approval for an expansion of the wastewater treatment facility
- SU-77-0005: Review and approval of modifications to the wastewater treatment facility
- SU-80-0002: Review and approval for improvements to the wastewater treatment facility
- SU-87-0012: Review and approval for improvements to the wastewater treatment facility
- SI-02-0001: Activities of state interest review and approval for the City of Lafayette to construct a diversion intake and a new raw waterline to the Goose Haven reservoir complex; City of Boulder to relocate discharge pipe to the east side of N 75th Street
- SI-04-0001: (Subject Project) Activities of state interest review and approval to increase capacity and provide a treatment system capable of compliance with anticipated regulations
- SPR-08-0038: Review and approval of grading greater than 50 yd³ for a ground-mount solar array in the floodplain
- SI-18-0003: Activities of state interest review and approval for the relocation and replacement of the City of Boulder sewer interceptor line
- SPR-19-0101: Review and approval of a 1.25 ac 499 kW ground-mount solar energy system
- SPR-22-0060: Review and approval of the Gunbarrel siphon replacement to replace an existing sewer pipe with a new sewer pipe

DISCUSSION:

Resolution 2004-75 placed twelve conditions on the approval of SI-04-0001.

The approving Resolution states (in condition of approval #11), *The County shall conduct periodic or interim reviews to assess the Applicant's compliance under this approval, and to determine whether, under the applicable criteria of the 1041 Regulations, new conditions of approval should be imposed or the original conditions modified, reduced or waived to accommodate changing technology, knowledge of new health concerns, or other new information not available at the time of this*

approval. Generally, the facility seems to be in compliance with SI-04-0001. We have notified property owners within 1,500 feet of this periodic review as well as the downstream users who were actively involved in the original review. We are seeking feedback and direction from neighbors, downstream users, Planning Commission, and the Board of County Commissioners to determine if the conditions of approval should be modified, reduced, or waived based on the experience of the last 17 years since construction on the SI-04-0001 improvements commenced.

Each of the conditions is enumerated below in italics followed by staff's response.

1. *Prior to the issuance of any permits, the Applicant shall obtain and provide verification of all applicable permits and approvals as required and necessary under state and federal law. These may include, but are not limited to, water quality discharge permits and the like. The operation of any aspect of this proposal that does not comply with the terms and conditions of all required permits shall be grounds for County action under the enforcement provisions of the 1041 Regulations.*

We have not verified the applicant has obtained all state and federal permits necessary for the operation of this public facility, however, we have no reason to suspect the City of Boulder would be derelict in this regard.

2. *Construction materials and colors shall be consistent with the existing development. No reflective materials shall be used. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall submit to, and have reviewed and approved by the County Land Use Department, a materials and color palette.*

With every building permit application, Community Planning & Permitting staff reviews colors and construction materials to make sure the applicant is in compliance with this condition. To date, all building permits have been in compliance with this condition.

3. *Exterior Lighting shall be down-cast and shielded in accordance with Article 7-1600 of the Land Use Code. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall submit to, and have reviewed and approved by the County Land Use Department, an exterior lighting plan.*

With every building permit application, Community Planning & Permitting staff reviews light fixtures to make sure the applicant is in compliance with this condition. To date, all building permits have been in compliance with this condition.

4. *The Applicant shall install substantial vegetative screening along the north side of the facility to reduce visual impacts to surrounding public and private properties. Deciduous trees must meet minimum size requirements of 2.5 inches in diameter while evergreen trees must be no less than six feet in height. Naturalized clusters are preferred to rows and regular spacing. At a minimum, the Applicant shall install and maintain 18 native trees along the north 3 side of the facility. The landscape screening plan and plant schedule must be submitted to, and reviewed and approved by, the County Land Use Department, prior to the issuance of any permits or authorization of any activity governed by this approval.*

New trees were planted as part of BP-05-2268. Staff visited the site on May 3, 2023, and walked the public access trail along the north side of the property. There are many evergreen trees along the northwest side of the facility. The original plan seemed to have more vegetative screening the entire length of the developed portion of the WRRF, however, there are a few limiting factors that haven't allowed it: the applicant is prohibited from planting trees on the FEMA-certified flood berm that surrounds the facility. There is also a sewer line that runs along the berm that would preclude trees from being planted here. The facility is still noticeable – it would be difficult to screen it so that it wasn't – but the trees do soften the visual impacts of the larger structures at the northwest corner of the WRRF.

5. *Noise levels shall not exceed those which currently exist at the property line. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide and have reviewed and approved by the County Land Use Department a study of existing noise levels for both the wastewater treatment plant operation and power plant operations. The noise study shall be a baseline to identify existing noise in relation to potential increases in nuisance noise caused by the approved upgrade project, and shall identify noise mitigation measures. In addition:*
 - a. *Hours of construction are limited to between 7:00 a.m. and 7:00 p.m., Monday through Friday, unless otherwise approved by County staff subject to prior notification and consultation with adjacent property owners.*
 - b. *The Applicant shall provide a comparative noise analysis to the County Land Use Staff prior to construction of Phase 2 and shall demonstrate implementation of mitigation measures as identified in the study.*

A noise mitigation plan was submitted and approved in 2005 and again in 2009. Baseline noise levels were established on 2/25/2005, 2/28/2005, and 8/12/2005. Staff does not have records indicating complaints from neighbors for noise (or anything else) emanating from the WRRF. There was a letter in the project file from 2005 from the contractor at that time requesting permission to allow some Saturday workdays, if necessary. This was approved by staff and a letter was sent to neighbors noting the request and approval. There are no records indicating this was a problem, however, on all building permits related to this facility, staff adds a note to the permit limiting construction hours as described in Resolution 2004-75.

The portion of the project the applicant intends to commence later this year is part two of Phase 2. This upcoming project would reduce phosphorous discharge in the effluent. The first part of Phase 2, implementing the nitrogen discharge reductions was completed in 2017.

6. *Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide to, and have reviewed and approved by the County Land Use Department and Transportation Department, a traffic management and control plan.*
 - a. *The Applicant shall attempt to keep the public trail open throughout the construction period. If a closure is necessary, the Applicant shall provide adequate notice to the County Land Use and Transportation Departments and signage for the public.*
 - b. *The Applicant shall provide a construction schedule and traffic construction schedule (see also Condition #5.a. above)*
 - c. *The applicant is advised of weight limit restrictions on adjacent roadways and shall demonstrate compliance with other County Transportation Department requirements.*
 - d. *In the event that the proposed construction coincides with other significant construction near the facility, the County reserves the right to coordinate construction impacts, traffic, and related activities to limit congestion and adverse impacts on adjacent roadways and neighboring property owners.*

A traffic management and control plan was submitted and approved in 2005 before the Phase 1 of the approval commenced. The plan specifically addressed the intensity of the initial phase of construction. The Applicant sent a letter to neighbors of the facility on February 24, 2006, alerting them to the project and possible traffic impacts. Staff has reached out to the applicant requesting an estimate of the additional traffic that might be generated as a result of this project in order to determine whether an updated traffic management and control plan is necessary for the upcoming project. Staff has not yet determined whether a traffic management and control plan is necessary at this time – staff is waiting for additional information from the applicant.

7. *Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide a copy of an approved fugitive dust mitigation plan to*

the County Land Use Department for this site and all related construction activities.

A fugitive dust mitigation plan was submitted and approved in 2005 before Phase 1 of the approval commenced. At that time, the contractor estimated two months of demolition activity, two months of excavation activity, and a 30-month total project schedule (January 2006-May 2008). Most of the construction proposed with the phosphorus upgrades will be within existing structures so it is not anticipated that a fugitive dust plan will be necessary.

8. *All final grading/re-vegetation/erosion control plans for the new facilities shall be reviewed and approved by Boulder County prior to issuance of any permits or authorization of any activity governed by this permit.*

- a. *The maximum preservation of existing trees is required within the site.*

A stormwater and erosion control plan was submitted and approved in 2005 before Phase 1 of the approval commenced. In addition, staff applies the standard revegetation requirements to every building permit associated with this docket.

9. *Nuisance odor levels shall not exceed those which currently exist at the property line. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant will provide to and have reviewed and approved by the County Land Use Department a study of existing odor sources/levels and particulate concentrations at the property line. The odor study shall be a baseline to identify existing odors in relation to potential changes or increases in nuisance odors caused by the approved upgrade project and shall identify odor mitigation measures.*

An odor mitigation plan was submitted and approved in 2005 and again in 2009. Baseline odor levels were established on 2/25/2005 and 8/12/2005. While neighbors were concerned about odors during the 2004 review, there are no records indicating neighborhood complaints of noxious odors.

10. *The County accepts the Applicant's commitment of record that even with the added wastewater flows which will result from the approved upgrade project, total pounds of nitrogen in the wastewater treatment plant's effluent discharged to Boulder Creek will not increase beyond current levels. The Applicant has based this commitment upon modeling calculations to which the Applicant and its consultant testified at the Public Hearing, showing that the activated sludge process to be installed in the approved project will reduce total pounds of nitrogen in the effluent by 20% to 30%.*

- a. *As a basis for implementation and enforcement of the Applicant's commitment that total pounds of nitrogen in the effluent will not increase beyond current levels, the Applicant shall, prior to the issuance of any permits or authorization of any activity governed by this approval, submit to and have reviewed and approved by the County Land Use Department an effluent nitrogen baseline/monitoring plan. This plan shall contain the following elements:*

- i. *The technical basis for the City's conclusion that the upgrade project's activated sludge process will achieve the reduction in total pounds of nitrogen asserted at the Public Hearing;*
 - ii. *An acceptable baseline establishing the current total pounds of nitrogen in the effluent from the Applicant's wastewater treatment plant; and*
 - iii. *A system for monitoring the total pounds of nitrogen in the effluent on an appropriate periodic basis, beginning once Phase 1 of the upgrade project is completed, and including the provision of regular monitoring reports to the County Land Use Department and to downstream reservoir and ditch companies and water users associations (including but not necessarily limited to Water Users Association of District No. 6, New Consolidated Lower Boulder Reservoir and Ditch Company, Boulder and White Rock Ditch and Reservoir Company, and the Leggett Ditch and Reservoir Company).*

- b. *The Board hereby authorizes and directs the County Land Use Department to retain a qualified and independent, professional water quality control consultant for the purpose of reviewing and evaluating all aspects of the Applicant's submitted effluent nitrogen baseline/monitoring plan as required above. With the aid and advice of this consultant, the Land Use Department shall determine whether the Applicant's submitted plan is adequate to provide a reasonable basis for (1) verifying the Applicant's conclusion presented at the Public Hearing that total pounds of nitrogen in the effluent will not increase under the upgrade project, and (2) monitoring and enforcing the Applicant's commitment that the upgrade project, once completed, will not increase total pounds of nitrogen in the effluent beyond the established baseline level. If the Land Use Department determines that the plan is not adequate for this purpose, the Land Use Director shall schedule a duly-noticed public hearing before the Board, so that the Board can determine whether the submitted plan reasonably fulfills the purpose and intent of this condition.*

One of the main concerns from downstream users was the quality of the effluent being released by the WRRF into Boulder Creek. Some of the ditch and irrigation companies who access their water downstream from the discharge point were concerned about excessive nitrogen. They opposed the expansion of the WRRF because they saw the expansion as a means to increase point source pollution.

The applicant provided technical reports to the county on a regular basis to demonstrate compliance with this condition. Around 2012, the applicant requested they provide these reports to the county upon request while continuing to report to the downstream users.

A consultant team, Water Management Inc and Integra Engineering, was retaining in 2005 and reviewed the city's proposed changes and their commitment that the new design could reduce nitrogen in the effluent by 20%-30%. The consultant confirmed the city's design and the project commenced in early 2006.

11. *The County shall conduct periodic or interim reviews to assess the Applicant's compliance under this approval, and to determine whether, under the applicable criteria of the 1041 Regulations, new conditions of approval should be imposed or the original conditions modified, reduced or waived to accommodate changing technology, knowledge of new health concerns, or other new information not available at the time of this approval. Interim reviews shall occur generally every five years after the issuance of permits under this approval for Phase 1. In addition, the County may also conduct a review two years prior to the anticipated commencement of construction of Phase 2: to this end, the Applicant shall inform the County Land Use Department at the time it believes that it is two years away from commencing Phase 2. The reviews shall be conducted as duly-noticed public hearings before the Planning Commission and the Board. Nothing in this condition shall limit the Board from taking enforcement action under the 1041 Regulations at other times as may be necessary.*

While planning staff has carefully reviewed all the building permits at the facility for compliance with SI-04-0001 and Resolution 2004-75, staff has not conducted periodic assessments for compliance. The first building permits were issued in 2006. Periodic reports should have been conducted in 2011, 2016, and 2021. There seems to be an optional review prior to commencement of Phase 2 which occurred in 2017 when the city added the external carbon feed facility. The city is seeking to commence construction on the phosphorous upgrades this summer.

While most of what was approved through SI-04-0001 has been implemented, future projects could be necessary to meet more stringent nutrient limitations, improvements in treatment processes, or changes that may be necessary as a result of future growth. Planning Commission and the Board of County Commissioners can expect a periodic update from staff in 2028 unless the Board of County Commissioners decides to remove or modify this condition of approval. One option would be to

reserve the right to request a periodic review prior to the next major project.

12. The Applicant shall be subject to the terms, conditions and commitments of record and in the file for the Docket.

All commitments of record seem to have been captured in Resolution 2004-75.

RECOMMENDATION:

Staff finds the applicant is in compliance with the terms, conditions, and commitments of record for SI-04-0001 with the recommended conditions of approval. The applicant has been able to demonstrate, following approximately 15 years of operation, that upgrades to the WRRF have not resulted in increased nitrogen levels in the facility's effluent. Staff recommends the following conditions of approval to ensure the WRRF remains in compliance with SI-04-0001:

1. The applicant shall continue to maintain the vegetative screening along the north property line and shall meet county revegetation requirements in association with all building permits that involve site disturbance.
2. The applicant shall submit an updated traffic plan for county review and approval if county staff determines that an updated plan is needed.
3. The nitrogen reporting requirement shall be modified from "regular reporting" to the county to "as requested" by the county. The applicant shall continue to provide monitoring reports to downstream users unless the downstream users specifically request a change to this procedure.



MEMORANDUM

To: Boulder County Planning Commission
Boulder County Community Planning & Permitting

From: City of Boulder Utilities

Date: May 3, 2023

RE: City of Boulder Water Resource Recovery Facility Periodic Report

1.0 INTRODUCTION

The Water Resource Recovery Facility (WRRF) was built in the late 1960s and has undergone several improvements over the years. Prior to 2008, the facility primarily used trickling filters and clarifier tanks for organics and solids removal, a technology that has minimal nutrient removal capabilities. In the mid-2000s, the facility underwent a major upgrade to install a modern activated sludge system that drastically improved its nutrient removal capabilities. This project was a major step forward in improving the effluent quality discharged to Boulder Creek and simultaneously included capacity expansion, necessitating a 1041 State Interest Planning Review with Boulder County that was conditionally approved in 2004.

The approval included three components: a hydraulic treatment capacity increase from 20.5 Million Gallons per Day (MGD) to 25 MGD, eliminating the use of gaseous chlorine for disinfection, and nutrient removal driven activated sludge upgrades. The city increased the capacity of the plant in 2008, eliminated the use of gaseous chlorine in 2013, and began implementing activated sludge upgrades in 2008. The activated sludge upgrades integrated a phased approach for nutrient reductions based on the expected regulatory timeline. Phase 1 was intended to reduce ammonia concentrations, and a subsequent Phase 2 would address total nitrogen and phosphorus reductions. The city completed Phase 1 in 2008 and the nitrogen components of the Phase 2 upgrades in 2017. The facility has yet to implement phosphorus reductions into its treatment system. The latter is the subject of the proposed Phosphorus Upgrades Project.

At the request of Boulder County Community Planning & Permitting staff, the City of Boulder Utilities Department prepared this periodic report memorandum that summarizes the changes that have been made at the WRRF and outlines the drivers for and scope of the upcoming Phosphorus Upgrades Project. There are no plans to expand the capacity of the facility with this project; this project is a process improvement designed to operate within the limits of the existing planning resolution.

2.0 WRRF UPDATE

Since the 1041 process in 2004, the city has continued to make improvements to the facility. Generally, these have fallen into categories of:

- Process improvements
- Resource recovery and green energy enhancements
- Asset management improvements and aging infrastructure rehabilitation/replacement
- Utility repairs and upgrades



The following sections highlight the various improvements the plant has completed since the 1041 was approved in 2004. Several of these improvements have involved various permitting processes with Boulder County Planning & Permitting, and all building upgrades have involved county building permits.

2.1 Process Improvements

2.1.1 Phase 1 Upgrade

This was the original upgrade described in the 1041 planning resolution; this project included decommissioning two large trickling filters, building an activated sludge system, and constructing a Dissolved Air Flotation Thickening (DAFT) system. The project was constructed in phases, largely due to budgetary constraints, and completed in 2008. This project enhanced the ammonia and organic material removal capabilities of the facility as planned, and expanded the WRRF capacity.

2.1.2 Biosolids Upgrades

In the late 2000s, the city began implementing a new biosolids management strategy to reduce hauling costs and reduce truck traffic at the facility. A new dewatering building was constructed in 2008. This facility is significantly more effective at removing liquid from hauled waste than prior to the upgrade, effectively cutting solids handling truck traffic from the plant by more than half.

Further, as solids processes tend to be more odorous, this project also included a new biofiltration odor control system. Since the implementation of this system 15 years ago, the city has received five complaints related to odors in the general area of the facility. Four of those complaints came from an area of the sanitary sewer system that is more susceptible to odors, which is a more likely source than from the facility itself. The city intends to mitigate these concerns by installing a new scrubber with an upcoming project.

2.1.3 Headworks/UV/Digester Upgrades

In 2013, the city completed construction of a project that replaced process equipment in the headworks and digester systems. Additionally, the gaseous chlorination and sulfur dioxide feed systems were replaced with an ultraviolet light disinfection process. The UV light disinfection system is a safer technology that provides pathogen inactivation without the chlorine gas hazard for the surrounding community and plant staff and has reduced operation and maintenance costs.

2.1.4 2017 Nitrogen Upgrades

This project addressed the nitrogen removal components that were slated for Phase 2 under the 2004 planning resolution, moving from partial-denitrification to enhanced denitrification. Boulder is participating in Colorado Department of Public Health and Environment's Voluntary Incentive Program for Nutrient Removal (VIP Program), which encourages electively removing nutrients to levels well below Regulation 85 requirements. In 2017, the city constructed a new external carbon feed facility to enhance nitrogen removal to these levels and new daily ammonia and nitrate permit limits, effective December 2017. The system facilitates nitrogen reduction primarily using carbon sourced from brewing waste, with an acetic acid (vinegar) backup.

Additionally, the 2017 project converted an existing sludge holding tank to a post aerobic digester (PAD). The PAD technology uses air to treat the solids process stream and reduces the nutrient load on the activated sludge process.



2.2 Resource Recovery and Green Energy Improvements

2.2.1 *Biogas Use Enhancements*

In 2019, the city implemented an upgrade to the city's biogas management strategy. Historically, biogas was used as fuel in a cogeneration system that generated electricity and recovered waste heat. This system reached the end of its useful life and was failing. The city conducted an analysis that recommended replacing the failing mechanical system with a biogas treatment system that creates Renewable Natural Gas (RNG). The upgraded RNG is pipeline quality and delivered into Xcel's natural gas distribution system. The RNG is used by Western Disposal to fuel approximately half of their trash collection trucks, and it is traded on the renewable vehicle fuels market for renewable energy credits as part of an Environmental Protection Agency (EPA) renewable fuels program.

2.2.2 *Photovoltaic Arrays*

In 2010 and 2020, the city built two large ground solar arrays along the entrance to the facility with a combined generation capacity of 1.5 MW. The solar system offset an average of 25% of the facility's annual energy usage in 2022.

2.2.3 *Electric Vehicle (EV) Charging Stations*

The city installed two EV charging stations as part of the city's climate initiatives program. These stations are used by city electric vehicles, as well as those owned by staff and visitors.

2.3 Asset Management Improvements and Rehabilitation

2.3.1 *Process Automation System Upgrades*

The city has been upgrading the process automation systems at the facility since 2018. This has improved the reliability of the facility by modernizing the control system and providing redundancy in the facility's Supervisory Control and Data Acquisition (SCADA) network.

2.3.2 *Electrical Upgrades*

Many of the facility's electrical systems date back to their original installation date, some back to the 1970s. In 2019, the city undertook an electrical upgrade project that replaced many of the major motor control and load centers to improve the reliability of the plant's electrical systems.

2.3.3 *Miscellaneous Asset Management*

Like any building or facility, many of the original components of the facility have reached the end of their useful life. As systems have aged and/or failed, many building and site assets have been replaced. Process and building mechanical systems have required replacement, as well as roofs, roads, and other site assets.

2.4 Utility Projects

2.4.1 *WRRF Water Main*

In late 2020, the original 1967 water main that feeds the WRRF failed in two locations: underneath the flood control levee, and just north of Boulder Creek. This break led to internal levee damage as well as a loss of redundancy in supplying water to the WRRF, which is critical to maintaining operations. The city repaired the levee and main break at the levee location, then bored a new waterline across the creek to correct the break north of the creek.



2.4.2 Main Sewer Improvements Project (upcoming)

The city is undertaking a large sanitary sewer replacement project that will connect to the southwest side of the WRRF. The project is just starting the construction contracting phase and will begin field work in mid to late 2023. The project completed a 1041 process that was approved in 2020 under docket SI-18-0003.

2.4.3 Inverted Siphon Replacement (upcoming)

The city currently has a design to replace an existing inverted siphon that travels underneath Boulder Creek with a more reliable system. The intent is to construct the project in conjunction with the Main Sewer Improvements Project. This effort completed a site plan review in 2022, which was approved under docket SPR-22-0060.

3.0 PHOSPHORUS UPGRADES PROJECT

Colorado is adopting increasingly stringent nutrient limits: Boulder will be required to meet Regulation 85 limits for both nitrogen and phosphorus when the effluent permit is renewed, currently anticipated in 2026. The city also plans to participate in the same Voluntary Incentive Program to reduce effluent phosphorus concentrations, like the current nitrogen removal strategy.

Detailed planning for Phase 2 began in 2012 with the Nutrient Compliance Study #1 (NCS1). The NCS1 set a framework for the facility to address upcoming limits in phases, based on anticipated regulatory timelines. This study initially recommended a chemical solution for phosphorus reduction. Since the completion of that study, the city conducted several pilot/demonstration studies to further evaluate chemical phosphorus removal at the WRRF.

As treatment technologies have evolved, the city re-evaluated phosphorus removal options with the updated Nutrient Compliance Study 2 (NCS2), completed in 2021. This study recommended a more sustainable phosphorus removal solution than suggested by NCS1 and assessed the whole-plant impacts of improving sidestream treatment processes. The recommendations included in NCS2 are the basis for the proposed project. The resulting project scope includes three main elements: upgrades to the secondary treatment system, improvements to sidestream treatment processes, and revitalization of existing facility assets. Work for this project will be confined within the existing facility fence line depicted in white in Figure 1. The sections below describe this scope in greater detail.



Figure 1 – Phosphorus Upgrades Project Extents

3.1 Secondary Treatment Process Upgrades

The secondary process at the WRRF is the part of the plant primarily responsible for organics and nutrient removal. The alternatives selection process for implementing phosphorus reduction started with a brainstorming session to review twelve (12) different technologies currently available. Generally, each of these options fell into one of the three following categories:

- **Chemical:** a coagulation process wherein a chemical is added to precipitate phosphorus out of solution and removed by settling
- **Biological:** a process that encourages the growth of organisms that uptake higher amounts of phosphorus, then the organisms are removed via secondary clarification
- **Biological with intensification:** a biological process with technologies that reduce footprint or operate in a more energy efficient way.

Following initial screening, exploratory models for seven (7) alternatives were conducted to review feasibility at the WRRF. Models for five (5) of these technologies progressed to more detailed full plant simulations. The city applied a multi-attribute criteria framework to evaluate the alternatives' benefits and drawbacks, including the financial, operational, environmental, and community impacts. Two (2) finalist candidates were further refined, leading to a single final recommendation.

The recommended low dissolved oxygen aerobic/oxic (low DO A/O) alternative is an intensified biological process technology on the leading edge of the industry, and it combines the performance of a conventional process with decreased energy usage in a moderate footprint. For Boulder, this will improve effluent quality, reduce energy usage, and avoid constructing additional process basins to treat the current flows and loadings to the WRRF.



The infrastructure required for this technology will require a small, unoccupied building to house new process and electrical equipment and two relatively small storage tanks. The remainder of the project will be isolated to existing structures and buried piping and conduits on the site. The structures that will be constructed or modified for the secondary treatment upgrades are highlighted in green in Figure 1.

3.2 Sidestream Nutrient Management

Implementing biological phosphorus removal is expected to increase maintenance requirements in the solids process due to scaling in pipes, valves, and tanks. The extent of that impact is nearly impossible to predict during design; thus, solids improvements will be phased as needed to mitigate these impacts. The implementation plan makes use of existing assets in the near term with minimal capital expense, while building more advanced systems in future years.

This plan initially includes converting an existing solids holding tank into a redundant PAD so operators can drain and clean a PAD unit without affecting plant performance. A pilot-scale, calcium-based chemical feed system will support applied research for staff to test different approaches for a more advanced, full-scale system. Additionally, this approach allows staff to continue to monitor market conditions and assess whether phosphorus recovery becomes economically viable in the future. This combination of a redundant PAD and calcium chemical feed system requires less chemical, will produce less biosolids, and will result in the lowest amount of truck traffic as compared to the other alternatives considered. The locations of the piping and existing structure that will be modified for these upgrades are highlighted in orange in Figure 1.

3.3 Existing Asset Revitalization

The Phosphorus Upgrades Project includes asset revitalization in the primary and solids treatment processes. The respective capacities of these systems will remain unchanged. The extents of these efforts are dependent on available funding, and they are highlighted in yellow in Figure 1. This rehabilitation allows the city to maximize its beneficial use of existing infrastructure.

3.4 Coordination with Other City Projects

The Phosphorus Upgrades Project is located near the terminus of the Main Sewer Improvements (MSI) Project, and a small project is also being completed to replace a failed clarifier mechanism on campus.

The MSI Project will construct both a new interceptor pipeline from the area of Butte Mill Road to the WRRF (largely through private property and open space), as well as a new inverted siphon that crosses the Northern Water canal, Jay Road, Boulder Creek, and into the north side of the WRRF. Both projects were approved through Boulder County Planning & Permitting through Dockets SI-18-0003 & SPR-22-0060.

The WRRF will be used for periodic access to these nearby projects, particularly during final tie-ins. When that is occurring, coordination will be required to manage construction traffic on campus and prevent contractors from impacting each other's operations. The city is familiar with this type of coordination: in 2008 and 2009, the Phase 1 Liquid Stream Upgrades and Biosolids Projects were both being constructed on campus simultaneously. In the same manner that those projects did not have a substantial impact on 75th traffic, the city does not expect that these competing projects would adversely affect traffic flow on 75th Street.



City of Boulder Utilities

Traffic impacts for the pipeline projects were discussed in the individual planning reviews for each project. Namely, the Site Plan Review for the inverted siphon replacement included a discussion on lane closures for the Jay Road crossing.

Additional permitting efforts required to construct these discrete projects, such as Stormwater Quality Permits and fugitive dust control plans, will be addressed according to the applicable Boulder County Community Planning and Permitting submittal requirements for each project.

RESOLUTION 2004-75

A RESOLUTION CONDITIONALLY APPROVING BOULDER COUNTY LAND USE DOCKET #SI-04-001 (CITY OF BOULDER WASTEWATER TREATMENT PLANT UPGRADE STATE INTEREST ("1041") REQUEST): A REQUEST FOR APPROVAL OF A PROPOSED UPGRADE TO THE CITY'S EXISTING N. 75TH STREET WASTEWATER TREATMENT PLANT, TO INCREASE WASTEWATER TREATMENT PLANT CAPACITY FROM 20.5 MGD TO 25.0 MGD, TO MEET MORE STRINGENT EFFLUENT LIMITS FOR AMMONIA, TO ULTIMATELY COMPLY WITH ANTICIPATED FUTURE WATER QUALITY LIMITS FOR NITRATE AND/OR TOTAL INORGANIC NITROGEN AND PHOSPHOROUS, AND TO ELIMINATE THE USE OF GASEOUS CHLORINE FOR WASTEWATER DISINFECTION THROUGH CONVERSION TO AN ACTIVATED SLUDGE TREATMENT SYSTEM, AT THE CITY'S WASTEWATER TREATMENT PLANT LOCATED AT 4049 N. 75TH STREET, IN THE SOUTHWEST QUARTER OF SECTION 13, T1N, R70W

WHEREAS, the Board of County Commissioners of the County of Boulder ("the Board") has duly approved and adopted regulations to designate areas and activities of state interest and to govern the administration of any designated activities and areas of state interest in unincorporated Boulder County pursuant to Article 65.1 of Title 24, as amended, commonly referred to as House Bill 1041 ("the 1041 Regulations"), which are codified as Article 8 of the Boulder County Land Use Code ("the Land Use Code"); and

WHEREAS, in pertinent part here, the 1041 Regulations designate the following activities of state interest which require application for and approval of a County permit, all as further set forth in the Regulations:

Site selection and construction of major new domestic water and sewage treatment systems, and major extension of existing domestic water and sewage treatment systems, as defined in Sections 25-9-102(5) ("wastewater treatment plant"), 25-9-102(6) ("water supply system"), and 25-9-102(7) ("water treatment plant"), C.R.S. (see Sections 24-65.1-104(5) and 24-65.1-203 (1)(a)); and

WHEREAS, the City of Boulder ("Applicant" or "City") has applied to the County for a 1041 ("state interest") permit to make certain improvements to its existing N. 75th Street wastewater treatment plant, which is located as described in the caption to this Resolution, above, in the Agricultural Zoning District in unincorporated Boulder County; and

WHEREAS, the proposed upgrade includes increasing the capacity of the wastewater treatment plant from 20.5 million gallons per day ("MGD") to 25.0 MGD (the capacity anticipated to serve the City's ultimate build-out at or around the year 2025), as required by the

Colorado Department of Public Health and Environment; to make improvements to reduce the amount of ammonia in the plant effluent to meet recent changes in the ammonia limitations in the City's water quality discharge permit as required by the State Water Quality Control Division; to eliminate the use of chlorine gas for disinfection and convert to a phased activated sludge process including, among other measures and improvements, the installation of an ultraviolet light disinfection system; and to ultimately provide the additional improvements necessary to meet anticipated future water quality discharge limitations affecting the plant effluent with respect to nitrate and/or total inorganic nitrogen and/or phosphorous; and

WHEREAS, the City proposes to accomplish the upgrade project in two phases: Phase 1, anticipated to be commenced in 2005 and required by the State Water Quality Control Division to be completed by January 25, 2008, and Phase 2, anticipated to occur between 2010 and 2015; and

WHEREAS, Phase 1 is proposed to include the addition of two new aeration basins, a new blower building, a secondary clarifier, and two dissolved air flotation devices; modification of the existing return activated sludge pumping structure; and demolition of a trickling filter and an existing scrubber building; and

WHEREAS, Phase 2 is proposed to include the addition of an aeration basin and a 2,000 square-foot chemical building, as well as the demolition of another trickling filter; and

WHEREAS, with respect to water quality control, Phase 1 is designed to meet the new, more stringent limits for effluent ammonia discharge, while the anticipated required reductions in nitrate/total inorganic nitrogen and phosphorus discharges will not be addressed until Phase 2; and

WHEREAS, the subject wastewater treatment plant upgrade request was processed and reviewed as Boulder County Land Use Docket #SI-04-001 ("the Docket"), all as further described in the memorandum and written recommendation of the Boulder County Land Use Department dated June 1, 2004, with its attachments ("the Staff Recommendation"); and

WHEREAS, on May 19, 2004, the Boulder County Planning Commission ("Planning Commission") held a duly-noticed public hearing on the Docket, based upon which it made a recommendation to the Board to approve the proposed upgrade with conditions; and

WHEREAS, on June 1, 2004, as continued to June 24, 2004 and July 6, 2004, the Board held a duly-noticed public hearing on the Docket ("the Public Hearing"), at which time the Board considered

the Staff Recommendation and the recommendation of the Planning Commission, as well as the documents and testimony presented by the County Land Use Department Planning staff, the County Attorney's Office, representatives of the Applicant, and several representatives of downstream agricultural ditch companies and other members of the public expressing concern with the Docket, all as further reflected on the official record of the Public Hearing; and

WHEREAS, based upon the Staff Recommendation and the evidence presented at the Public Hearing, the Board finds that the Docket, subject to the conditions stated below, meets the applicable criteria contained in the 1041 Regulations, and can be approved on that basis.

NOW, THEREFORE, based upon the findings made and incorporated into this Resolution, and as supported by the record of the Public Hearing judged against the applicable criteria of the 1041 Regulations, **BE IT RESOLVED** that the Docket is hereby approved, subject to the following conditions:

1. Prior to the issuance of any permits, the Applicant shall obtain and provide verification of all applicable permits and approvals as required and necessary under state and federal law. These may include, but are not limited to, water quality discharge permits and the like. The operation of any aspect of this proposal that does not comply with the terms and conditions of all required permits shall be grounds for County action under the enforcement provisions of the 1041 Regulations.
2. Construction materials and colors shall be consistent with the existing development. No reflective materials shall be used. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall submit to, and have reviewed and approved by the County Land Use Department, a materials and color pallet.
3. Exterior Lighting shall be down-cast and shielded in accordance with Article 7-1600 of the Land Use Code. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall submit to, and have reviewed and approved by the County Land Use Department, an exterior lighting plan.
4. The Applicant shall install substantial vegetative screening along the north side of the facility to reduce visual impacts to surrounding public and private properties. Deciduous trees must meet minimum size requirements of 2.5 inches in diameter while evergreen trees must be no less than six feet in height. Naturalized clusters are preferred to rows and regular spacing. At a minimum, the Applicant shall install and maintain 18 native trees along the north

side of the facility. The landscape screening plan and plant schedule must be submitted to, and reviewed and approved by, the County Land Use Department, prior to the issuance of any permits or authorization of any activity governed by this approval.

5. Noise levels shall not exceed those which currently exist at the property line. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide and have reviewed and approved by the County Land Use Department a study of existing noise levels for both the wastewater treatment plant operation and power plant operations. The noise study shall be a baseline to identify existing noise in relation to potential increases in nuisance noise caused by the approved upgrade project, and shall identify noise mitigation measures. In addition:
 - a. Hours of construction are limited to between 7:00 a.m. and 7:00 p.m., Monday through Friday, unless otherwise approved by County staff subject to prior notification and consultation with adjacent property owners.
 - b. The Applicant shall provide a comparative noise analysis to the County Land Use Staff prior to construction of Phase 2 and shall demonstrate implementation of mitigation measures as identified in the study.
6. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide to, and have reviewed and approved by the County Land Use Department and Transportation Department, a traffic management and control plan.
 - a. The Applicant shall attempt to keep the public trail open throughout the construction period. If a closure is necessary, the Applicant shall provide adequate notice to the County Land Use and Transportation Departments and signage for the public.
 - b. The Applicant shall provide a construction schedule and traffic construction schedule (see also Condition #5.a. above).
 - c. The applicant is advised of weight limit restrictions on adjacent roadways and shall demonstrate compliance with other County Transportation Department requirements.
 - d. In the event that the proposed construction coincides with other significant construction near the facility, the County reserves the right to coordinate construction impacts, traffic, and related activities to limit congestion and adverse impacts on adjacent roadways and neighboring property owners.
7. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant shall provide a copy of an approved fugitive dust mitigation plan

to the County Land Use Department for this site and all related construction activities.

8. All final grading/re-vegetation/erosion control plans for the new facilities shall be reviewed and approved by Boulder County prior to issuance of any permits or authorization of any activity governed by this permit.

- a. The maximum preservation of existing trees is required within the site.

9. Nuisance odor levels shall not exceed those which currently exist at the property line. Prior to the issuance of any permits or authorization of any activity governed by this approval, the Applicant will provide to and have reviewed and approved by the County Land Use Department a study of existing odor sources/levels and particulate concentrations at the property line. The odor study shall be a baseline to identify existing odors in relation to potential changes or increases in nuisance odors caused by the approved upgrade project, and shall identify odor mitigation measures.

10. The County accepts the Applicant's commitment of record that even with the added wastewater flows which will result from the approved upgrade project, total pounds of nitrogen in the wastewater treatment plant's effluent discharged to Boulder Creek will not increase beyond current levels. The Applicant has based this commitment upon modeling calculations to which the Applicant and its consultant testified at the Public Hearing, showing that the activated sludge process to be installed in the approved project will reduce total pounds of nitrogen in the effluent by 20% to 30%.

- a. As a basis for implementation and enforcement of the Applicant's commitment that total pounds of nitrogen in the effluent will not increase beyond current levels, the Applicant shall, prior to the issuance of any permits or authorization of any activity governed by this approval, submit to and have reviewed and approved by the County Land Use Department an effluent nitrogen baseline/monitoring plan. This plan shall contain the following elements:

- (1) the technical basis for the City's conclusion that the upgrade project's activated sludge process will achieve the reduction in total pounds of nitrogen asserted at the Public Hearing; (2) an acceptable baseline establishing the current total pounds of nitrogen in the effluent from the Applicant's wastewater treatment plant; and (3) a system for monitoring the total pounds of nitrogen in the effluent on an appropriate periodic basis, beginning once Phase 1 of the upgrade project is completed, and including the provision of regular monitoring reports to the County Land Use Department and to downstream reservoir and ditch companies and water users associations

(including but not necessarily limited to Water Users Association of District No. 6, New Consolidated Lower Boulder Reservoir and Ditch Company, Boulder and White Rock Ditch and Reservoir Company, and the Leggett Ditch and Reservoir Company).

b. The Board hereby authorizes and directs the County Land Use Department to retain a qualified and independent, professional water quality control consultant for the purpose of reviewing and evaluating all aspects of the Applicant's submitted effluent nitrogen baseline/monitoring plan as required above. With the aid and advice of this consultant, the Land Use Department shall determine whether the Applicant's submitted plan is adequate to provide a reasonable basis for (1) verifying the Applicant's conclusion presented at the Public Hearing that total pounds of nitrogen in the effluent will not increase under the upgrade project, and (2) monitoring and enforcing the Applicant's commitment that the upgrade project, once completed, will not increase total pounds of nitrogen in the effluent beyond the established baseline level. If the Land Use Department determines that the plan is not adequate for this purpose, the Land Use Director shall schedule a duly-noticed public hearing before the Board, so that the Board can determine whether the submitted plan reasonably fulfills the purpose and intent of this condition.

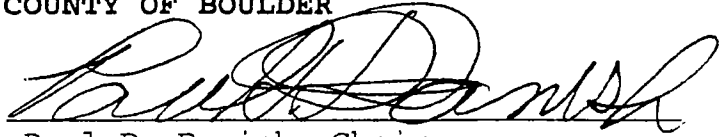
11. The County shall conduct periodic or interim reviews to assess the Applicant's compliance under this approval, and to determine whether, under the applicable criteria of the 1041 Regulations, new conditions of approval should be imposed or the original conditions modified, reduced or waived to accommodate changing technology, knowledge of new health concerns, or other new information not available at the time of this approval. Interim reviews shall occur generally every five years after the issuance of permits under this approval for Phase 1. In addition, the County may also conduct a review two years prior to the anticipated commencement of construction of Phase 2: to this end, the Applicant shall inform the County Land Use Department at the time it believes that it is two years away from commencing Phase 2. The reviews shall be conducted as duly-noticed public hearings before the Planning Commission and the Board. Nothing in this condition shall limit the Board from taking enforcement action under the 1041 Regulations at other times as may be necessary.

12. The Applicant shall be subject to the terms, conditions and commitments of record and in the file for the Docket.

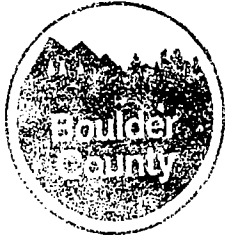
A motion to approve the Docket, as stated above, was made by Commissioner Stewart, seconded by Commissioner Mayer, and passed by a 3-0 vote of the Board.

Adopted this 3rd day of August, 2004, nunc pro tunc the 6th day of July, 2004.

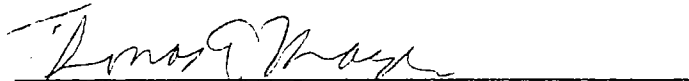
BOARD OF COUNTY COMMISSIONERS OF THE
COUNTY OF BOULDER



Paul D. Danish, Chair



Ronald K. Stewart, Vice Chair



Thomas A. Mayer, Commissioner

ATTEST:


Clerk to the Board

Traffic Management and Control Plan 75th Street WWTP Upgrades

Contractor: Garney Construction
10822 West Toller Drive, Suite 100
Littleton, CO 80127

Prepared by: Matt Wampler
Project Manager
(720) 339-5973 – mobile

Project Location: 4049 75th Street
Boulder, CO 80301

The 75th Street WWTP is located at 4049 North 75th Street, in the southwest quarter of section 13, T1N, R70W. The plant is recessed approximately 1500 feet west of 75th Street. Because of this distance there is minimal traffic disturbance anticipated on 75th Street. The only such disturbance will be from traffic turning in and out of the plant entrance drive. However, in the best entrance of this project we have decided to add signage north and south of the plant entrance. The signage will warn drivers of construction activity. Please reference the traffic control plan showing this signage.

All of the contractor's employees will park at a designated parking area located on the east boundary of the plant and then be transported to the plant site via group-transit; this will limit car activity within the plant boundary. All delivery trucks will be routed via signage to check in at the contractor's office setup on the east boundary of the plant before accessing the plant. Signage will be posted on the plant entrance drive warning passerby's of construction activity. Reference the attached site drawing for signage.

There is an existing public walking trail located to the west and north of the existing plant. West of the existing plant this trail is within feet of the existing chain link boundary separating plant property from the trail. This fence will stay in place at all times. In addition to this fence the contractor will add orange safety fence in the same location. There may be periods of time where on-site construction activities warrant a temporary trail closure, such as overhead loads suspended by mechanical means directly adjacent to the trail. If such an instance the contractor will notify Boulder County and request for a temporary closure approval. The contractor will provide the appropriate flagging and signage warning of temporary closures. Flagging will only be required if the trail is temporary shut-down. Reference attached drawing for signage and trail closure locations. Regardless of trail closures, caution signs will be placed on both ends of the trail near the construction for the duration of activity in this area.

If at any time the contractor needs to gain access to the trail, they will re-evaluate their situation and submit for approval a revised traffic control plan. In any such instance all weight limit restrictions as per the County Traffic Control Department will be adhered to.

Reference the attached drawing showing the site and all areas of anticipated traffic control.



CITY OF BOULDER

Department of Public Works/Utilities Division
PO Box 791
1739 Broadway
Boulder, Colorado 80306

Feb. 24, 2006

Dear WWTP Neighbor,

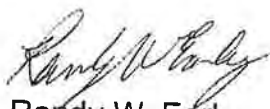
This letter is to advise you of an increase in construction traffic on 75th Street that may impact you. As you are probably aware, there are several construction projects beginning along a corridor on the east side of Boulder. One of these projects is the City of Boulder's Wastewater Treatment Plant (WWTP) Liquid Stream Improvements Project at the facility on 75th Street. Although this project includes no work in or adjacent to the road, there will be construction related traffic that in combination with the other, non-city related, road construction projects in Valmont, Arapahoe, Jay Road and 75th Street may cause some slight additional traffic delays.

The WWTP project will require materials delivery and removal trucks to travel along 75th Street. Trucks will be turning into and out of the WWTP access road south just of Boulder Creek. To reduce the impact on 75th Street traffic, the trucks will be restricted to right turns during the peak traffic hours. The volume of construction traffic from this project and the associated traffic impact will vary throughout the project which is scheduled to take two and one-half years.

Please be aware of the limitations of these large trucks and drive cautiously around them. Because of their size and weight, these trucks have limited visibility in certain areas and cannot stop as quickly as passenger vehicles. Also, please remind your children of the hazards associated with the large trucks, construction projects and traffic in general and urge them to be extra careful around these construction zones.

As the project continues, you may receive more information on work that may be noticeable to you. We will continue to work to mitigate and minimize any impacts of this project. If you have questions concerns and comments regarding the construction project, please contact me at 303-441-3266.

Sincerely,



Randy W. Earley
Utilities Project Manager



Lorantos, Adrienne

From: Riley, Anita A.
Sent: Tuesday, February 21, 2006 2:11 PM
To: Walters, Rosalyn; Swirhun, Lesley; Tidwell, Tom; Plank, Ted; Willard, Natalie; Reed, Andy; Bath, Joe; Thomas, Mike; Lorantos, Adrienne
Subject: City of Boulder Wastewater Treatment Plant construction

The City of Boulder is about to begin construction to improve the wastewater treatment plant facilities at N. 75th Street. Construction should continue through May 2008. We will be conditionally approving the building permit with no construction traffic restrictions based anticipated operations not significantly affecting traffic during peak hours. Should you hear of any complaints regarding this project, please forward them to my attention. Isn't nice it to who to pass the buck to?

For background information-

During our meeting this afternoon, we decided on the following conditions:

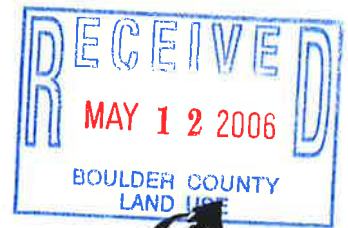
- right in/ right out (RI/RO) movement for construction traffic, and
- safety meetings for drivers

These conditions will be enforced in the following ways:

- RI/RO movements will be monitored as necessary
- 3 or more complaints of similar nature within a 6-month time period will result in a stop work order
- Boulder County will relay any complaints to the contractor as they are received

Anita Riley
Transportation Planner
Boulder County Transportation Department
PO Box 471
Boulder, CO 80306
aariley@co.boulder.co.us





CITY OF BOULDER

Department of Public Works/Utilities Division
PO Box 791
1739 Broadway
Boulder, Colorado 80306
(303) 441-3266
(303) 441-4271 FAX

May 10, 2006

WWTP Neighbor,

This letter is to inform you that the contractor on the 75th Street Wastewater Treatment Plant (WWTP) Liquid Stream Improvement project, Garney Construction, has requested to work on selected Saturdays. The WWTP project has been underway since January and has made good progress to this point. This construction is scheduled to continue through July 2008. In order to continue meeting the project schedule over the long course of the construction, the contractor would like the flexibility to work on occasional Saturdays after notification of Boulder County.

Garney Construction and the city of Boulder feel Saturday work will have minimal impact on the surrounding neighborhoods and should be an acceptable practice for this project. The contractor has made this request for the following reasons:

- 1) Some construction work needs to follow other work in a specific order within a limited time period for efficiency and effectiveness. For example concrete forms must be removed from walls and slabs 24 hours after the concrete has been placed. Otherwise, removal of the forms can be difficult and damage the cured concrete if left on too long or removed too soon.
- 2) Although we have had good weather and not lost work days so far, over the course of the project we are sure to encounter periods when the weather conditions will delay construction.
- 3) We can foresee situations during this 30 month construction where having the ability to perform some work on selected Saturdays will ease scheduling problems which will effectively shorten the overall project length or enable the contractor to meet the schedule and complete the project on time.
- 4) Additionally, the flexibility to work on selected Saturdays with prior notification should reduce traffic load on 75th Street during the work week.

Garney Construction does not plan to work on all Saturdays but they would like to have the ability to work on some Saturdays. They would use these Saturdays to make up for lost time or take advantage of good weather. Also, they would notify Boulder County prior to any significant Saturday work.

If you have concerns about the contractor working on selected Saturdays, please contact me and express those concerns. I would like to collect your comments and respond within the next two weeks. I can be reached by telephone at 303-441-3266 or by email at earleyr@ci.boulder.co.us. We, the City of Boulder and Garney Construction, will make every effort to continue to minimize the impacts of this project on the public.

Sincerely,

Randy W. Earley
Utilities Project Manager

cc- David Callahan, Boulder County Land Use Department

**75TH STEET WASTEWATER TREATMENT PLANT UPGRADES
STORMWATER MANAGEMENT PLAN (SWMP)**

**Prepared by Garney Construction
December 13, 2005**

1. Site Description

- a) The construction work for the 75th Street Wastewater Treatment Plant Upgrades project consists of a series of improvements to the existing City of Boulder WWTP to expand the treatment capacity from 20.5 million gallons per day to 25mgd, and to convert the secondary treatment process from a Trickling Filter/Solids Contract Process to an Activated Sludge Process. These improvements are being driven by a compliance date of November 2007 to have the upgrades process started up and meeting the City of Boulder's revised discharge permits at that time.

The project includes construction of a new secondary pump station, three new activated sludge aeration basins, a new blower building, and a new secondary clarifier. Other project work includes demolition of select existing facilities; miscellaneous site piping, grading, and landscaping work; and upgrades to the electrical and instrumentation and control systems.

Site restoration includes seeding open areas that are disturbed during construction and permanent landscaping and planting, and an irrigation system.

- b) The proposed sequence of activities are as follows:
1. Demolition of existing trickling filters to accommodate space for three new aeration basins.
 2. Construction of new aeration basins. The associated construction activities include excavation, subgrade preparation, concrete, masonry, mechanical, electrical and backfill of structure.
 3. Construction of new blower building. The associated construction activities include excavation, subgrade preparation, concrete, masonry, mechanical, and backfill of structure.
 4. Construction of new secondary clarifier. The associated construction activities include excavation, subgrade preparation, concrete, masonry, mechanical, electrical and backfill of structure.
 5. Other construction activities that will be completed concurrently with the above listed activities are the associated yard piping to connect new piping to provide service to new and upgraded processes. In addition, to the yard piping there will be new electrical ductbanks installed on-site.
 6. Finish activities include paving and grading, minor curb and gutter, finish grading, landscape planting, and landscape irrigation.
- c) The estimated total area of the site is approximately 10 acres. The estimated site disturbance is approximately 7.5 acres of which include 3.5 acres of disturbance at the temporary office setup location and 4 acres of disturbance for new construction.
- d) The project site is contained within an existing flood berm which protects the plant from flood waters. This berm will also serve as an erosion control barrier between the construction site and land adjacent to the site. The berm is located at the perimeter of the WWTP site and is constructed of clay fill material and a slurry wall to a depth of approximately 30'. There is one primary 18" storm water outlet for drainage of the site. The drains are located at the northern boundary of the site. The potential for erosion of the existing site is minimal due to extensive landscaping, paving, concrete structures and drainage pans. During construction surface runoff is likely to occur due to snowstorms and subsequent melting in the winter and spring months. Precipitation in the form of rain is also likely as the weather warms and the seasons change. However, due to the existing landscaping

Disturbed areas should be stable once backfilled and fine graded, and will be ultimately be stabilized by seeding and mulching, or covered by concrete flatwork and asphalt. Once growth is established, the disturbed areas will return to their pre-construction state.

The existing site consists of a variety of land use types as shown in Appendix A of the General Permit Application. The site includes large open-air concrete structures, landscaping, and asphalt roadways. The *land use's* represents a different runoff coefficient for each type. The estimated runoff coefficient of the site ranges as follows:

- I. Prior to construction = 0.18 – 0.95
- II. After construction = 0.18 – 0.95

- e) The site consists of a variety of land use types. The site includes large open-air concrete structures, landscaping of sod and native seeding, and asphalt roadways. The site is approximately 40% structures and flatwork and 60% landscaped.
- f) During construction an added potential source of pollution is from the fueling and servicing of construction equipment. A 500 gallon fuel tank will be placed at the northern boundary of the project. The tank will be contained within an earthen berm lined with plastic. In addition to the fuel tank, minor amounts of day-to-day chemicals/products such as marker paint, pipe lubricant, gasoline, motor oil and the like will be stored in a tool van when not needed.
- g) A CDPHE Construction Dewatering Permit has been applied for, and the discharges from dewatering will be monitored and reported in accordance with the permit. Discharges of groundwater will not be made in a manner that causes surface erosion or sedimentation. An existing irrigation will remain in service during construction to water undisturbed areas. The excess water will drain to the two outlets at the northern perimeter of the site.
- h) The surface water generated at the site drains to the low-point of the site and then to Boulder Creek. There are no discharges to a storm sewer system. The existing outfall consist of one 18" pipe through the clay flood berm and then through a buffer zone before entering Boulder Creek. There is a flap gate installed on the exterior side of the berm to prevent backflow of floodwater into the plant.

2. Site Map

See attached site map.

3. BMP's for Stormwater Pollution Prevention

a) Erosion and Sediment Controls

- 1) **Structural Practices** – Silt fences will be installed on the downstream sides of the temporary office setup as shown on the site map. Additional silt fencing will be provided at the storage area located at the northern perimeter of the site as shown on the site map. Settling ponds built of straw bales will be installed in the existing drainage pan located on the northern perimeter of the site to act as silt barriers for storm water. Silt fences and straw bails will be repaired or replaced immediately upon inspection of deterioration or damage. Earthen dikes may be constructed to control the path and/or flow rate of stormwater if necessary. In the event that a defined path of drainage is observed, check dams will be used to control the concentrated flow of stormwater from the site.
- 2) **Non-Structural Practices** – If site conditions warrant interim controls, mulching and/or geotextile fabrics will be installed. The limits of construction will be clearly defined by silt fencing, safety fencing, and/or staking and flagging to protect existing vegetation outside of the work zone. No construction activities are expected outside of the limits of construction and designated staging area.

b) Materials Handling and Spill Prevention

- 1) It is not anticipated that the construction procedures or the materials handled at the site will contribute pollutants to stormwater runoff. Excavated material will be stockpiled in a common area and silt fence will be provided at the exterior the stockpile footprint. Any fuel or other contaminate spill will immediately be contained and the contaminated soil will be put on an impervious material for immediate removal and proper disposal at a designated landfill. Fuel supply lines will be locked and only authorized personnel will have access to the keys. Local, State, and Federal regulations will be followed.

4. **Final Stabilization and Long-term Stormwater Management**

The construction site will be re-vegetated upon completion of construction. The site will be landscaped through seeding and sodding of disturbed areas by professionals employed by the contractor. Silt fences and straw bales will remain in place after construction until final stabilization is completed at which time they will be removed and the permit inactivated.

5. **Other Controls**

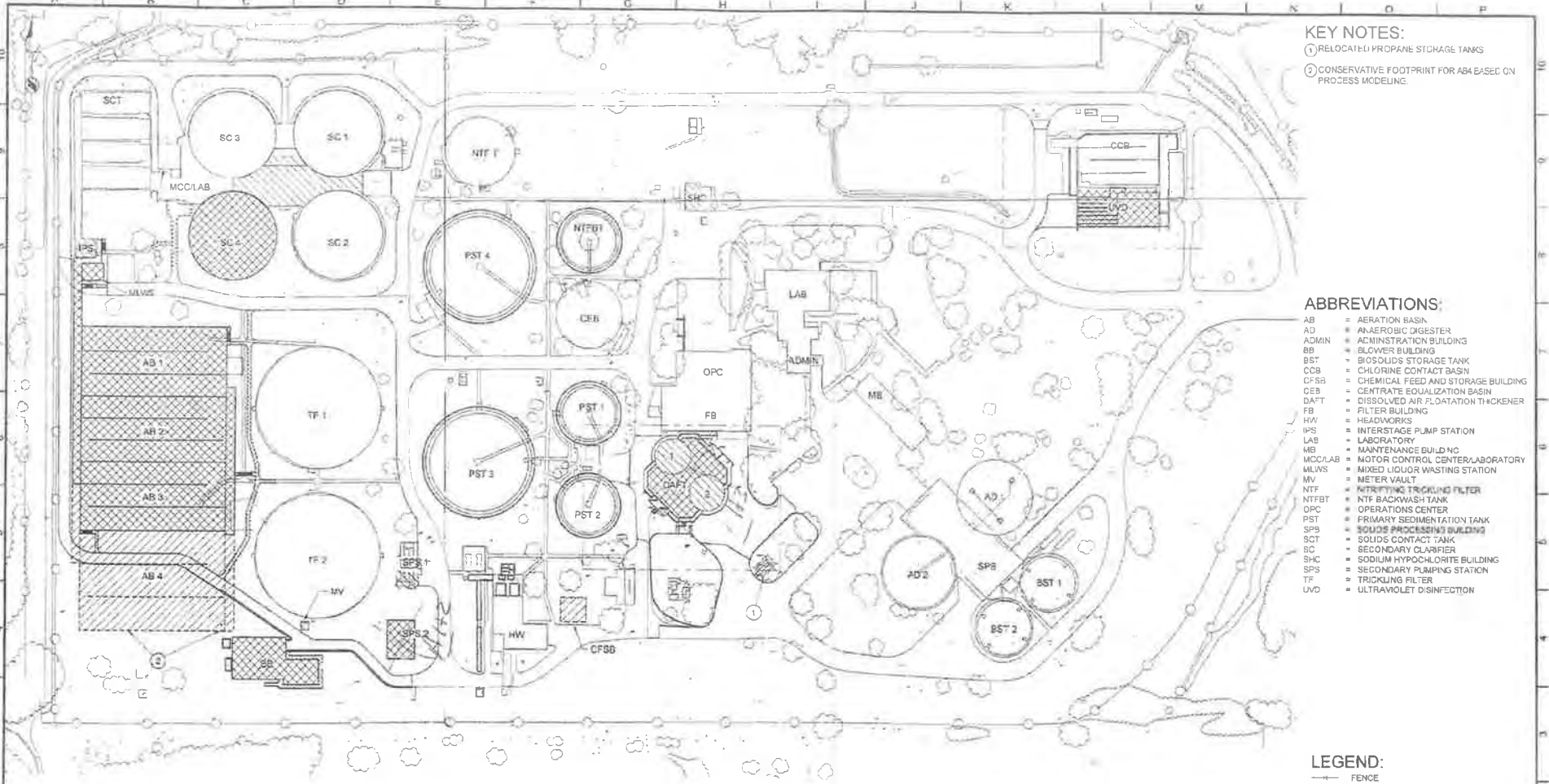
- 1) **Waste Disposal** – Construction debris generated during the course of the project will be collected on a daily basis, loaded into a dumpster and hauled off on a regular basis by a qualified waste disposal firm.
- 2) **Concrete Washout** – A designated area will be provided at the site for concrete trucks to washout in. The washout area will be located such that stormwater will not flow through the washout area, and that the waste will be contained within the berm in which the trucks washout in to.
- 3) **Vehicle Tracking Pad (If required)** – A gravel vehicle tracking pad approximately 40' in depth by 20' in width will be constructed in an effort to limit off-site soil tracking on to paved roads when exiting the site. The entrances will be monitored and any soil tracked on to existing roadways will be removed. If the tracking pad(s) become contaminated and ineffective, they will be removed and replaced with new materials.

6. **Inspection and Maintenance**

- 1) The immediate work area will be monitored on a daily basis. As the areas of disturbance increase as the work progresses, the overall site will be inspected and maintained on a bi-weekly basis. At any time a supervisor notices a failure in the erosion and sedimentation measures the appropriate actions will be taken to appropriately address the failure. Otherwise, deficient erosion and sediment control measures will be repaired or replaced immediately upon the bi-weekly inspection. Upon completion of construction these controls will be inspected and maintained until final stabilization of the various portions of the site is achieved. Once an area has established vegetation and it is desirable to remove the erosion and sediment control measures, they will be removed. Once the entire pipeline alignment is stabilized, all remaining erosion and sediment control measures will be removed and the contractor will request to have the stormwater permit inactivated.

GENERAL NOTES:

- KEY NOTES:**
- ① RELOCATED PROPANE STORAGE TANKS
 - ② CONSERVATIVE FOOTPRINT FOR AB4 BASED ON PROCESS MODELING



- ABBREVIATIONS:**
- AB = AERATION BASIN
 - AD = ANAEROBIC DIGESTER
 - ADMIN = ADMINISTRATION BUILDING
 - BB = BLOWER BUILDING
 - BST = BIOSOLIDS STORAGE TANK
 - CCB = CHLORINE CONTACT BASIN
 - CFSS = CHEMICAL FEED AND STORAGE BUILDING
 - CEB = CENTRATE EQUALIZATION BASIN
 - DAFT = DISSOLVED AIR FLOTATION THICKENER
 - FB = FILTER BUILDING
 - HW = HEADWORKS
 - IPS = INTERSTAGE PUMP STATION
 - LAB = LABORATORY
 - MB = MAINTENANCE BUILDING
 - MCC/LAB = MOTOR CONTROL CENTER/LABORATORY
 - MLWS = MIXED LIQUOR WASTING STATION
 - MV = METER VAULT
 - NTF = NITRIFYING TRICKLING FILTER
 - NTFBT = NTR BACKWASH TANK
 - OPC = OPERATIONS CENTER
 - PST = PRIMARY SEDIMENTATION TANK
 - SPS = SOLIDS PROCESSING BUILDING
 - SCT = SOLIDS CONTACT TANK
 - SC = SECONDARY CLARIFIER
 - SHC = SODIUM HYPOCHLORITE BUILDING
 - SPS = SECONDARY PUMPING STATION
 - TF = TRICKLING FILTER
 - UVD = ULTRAVIOLET DISINFECTION

- LEGEND:**
- FENCE
 - ▨ PHASE 1 (CURRENT PROJECT)
 - ▩ EXISTING TO BE MODIFIED
 - ▧ EXISTING TO REMAIN
 - ▨ FUTURE PHASE

SITE PLAN
SCALE: 1" = 50'

1987 Cole Blvd, Suite 200 Golden, Colorado 80401 303-239-5400 www.strongbuild.com	PROJECT NO: 15-0000 DATE: 12/15/15 DRAWN BY: JMM CHECKED BY: JMM APPROVED BY: JMM	EXTERNAL REFERENCE FILES: 15-0000-01-001 15-0000-01-002 15-0000-01-003 15-0000-01-004 15-0000-01-005 15-0000-01-006 15-0000-01-007 15-0000-01-008 15-0000-01-009 15-0000-01-010	REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>BY</th> <th>DATE</th> <th>APP.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DESCRIPTION	BY	DATE	APP.																					 CITY OF BOULDER 75TH STREET WASTEWATER TREATMENT PLANT	UPGRADES PROJECT GENERAL SITE PLAN G-00-006
				NO.	DESCRIPTION	BY	DATE	APP.																						
SUBMITTED: <i>[Signature]</i> DATE: _____ APPROVED: <i>[Signature]</i> DATE: _____																														

ATTACHMENT # 3

September 26, 2004 (revised 1/4/05, revised 12/7/05)

Draft Odor and Noise Monitoring and Control Plan

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Monitoring Odor levels

Locations monitored

Frequency of Testing

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Background

The City of Boulder must construct improvements to its wastewater treatment facilities to meet new discharge limitation for ammonia that will take effect in 2008.

Boulder County, as a condition of its 1041 Matters of State Interest approval for the wastewater treatment plant upgrade project approval, required the City of Boulder to limit odor and noise to the currently existing levels at the plant. Although the city's utilities division intention was to continue to address noise and odor complaints as they occur as we have in the past, a practice which has yielded favorable community response. The county commissioners felt that this was inadequate and required plans to establish the existing levels of odors and noise, monitor the odors and noise from the plant, and set up a methodology to address odor and noise problems should they exceed the levels currently existing at the plant. Obviously, the city felt that Boulder County should only hold the wastewater treatment plant to the county wide limits imposed in their existing ordinances and that if these were inadequate the county should revise their standards county wide.

However, this plan is provided to meet the conditions of the 1041 approval. Since the utilities division, based upon industry experience, believes that the facility's new processes will not increase odors or noise in any way. The noise will be controlled via noise attenuation features that will be built into the new structures and odors will still be primarily from solids processing and anoxic raw sewage which will not be changed because of this project.

Each plan is broken into three segments to address the 1041 approval conditions:

- 1) Establishing the Baseline Levels of the existing treatment processes
- 2) Ongoing Monitoring to Demonstrate Compliance with the 1041 requirements
- 3) A Strategy for Addressing Noise and Odor Excedances

Existing Site and Process Descriptions

The existing treatment processes at the plant include liquid stream and solids handling units.

Liquid Stream Treatment

The wastewater passes through the headworks processes in which grit, rags and large solids are removed from the flow stream. Solids removed in these primary treatment units are disposed of in the landfill. These processes and the headworks building are removing materials from the raw sewage. Raw sewage is a primary odor source in the treatment plant. The headworks buildings, due to the gases associated with the raw sewage, have large fans which add to the noise and move large volumes of air out of the headworks building.

After large and heavy materials are removed the sewage passes into the primary clarifiers. These units settle out rapidly settling and floating materials. The floating and settling solids are wasted to the solids handling processes which are addressed below. Neither the processes in the headworks nor the primary clarifiers are planned to be changed with this project so no impact to noise or odor is expected.

The liquid treatment stream continues through the fixed film or trickling filter units for removal of organic materials that is converted into biomass and reduces the Biochemical Oxygen Demand (BOD) of the wastewater. The wastewater has to be pumped from the primary clarifier elevation up to the tops of the trickling filters. This pumping station generates noise.

The fixed film process can generate odors as the zoogeal mass grows thick and creates anaerobic zones under the aerobic portion of the organic mat before sloughing off. The anaerobic areas create odors. Any plugging of the underdrain system or short circuiting within the trickling filter can result in additional anaerobic zones and odors.

The wastewater then flows to the solids contact process in which settled solids are recycled back into the flow stream to achieve a flocculated or larger particle which settles at higher velocities in the next process, the final clarifiers. The Solids Contact Process is aerated with large blowers that keep the sewage and returned sludge aerated and well mixed. The blowers, as well as the return sludge pumps, are noise sources in the existing process. Since the solids contact process is aerobic, no significant odors are generated in the process.

The final clarifiers remove the biomass generated from the conversion of wastewater organics into microbiological cell growth during the biological treatment process. The biosolids are wasted, via pumping, to the solids handling processes.

After the final clarifiers, part of the liquid stream is pumped over a fixed film nitrification process to remove ammonia. This is an aerobic process and has little odor associated with it. There is noise associated with the pumping required in this process.

Last, the wastewater is disinfected with chlorine and dechlorinated prior to discharge to Boulder Creek. There is no noise or foul odor associated with the disinfection/dechlorination process.

Occasionally the treatment chambers and units are taken out of service for inspection and cleaning. During the cleaning process odors develop that can be worse than normal operation.

Solids Handling and Treatment

The solids wasted from the primary clarifier as scum and sludge along with the biomass wasted from the secondary clarifiers under-flows are combined and fed into the solids thickener. This process collects the underflows from the primary and secondary clarifiers and settles the solids again into a thickened form. The thickened sludge is pumped from the bottom of the thickener to the digester which breaks down unstable materials. After digestion, the sludge is again thickened in centrifuges before being loaded into trucks for land application.

These solids handling facilities are major contributors to odors in most wastewater treatment plants. Additionally, one product of the digestion process is methane gas which is used to run generators on site. These generators produce energy that is sold back to Xcel Energy to help defray the operating cost of the wastewater treatment plant. These generators are noisy units and have resulted in noise complaints in the past.

However, these solids handling units, with one exception that is explained in the proposed improvements section, will not be modified in this project. So no increase in noise or odor is expected from these processes due to the upgrade project.

Proposed Site and Process Description

The raw sewage and solid handling processes will be basically unchanged after this project with the exception of the addition of a DAF (Dissolved Air Flootation) sludge thickening unit. This process off gases to some degree but the units will be enclosed and the gases will be containable. The addition of air to the sludge removes the anaerobic nature of the solids and serves to 'freshen' the sludge. Both of these factors should result in reduced odors at the plant.

(As of 12/2005 the conversion of the gravity thickeners to DAF thickeners has not been awarded. This process was deleted from the awarded project due to budgetary constraints. A separate DAF to thicken only the waste activated sludge is in the conceptual design phase.)

Biological Treatment Upgrades

The fixed film processes will be replaced with activated sludge process. The activated sludge process, like the fixed film process was initially developed to achieve secondary treatment, that is removal of BOD. However, the activated sludge process has been adapted to provide removal of additional pollutants over time. The nature of the system allows flexibility of operation for the removal of ammonia, the constituent we are required to remove in this upgrade.

The activated sludge process will replace the trickling filter towers with aerated basins. These basins have controllable oxygen concentrations and no 'dead air' or unmixed zones. An anoxic zone will be required to achieve sludge conditioning for improved settling and nitrogen removal. However, these zones are relatively small and no more odiferous than the primary clarifiers. The odor associated with these basins is typically described as 'earthy' but not objectionable. These basins will be located on the west side of the site. The blowers providing aeration will be a noise source as will the return pumps which recycle the mixed liquid within the activated sludge basins.

UV Disinfection System

The existing chlorination/dechlorination system will be replaced with a Ultra Violet Light disinfection (UV) system. The UV system will require a backup power source in the form of an onsite generator which will be a source of noise. There should be no odor concerns associated with the UV disinfection process.

(As of 12/2005 the UV disinfection system has not been awarded due to budgetary constraints. The city hopes to add this process back into the project when overall costs become clear or, if that's not possible, to include it in phase 2.

Construction Disturbances

Transitional odor sources will develop during construction but will be short term between the time the units are taken off line and when the units are demolished or cleaned. Of

draft noise and odor control plan

primary concern are the trickling filter processes both secondary treatment filters and nitrification filter. These units will have to be disinfected and flushed with high flow rates to clean them of potential putrefaction sources. Additionally, the noise associated with the construction will be significant in level but relatively short lived. Anticipated noisy construction phases will be the demolition of existing treatment units and earthmoving.

Noise Monitoring and Control Plan

The intent of this implementing this plan is to establish the existing noise level at the Boulder wastewater treatment plant. To monitor the noise generated at the site the following procedure will be followed.

Equipment

The noise will be monitored using a sound meter manufactured by Casella or equal manufacturer or meter. The meter will be calibrated and used per the manufacturers recommendations. Any irregularities with the meter will be reported in the Noise Monitoring Report. The same caliber of meter will be used in all phases of the noise monitoring; baseline, monitoring and problem resolution.

The monitoring may be performed by plant staff or contracted out to an environmental consultant. The operators will receive training regarding the nature of noise and use of the sound meter. Alternatively, the monitoring may be contracted out to an environmental testing company. Due to the cost of the meters, training, calibration and shipping, using an outside testing company may be best for the city.

Establishing Baseline Noise Levels

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There are two monitoring locations more or less evenly spaced on each side of the plant. The eight monitoring sites will be representative of noise, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. Also, note that these locations are used for both noise and odor test points. These points will be marked by survey stakes and tied to existing features at the plant. Aerial photographs showing the location of the monitoring points are also attached.

(ATTACH SITE MAP & DETAIL MAP OF LOCATIONS)

Frequency and Duration of testing: Existing baseline noise levels will be established using noise levels the eight test locations at multiple sampling periods. The sampling periods are intended to cover various atmospheric conditions that occur at the site. The locations will be monitored with different operational conditions at the facility. However, a round of monitoring must be completed prior to the beginning of construction because certain phases of the construction will be quite loud. Noise levels will be recorded two times each year before the construction of the upgrades begins in February and May or August. Each site will be monitored for a minimum of five minutes to establish a peak and average sound level.

Record Keeping and Reporting: Results of the monitoring will be recorded in a 'Noise Level Monitoring Report'. Records will be saved in permanent files and a report summarizing the results will be sent to the Boulder County Land Use department. The report will contain average and peak noise levels recorded during the baseline study. This report will be available to the public for a minimal copying fee.

Monitoring Future Noise Levels:

Future noise levels will be monitored after the construction of the new is complete. The noise levels will be checked using the equal caliber of equipment and the same locations that were used to establish the baseline noise levels in the initial testing.

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of noise, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. These locations assure future access and will not be impacted by the treatment upgrades project. Also, note that these locations are used for both noise and odor test points. These points will be marked by metal survey stakes and tied, measured distances, to existing features at the plant. Locations drawings are attached to in the 'Baseline Monitoring' section.

Frequency and Duration of testing: The noise levels will be tested semi-annually. As in the baseline monitoring, noise levels will be monitored for a minimum of five minutes at each location to determine a peak and average noise level.

Reporting and Record Keeping: A report form will be used to record the readings of the decibel meter. The results of the noise level monitoring will be compiled and summarized in an annual report. This report will be sent to the Boulder County Land Use Department and kept on file at the plant for public distribution if requested for a minimal copying fee set by the city policy. This charge is currently \$0.25 per sheet. But the report will be available for perusal and selection of particular sheets to be copied at the plant.

Weather conditions and any significant operational conditions will be recorded on the report form. Results will be recorded on a standard form, also attached in the 'Baseline Monitoring' section.

Addressing Excedences:

When noise readings higher than the average or peak established baseline are recorded, the wastewater treatment plant staff or the environmental tester will investigate the cause of any unexplainable increase in noise. The highest recorded noise levels should be closest to the offending machine or process unless the sound is subject to wind or echoing effects. In any case, an investigation will be performed to determine the source of the problem.

Locations: A preliminary sweep of the area near the problem site should locate the general source of the noise. But it may be necessary to monitor the buildings, outside machinery, and noise sources throughout the site to locate the source of increased noise. The decibel level and frequency output from each component will be monitored to determine the probable cause of the increased noise.

This monitoring will include defining the frequency of the loudest component of the noise at the perimeter monitoring sites and the loudest frequencies of each of the individual buildings and outside machinery or noise source. This will allow identification of the problem source and also indicate which frequency could be reduced to result the greatest reduction in overall noise.

Reduction Measures: Once the problem noise source has been identified, the remedy will be found. This could be installing mufflers on exhaust pipes, additional sound proofing added to buildings or other constructed noise reduction features. This less expensive or maintenance type solutions will be addressed in-house by plant staff. If this fails to reduce the problem then consulting expertise will be brought in to evaluate and reduce the problem noise source.

Odor Monitoring and Control Plan

Equipment:

Odor will be monitored using a meter that records all sulfur compounds present like the Jerome X-31 or equal. The meter will be calibrated and used per the manufacturers recommendations. Any irregularities with the meter will be reported in the Odor Monitoring Report. The same caliber of meter will be used in all phases of the odor monitoring; baseline, monitoring and problem resolution.

The monitoring may be performed by plant staff or contracted out to an environmental consultant. The operators will receive training regarding the nature of odor and use of the monitoring equipment. Alternatively, the monitoring may be contracted out to an environmental testing company. Due to the cost of the meters, calibration and shipping, using an outside testing company may be best for the city.

Establishing Baseline Odor Levels

Locations: Locations will be the same sites used for noise monitoring. The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of odor, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached in the noise monitoring section. These points will be marked by metal survey stakes and tied to existing features at the plant. Detailed locations drawings are also attached.

Frequency and Duration of Testing: Existing baseline odor levels will be established using odor levels the eight test locations at multiple sampling periods. The sampling periods are intended to cover various atmospheric conditions that occur at the site. The locations will be monitored with different operational conditions at the facility. However, all monitoring must be completed prior to the beginning of construction because certain phases of the construction will be quite loud. Odor levels will be recorded twice times each year before the construction of the upgrades begins in February and May or August. Each site will be monitored for a minimum of five minutes to establish a peak and average odor level.

Record Keeping and Reporting: Results of the monitoring will be recorded on the following 'Odor Level Monitoring Report Form'. Records will be saved in permanent files and a report summarizing the results will be sent to the Boulder County Land Use department. The report will contain average and peak odor constituents levels recorded during the baseline study. This report will be available to the public for a minimal copying fee.

Monitoring Future Odor levels:

Future odor levels will be monitored after the construction of the new is complete. The odor levels will be checked using the equal caliber of equipment and the same locations that were used to establish the baseline odor levels in the initial testing.

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of odor, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. These locations assure future access and will not be impacted by the treatment upgrades project. Also, note that these locations are used for both noise and odor test points. These points will be marked by metal survey stakes and tied, measured distances, to existing features at the plant. Locations drawings are attached to in the 'Baseline Monitoring' section.

Frequency and Duration of testing: The odor levels will be tested ~~semi-annually~~. As in the baseline monitoring, odor levels will be monitored for a minimum of five minutes at each location to determine a peak and average odor level.

Reporting and Record Keeping: A report form will be used to record the readings of the odor component meter. The results of the odor level monitoring will be compiled and summarized in an annual report. This report will be sent to the Boulder County Land Use Department and kept on file at the plant for public distribution if requested for a minimal copying fee set by the city policy. This charge is currently \$0.25 per sheet. But the report will be available for perusal and selection of particular sheets to be copied at the plant.

Weather conditions and any significant operational conditions will be recorded on the report form. Results will be recorded on a standard form, also attached in the 'Baseline Monitoring' section.

Addressing Excedences

When odor component readings higher than the average or peak established baseline are recorded, the wastewater treatment plant staff or the environmental tester will investigate the cause of any unexplainable increase in odor. The highest recorded odor concentrations should be closest to the offending process unless the odor is subject to wind or buffeting effects. In any case, an investigation will be performed to determine the source of the problem.

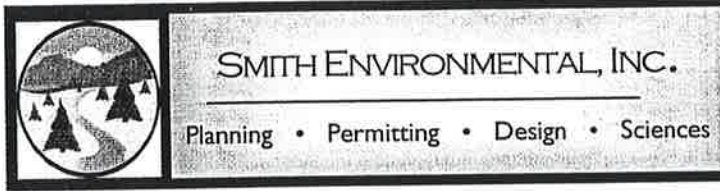
Locations: A preliminary sweep of the area near the problem site should locate the general source of the odor. But it may be necessary to monitor the buildings, outside machinery, and odor sources throughout the site to locate the source of increased odor. The sulfur compound levels and specific sulfur compound output from each component will be monitored to determine the probable cause of the increased odor.

This monitoring will include defining the sulfur compound with the highest concentration at the perimeter monitoring sites and the highest concentrations of each of the individual buildings and outside machinery and odor source. This will allow identification of the problem source and also indicate which compound could be reduced to result the greatest overall odor reduction.

Reduction Measures: Once the problem odor source has been identified, the remedy will be found. This could be installing scubbers on exhaust fan discharge pipes, additional air containment added to buildings or other constructed odor reduction measures. This less expensive or maintenance type solutions will be addressed in-house by plant staff. If this fails to reduce the problem then consulting expertise will be brought in to evaluate and reduce the problem odor source.

ATTACHMENT #4

**Westminster
Office**
2071 Tejon Street, Suite 470
Westminster, CO 80234
Phone: 720.887.4928
Fax: 720.887.4680



**Fort Collins
Office**
760 Whalers Way, Building C, Suite 120,
Ft. Collins, CO 80525
Phone: 970.206.4432
Fax: 970.206.4435

CONDITIONS #9 AND #5

*Still needs site plan



TRANSMITTAL SHEET

TO: Mr. Randy Earley, City of Boulder
FROM: Andrew Ricker, Smith Environmental, Inc.
DATE: November 16, 2005
RE: Boulder Waste Water Treatment Plant, Boulder, Colorado

Attached please find one (1) copy of the following:

- H2S Readings – February 25, 2005
- Sound Readings - February 25, 2005
- Sound Readings – February 28, 2005
- H2S Readings – August 12, 2005
- Sound Readings – August 12, 2005

SMITH ENVIRONMENTAL, INC.

Sample Number and H2S Result (ppm) February 25, 2005

Sample Location	1	2	3	4	5	6	7	8	9	10	Average
1	0.003	0.004	0.003	0.003	0.003	0.004	0.002	0.004	0.003	0.004	0.0033
2	0.01	0.008	0.006	0.005	0.005	0.007	0.003	0.003	0.004	0.004	0.0055
3	0.004	0.004	0.003	0.005	0.003	0.004	0.004	0.004	0.004	0.004	0.0039
4	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.0032
5	0.005	0.005	0.006	0.006	0.005	0.006	0.005	0.004	0.006	0.007	0.0055
6	0.003	0.005	0.005	0.004	0.003	0.004	0.004	0.004	0.004	0.004	0.004
7	0.003	0.005	0.004	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.0043
8	0.004	0.004	0.005	0.004	0.004	0.004	0.005	0.005	0.005	0.006	0.00456

Sound Readings - February 25, 2005

Sample Location 1 Memory Locations 1-34

LEQ	LMAX	LPEAK
Average		
Sound Level	Maximum obtained	Peak Level
51.6	51.6	74.8
51.6	51.6	75.2
51.6	51.6	75.2
51.6	51.6	74.7
51.6	51.6	74.3
51.6	51.6	74.7
51.6	51.6	75.1
51.6	51.6	75
51.6	51.6	75
51.6	51.6	74.8
51.6	51.6	74.2
51.6	51.6	75
51.6	51.6	74.3
51.6	51.6	75.1
51.6	51.6	75
51.6	51.6	74.9
51.6	51.6	74.6
51.6	51.6	74.4
51.6	51.6	77
51.6	51.6	74.8
51.6	51.6	74.6
51.6	51.6	75
51.6	51.6	75.3
51.6	51.6	74.6
51.6	51.6	74.7
51.6	51.6	75
51.6	51.6	76.6
51.6	51.6	74.6
51.6	51.6	75
51.6	51.6	75.1
51.6	51.6	75
51.6	51.6	75
51.6	51.6	75.1
51.6	51.6	75
51.6	51.6	75.5
51.6	51.6	74.7
51.6	51.6	74.9
51.6	51.6	74.8
51.6	51.6	74.9
51.6	51.6	74.9
51.6	51.6	75
51.6	51.6	74.5
51.6	51.6	74.7
51.6	51.6	74.5
51.6	51.6	74.8
51.6	51.6	74.6

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 25, 2005
 Sample Location 2 Memory Locations 35-68

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	75.6
51.6	51.6	74.8
51.6	51.6	74.7
51.6	51.6	74.4
51.6	51.6	74.7
51.6	51.6	74.4
51.6	51.6	75.2
51.6	51.6	74.9
51.6	51.6	74.9
51.6	51.6	75
51.6	51.6	74.9
51.6	51.6	75.4
51.6	51.6	74.5
51.6	51.6	75
51.6	51.6	74.5
51.6	51.6	74.6
51.6	51.6	75
51.6	51.6	75
51.6	51.6	74.5
51.6	51.6	75.1
51.6	51.6	74.8
51.6	51.6	74.9
51.6	51.6	74.5
51.6	51.6	74.9
51.6	51.6	75
51.6	51.6	74.8
51.6	51.6	74.4
51.6	51.6	75
51.6	51.6	74.5
51.6	51.6	75.2
51.6	51.6	74.2
51.6	51.6	74.6
51.6	51.6	74.9
51.6	51.6	75.2
51.6	51.6	74.4
51.6	51.6	74.6
51.6	51.6	74.6
51.6	51.6	74.9
51.6	51.6	74.9
51.6	51.6	74.5
51.6	51.6	74.9
51.6	51.6	75
51.6	51.6	73.8
51.6	51.6	73.8
51.6	51.6	74.2
51.6	51.6	74.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 25, 2005
 Sample Location 3 Memory Locations 69-102

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	75.3
51.6	51.6	75.2
51.6	51.6	75.6
51.6	51.6	74.5
51.6	51.6	74.5
51.6	51.6	75.1
51.6	51.6	76.6
51.6	51.6	75.2
51.6	51.6	76.8
51.6	51.6	75.3
51.6	51.6	76.6
51.6	51.6	74
51.6	51.6	75.2
51.6	51.6	74.5
51.6	51.6	75.3
51.6	51.6	75.1
51.6	51.6	75.5
51.6	51.6	74.7
51.6	51.6	75.2
51.6	51.6	75
51.6	51.6	75.6
51.6	51.6	76
51.6	51.6	76.5
51.6	51.6	74.3
51.6	51.6	74.9
51.6	51.6	76.1
51.6	51.6	75.6
51.6	51.6	74.2
51.6	51.6	75.2
51.6	51.6	77.1
51.6	51.6	76.5
51.6	51.6	76.2
51.6	51.6	76.1
51.6	51.6	74.5
51.6	51.6	75.8
51.6	51.6	75.8
51.6	51.6	75.7
51.6	51.6	74.5
51.6	51.6	76.7
51.6	51.6	75.8
51.6	51.6	76.6
51.6	51.6	76.4
51.6	51.6	74.1
51.6	51.6	75.2
51.6	51.6	76.4
51.6	51.6	75.3

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 25, 2005

Sample Location 4

Memory Locations 103-136

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	74.7
51.6	51.6	75.4
51.6	51.6	75.6
51.6	51.6	76.9
51.6	51.6	77.3
51.6	51.6	74.9
51.6	51.6	75.2
51.6	51.6	74.2
51.6	51.6	75.2
51.6	51.6	74.9
51.6	51.6	75.5
51.6	51.6	75.6
51.6	51.6	77.6
51.6	51.6	76.2
51.6	51.6	74.2
51.6	51.6	74.7
51.6	51.6	73.4
51.6	51.6	77.4
51.6	51.6	75.6
51.6	51.6	75.7
51.6	51.6	75.4
51.6	51.6	75.2
51.6	51.6	77
51.6	51.6	75.4
51.6	51.6	76.6
51.6	51.6	74.9
51.6	51.6	75.8
51.6	51.6	74.3
51.6	51.6	75.9
51.6	51.6	77
51.6	51.6	76.4
51.6	51.6	75.3
51.6	51.6	75
51.6	51.6	76.6
51.6	51.6	75.2
51.6	51.6	75.3
51.6	51.6	76.7
51.6	51.6	75.7
51.6	51.6	77.4
51.6	51.6	75.8
51.6	51.6	75.4
51.6	51.6	76
51.6	51.6	75.7
51.6	51.6	75.8
51.6	51.6	75.4
51.6	51.6	76.1

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 28, 2005

Sample Location 5 Memory Locations 1-34

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	74.4
51.6	51.6	74.5
51.6	51.6	74.1
51.6	51.6	74.4
51.6	51.6	75
51.6	51.6	74.7
51.6	51.6	74.6
51.6	51.6	74.1
51.6	51.6	74.6
51.6	51.6	74.1
51.6	51.6	74.7
51.6	51.6	75.2
51.6	51.6	74.3
51.6	51.6	74.6
51.6	51.6	74.4
51.6	51.6	74.6
51.6	51.6	74.6
51.6	51.6	74.4
51.6	51.6	74.9
51.6	51.6	74.4
51.6	51.6	74.6
51.6	51.6	74.1
51.6	51.6	74.9
51.6	51.6	74.6
51.6	51.6	74.4
51.6	51.6	74.6
51.6	51.6	74.1
51.6	51.6	74.2
51.6	51.6	74.8
51.6	51.6	74.6
51.6	51.6	74.4
51.6	51.6	74.6
51.6	51.6	74.7
51.6	51.6	74.3
51.6	51.6	74.6
51.6	51.6	74.7
51.6	51.6	74.4
51.6	51.6	74.4
51.6	51.6	74.2
51.6	51.6	74.7
51.6	51.6	74.6
51.6	51.6	74.2
51.6	51.6	74.5
51.6	51.6	74.5
51.6	51.6	74.6
51.6	51.6	74.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 28, 2005
 Sample Location 6 Memory Locations 35-68

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	77.1
51.6	51.6	77
51.6	51.6	77.8
51.6	51.6	78.1
51.6	51.6	74.5
51.6	51.6	75.8
51.6	51.6	76.2
51.6	51.6	78.2
51.6	51.6	76
51.6	51.6	78.7
51.6	51.6	78.4
51.6	51.6	74.8
51.6	51.6	75
51.6	51.6	77.3
51.6	51.6	76.2
51.6	51.6	76.2
51.6	51.6	75.6
51.6	51.6	78.6
51.6	51.6	73.4
51.6	51.6	77.2
51.6	51.6	75.7
51.6	51.6	74.3
51.6	51.6	76.5
51.6	51.6	75.3
51.6	51.6	76.3
51.6	51.6	75.4
51.6	51.6	78.6
51.6	51.6	77
51.6	51.6	76.5
51.6	51.6	76.4
51.6	51.6	77.1
51.6	51.6	76.6
51.6	51.6	75.5
51.6	51.6	77
51.6	51.6	74.7
51.6	51.6	77.2
51.6	51.6	78.1
51.6	51.6	74.8
51.6	51.6	77.2
51.6	51.6	78.4
51.6	51.6	75.9
51.6	51.6	78
51.6	51.6	75.2
51.6	51.6	77.4
51.6	51.6	76.5
51.6	51.6	78.4

SMITH ENVIRONMENTAL, INC.

Sound Readings - February 28, 2005
 Sample Location 7 Memory Locations 69-102

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	74.9
51.6	51.6	75.8
51.6	51.6	76.7
51.6	51.6	74.7
51.6	51.6	75.7
51.6	51.6	74.9
51.6	51.6	75.6
51.6	51.6	76.5
51.6	51.6	75.7
51.6	51.6	74.8
51.6	51.6	75.7
51.6	51.6	75.4
51.6	51.6	76.1
51.6	51.6	75.5
51.6	51.6	74.9
51.6	51.6	75.8
51.6	51.6	74.6
51.6	51.6	74.5
51.6	51.6	75.2
51.6	51.6	75
51.6	51.6	75.5
51.6	51.6	74.6
51.6	51.6	74.9
51.6	51.6	75.2
51.6	51.6	75
51.6	51.6	74.6
51.6	51.6	75.2
51.6	51.6	74.8
51.6	51.6	75.6
51.6	51.6	76
51.6	51.6	76.3
51.6	51.6	75.9
51.6	51.6	77.2
51.6	51.6	76.1
51.6	51.6	75.2
51.6	51.6	73.8
51.6	51.6	76.9
51.6	51.6	76.5
51.6	51.6	77.3
51.6	51.6	74.5
51.6	51.6	74.6
51.6	51.6	74.3
51.6	51.6	75.8
51.6	51.6	73.9
51.6	51.6	74.9
51.6	51.6	76.1

Sound Readings - February 28, 2005

Sample Location 8

Memory Locations 103-136

LEQ	LMAX	LPEAK
Average Sound Level	Maximum obtained	Peak Level
51.6	51.6	75.1
51.6	51.6	75.3
51.6	51.6	74.9
51.6	51.6	75.7
51.6	51.6	75.9
51.6	51.6	75.7
51.6	51.6	74.8
51.6	51.6	76.4
51.6	51.6	75
51.6	51.6	75.1
51.6	51.6	87.1
51.6	51.6	74.3
51.6	51.6	77.4
51.6	51.6	74.5
51.6	51.6	74.9
51.6	51.6	74.8
51.6	51.6	74.6
51.6	51.6	76.8
51.6	51.6	75.7
51.6	51.6	75.3
51.6	51.6	73.4
51.6	51.6	76.9
51.6	51.6	76.4
51.6	51.6	75.4
51.6	51.6	75.3
51.6	51.6	75.7
51.6	51.6	75.1
51.6	51.6	75.4
51.6	51.6	74.4
51.6	51.6	75
51.6	51.6	75.3
51.6	51.6	74.8
51.6	51.6	75.4
51.6	51.6	75.4
51.6	51.6	74.1
51.6	51.6	75.5
51.6	51.6	75.6
51.6	51.6	76.2
51.6	51.6	76
51.6	51.6	75.1
51.6	51.6	74.9
51.6	51.6	74.9
51.6	51.6	75.4
51.6	51.6	74.9
51.6	51.6	74.5
51.6	51.6	75

SMITH ENVIRONMENTAL, INC.

Sample Number and H2S Result (ppm) August 12, 2005

Sample Locations	1	2	3	4	5	6	7	8	9	10	Average
1	0	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0051
4	0.003	0.005	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.003	0.0036
5	0.005	0.005	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.0039
6	0.005	0.005	0.004	0.002	0.004	0.004	0.002	0.005	0.005	0.005	0.0041
7	0.005	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.0047
8	0.007	0.005	0.005	0.004	0.004	0.003	0.002	0.003	0.003	0.003	0.0039

Sound Readings - August 12, 2005
 Sample Location 1 Memory Locations 1-55

LEQ Average Sound Level	LMAX Maximum Obtained	LMIN Minimum Obtained	LPEAK Peak Level
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	74.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	71.3
51.6	51.6	51.6	70.2
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 2

Memory Locations 59-119

LEQ	LMAX	LMIN	LPEAK
Average	Maximum	Minimum	Peak
Sound	obtained	Obtained	Level
Level			
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	70.4
90	51.6	128.4	61.5
51.6	51.6	51.6	71.7
51.6	51.6	51.6	72.1
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
90	51.6	128.4	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	73
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	88.7
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	73.9
51.6	51.6	51.6	88.2
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
90	51.6	128.4	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	72.2
51.6	51.6	51.6	72
51.6	51.6	51.6	74.5
51.6	51.6	51.6	74.3
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	75.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 4 Memory Locations 177-237

LEQ	LMAX	LMIN	LPEAK
Average Sound Level	Maximum Obtained	Minimum Obtained	Peak Level
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
52.05	52.5	51.6	82.6
51.6	51.6	51.6	89.1
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	72.8
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	73.9
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	70.2
51.6	51.6	51.6	74.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 5 Memory Locations 238-297

LEQ	LMAX	LMIN	LPEAK
Average Sound Level	Maximum Obtained	Minimum Obtained	Peak Level
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	73.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	71
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	84
56.6	61.6	51.6	72.8
52.15	52.7	51.6	73.9
53.25	54.9	51.6	73.6
51.6	51.6	51.6	76.5
56.6	61.6	51.6	74.4
52.15	52.7	51.6	75.6
53.25	54.9	51.6	73.9
51.6	51.6	51.6	74
51.6	51.6	51.6	74
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
90	51.6	128.4	61.5
51.6	51.6	51.6	61.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 6

Memory Locations 298-357

LEQ	LMAX	LMIN	LPEAK
Average Sound Level	Maximum Obtained	Minimum Obtained	Peak Level
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
90	51.6	128.4	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	68.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	70.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	75.2
51.6	51.6	51.6	74.4
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	74.1
51.6	51.6	51.6	61.5
51.6	51.6	51.6	73.6

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 7

Memory Locations 358-416

LEQ	LMAX	LMIN	LPEAK
Average Sound Level	Maximum Obtained	Minimum Obtained	Peak Level
51.6	51.6	51.6	61.5
51.6	51.6	51.6	84.1
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5
90	51.6	128.4	70.9
51.6	51.6	51.6	61.5
51.6	51.6	51.6	61.5

SMITH ENVIRONMENTAL, INC.

Sound Readings - August 12, 2005

Sample Location 8

Memory Locations 417-476

LEQ Average Sound Level	LMAX Maximum Obtained	LMIN Minimum Obtained	LPEAK Peak Level
51.6	51.6	51.6	72.2
51.6	51.6	51.6	73.6
51.6	51.6	51.6	61.5
51.6	51.6	51.6	70.4
51.6	51.6	51.6	71.5
51.6	51.6	51.6	72.4
51.6	51.6	51.6	71.9
51.6	51.6	51.6	72.8
51.6	51.6	51.6	72.7
51.6	51.6	51.6	72.8
51.6	51.6	51.6	80.8
51.6	51.6	51.6	72.4
51.6	51.6	51.6	61.5
52.05	52.5	51.6	74
51.75	51.9	51.6	74.4
51.6	51.6	51.6	73.6
51.6	51.6	51.6	73
51.6	51.6	51.6	73.2
51.6	51.6	51.6	72.8
51.6	51.6	51.6	73.2
51.6	51.6	51.6	73.1
51.6	51.6	51.6	73.9
51.6	51.6	51.6	70.4
51.6	51.6	51.6	71.6
51.6	51.6	51.6	73.4
51.6	51.6	51.6	70.8
51.6	51.6	51.6	73
51.6	51.6	51.6	69.5
51.6	51.6	51.6	72.7
51.6	51.6	51.6	72.6
51.6	51.6	51.6	72.3
51.6	51.6	51.6	73.8
51.6	51.6	51.6	69.1
51.6	51.6	51.6	75.9
51.6	51.6	51.6	82.2
51.6	51.6	51.6	76.4
51.6	51.6	51.6	72
51.6	51.6	51.6	72.7
51.6	51.6	51.6	73.9
51.6	51.6	51.6	75.5
51.6	51.6	51.6	73.6
51.6	51.6	51.6	73.2
51.6	51.6	51.6	73.2
51.6	51.6	51.6	72.9
51.6	51.6	51.6	74.4
51.6	51.6	51.6	73.8

Lorantos, Adrienne

From: Randy Earley [EarleyR@ci.boulder.co.us]
Sent: Wednesday, January 25, 2006 10:26 AM
To: Lorantos, Adrienne; ariley@co.boulder.co.us
Subject: Noise and Odor Monitoring Sites

Adrienne and Anita,

One of you requested the noise and odor monitoring site locations map with numbered locations. I'm glad you did because I found an error that I now have a chance to clear up before it causes a problem. When I went through my records I found that the Smith Environmental (SEI) employee that performed the noise and odor monitoring had used different site numbering scheme than was in the City's Noise and Odor Plan. The locations are the same as in the original plan, just the numbering system is different.

The attached PDF file shows both SEI's and the original plan numbering scheme. The SEI numbering system starts with #1 on the north side of the plant entrance and proceeds counter clockwise around the plant. The noise and odor plan began the numbering at the northwest sample location and proceeded clockwise around the plant. So on the attached drawing, I've shown the SEI number first with the original site number preceded by an 'X' in parentheses (ie - site '1 (X3)' is the site SEI data listed as #1 that was originally listed as site 3 in the noise and odor plan).

I hope this makes sense to you but if not please give me a call and I can explain it. I know that the PDF files are sometimes grainy so I'll send a copy of the original printout to Adrienne via the interoffice mail.

Please let me know if you need further information from me.

Thanks - Randy x4273

Boulder's 75th Street WWTP - Monitoring Site Map (2)



LEGEND

Sample Locations:
 A (XB)
 where:
 - A is SEI sample point designation
 - B is original sample point designation in Boulder's N & O monitoring plan

- Main Roads
- Arterial
 - Highway
 - Street Centerlines
 - Survey Polygons
 - Ownership Parcels
 - City Limits



N

1:2773



Maplink
 City of Boulder

The information depicted on this map is provided as graphical representation only. The City of Boulder provides no warranty, expressed or implied, as to the accuracy and/or completeness of the information contained hereon.

Fugitive Dust Mitigation Plan

Contractor: Garney Construction
10822 West Toller Drive, Suite 100
Littleton, CO 80127

Prepared by: Matt Wampler
Project Manager
(720) 339-5973 – mobile

Monitored by: David Lustig
Superintendent
(303) 725-9348 – mobile

Matt Wampler
Project Manager
(303) 725-9348 - mobile

Project Location: 4049 75th Street
Boulder, CO 80301

Project Description: The construction work for the 75th Street Wastewater Treatment Plant Upgrades project consists of a series of improvements to the existing City of Boulder WWTP to expand the treatment capacity from 20.5 million gallons per day to 25mgd, and to convert the secondary treatment process from a Trickling Filter/Solids Contract Process to an Activated Sludge Process. These improvements are being driven by a compliance date of November 2007 to have the upgrades process started up and meeting the City of Boulder's revised discharge permits at that time.

The project includes construction of three new activated sludge aeration basins, a new blower building, and a new secondary clarifier. Other project work includes demolition of select existing facilities; miscellaneous site piping, grading, and landscaping work; and upgrades to the electrical and instrumentation and control systems.

Site restoration includes seeding open areas that are disturbed during construction and permanent landscaping and planting, and an irrigation system.

Area of Disturbance: The estimated total area of the site is approximately 10 acres. The estimated site disturbance is approximately 7.5 acres of which include 3.5 acres of disturbance at the temporary office setup location and 4 acres of disturbance for new construction inside the boundary plant boundary.

Anticipated Schedule: Demolition Activities – January 2006 thru February 2006
Excavation Activities – February 2006 thru March 2006
Backfill Activities – Early 2007
Overall Project Schedule – January 2006 thru May 2008

These dates are may change and are given for general scheduling purposes only

Dust Source: Areas capable of producing dust emissions include haul roads, temporary stockpiles and bare excavated areas. Much of the excavated material will be hauled offsite during construction while the remainder will be temporarily stockpiled on the plant site. A potential source of dust emission on this project will be during the excavation and backfill of structures and the associated trucking operation for dirt haul. Reference attached job site layout for locations of roads, stockpiles, etc.

BMP's: **Construction** - To prevent dust the contractor will use a water truck or hose at dry and heavily trafficked areas. There is ample water available on the site for this use via hydrant or water truck. In addition to the heavily trafficked areas stockpiles will be wetted as circumstances dictate.

Bulk Material Handling – Water will be applied to stockpiles in the event dust emissions are prevalent. This will be done via hose or water truck.

Trackout Management - We are fortunate that the majority of haul roads are paved and will not create dust or require extensive dust control procedures. Gravel vehicle tracking pads will be used to remove mud and soil material from haul trucks and equipment as needed. These tracking pads will be located at transitions between bare soil areas and paved areas. These VTP's will be placed specifically between the structural excavation and existing asphalt roads.

Blasting Activities – No blasting required.

Chemical Suppressants – No chemical suppressants are planned at this time.



City of Boulder
75th Street Wastewater Treatment Plant
Noise and Odor Study

January 2009

City of Boulder
75th Street Wastewater Treatment Plant
Noise and Odor Study

Background:

In response to a condition in Boulder County's 1041 'Matters of State Interest' approval (Resolution 2004-75) for the City's 75th Street WWTP Liquid Stream Improvement's Project, the city authored and submitted a Draft Noise and Odor Control Plan to the County Land Use Department. A copy of that draft Noise and Odor Control Plan is attached to this Study.

The two primary concerns heard from local residents during the public meetings about the improvements project at Boulder WWTP was that the process changes could increase the odors or noise levels emitted from the plant. The city's response to the noise concern was that although the activated sludge process required large blowers, which would be loud at the source, the blower building would be constructed with the latest noise attenuating features to contain the noise inside the building without impacting decibel levels outside of the building or off the plant site. With regards to the concern about more odors, the city's position was that the move from a fixed film process, which combines aerobic and anaerobic conditions in uncontrolled zones, to the suspended growth system which could be better controlled and was predominated by completely aerobic conditions would result in different, more consistent, and a less offensive odor. Additionally, the increase in treatment capacity would further reduce the potential for traditional odor problems commonly related to many organically overloaded wastewater treatment plants.

The Boulder County Commissioner's approved the project with the condition that the City of Boulder develops a noise and odor control plan. Part of that plan included establishing baselines for both noise and odor at the plant site prior to starting the new processes and then checking the noise and odor levels after the new processes were brought on-line.

The activated sludge process was initially brought on line in August 2007 in a limited way with two of the three activated sludge aeration basins but the process was not completely constructed and the project was not completed until September 2008. This study presents the data establishing the baseline collected before August 2007 and monitoring results since the activated sludge process was put on line and also since the project was completed. For noise considerations, the September 2008 date should be used as the final completion date to begin noise comparisons. For odor considerations, the activated sludge start-up date, August 2007, should be used as the period when the new processes went on line and the treatment process odors could have begun.

Noise and Odor monitoring was completed twice each year since 2005 to set the baseline and monitor changes in the noise and odor levels at the site boundaries.

Smith Environmental completed the monitoring as outlined in the Draft Noise and Odor Control Plan. For odor testing Smith used a Jerome 631-XC H2S Analyzer and Jerome Data logger and for noise testing Smith used a Quest 2900 Type 2 SLM with QC-20 calibrator and OB 300 Octave. The test was completed twice in 2005 prior to beginning construction. Sampling dates are in the following list.

Noise and Odor Sample and Test Dates:

- February 25, 2005
- August 12, 2005
- February 15, 2006
- August 24, 2006
- February 22, 2007
- August 16, 2007
- February 26, 2008
- August 28, 2008

Noise and Odor Sample Locations:

- Site 1, on the east side of the plant to the north of the entry gate (EN).
- Site 2, on the north side of the plant towards the east (NE).
- Site 3, on the north side of the plant toward the west (NW).
- Site 4, on the west side of the plant toward the north (WN).
- Site 5, on the west side of the plant toward the south (WS).
- Site 6, on the south side of the plant toward the west (SW).
- Site 7, on the south side of the plant toward the east (SE).
- Site 8, on the east side of the plant to the south side of the entry gate (ES).

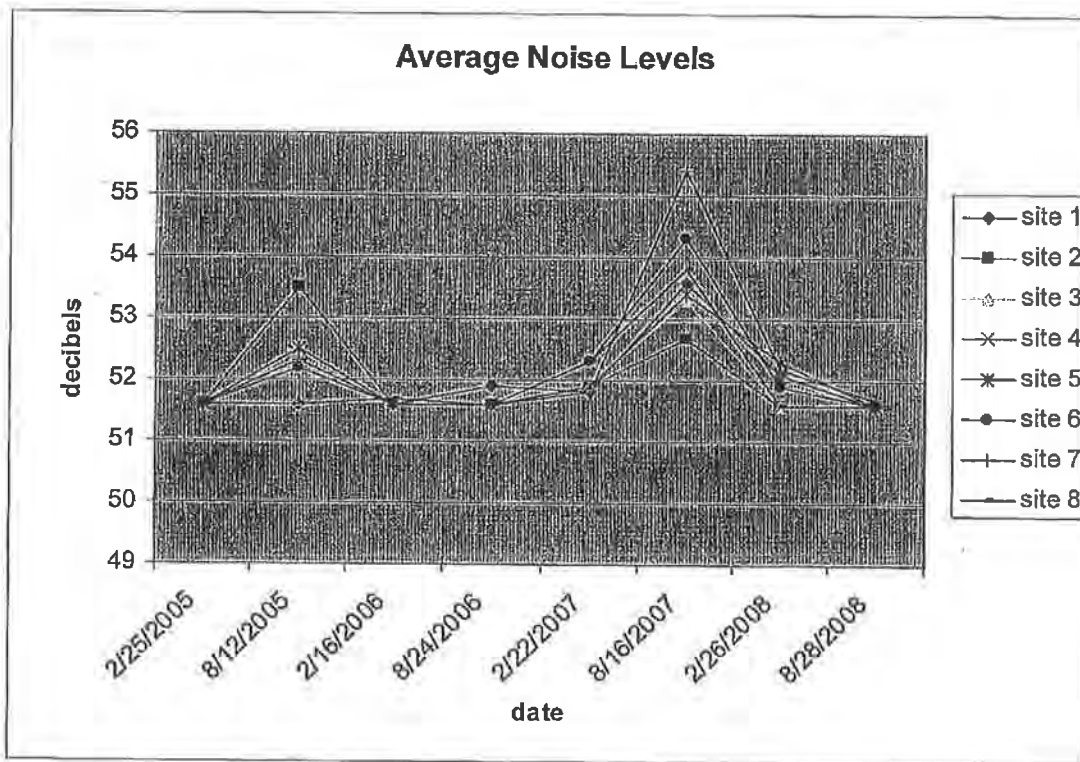
Important dates to note in reviewing the data in this study are January 2006 when construction began. Another important month is August 2007 when we moved off of the trickling filter process to the activated sludge process. Odors were associated with stopping the trickling filter process which coincided with the startup of the activated sludge process. When the flow to the trickling filters was stopped, the biomass in the trickling filters went anaerobic and started to putrefy. The putrefying process produces very offensive odors. The trickling filters were chlorinated and flooded after they were taken off line in an attempt to minimize the odors from the dying trickling filters. The trickling filter media, rocks, were removed and the trickling filters distribution systems were demolished. So realistically, all the testing completed prior to August 2007 is all background data and then there was a transitional period when the odors and noise were noticeable different from the final conditions. Additionally, all the construction was not completed until October 1, 2008. These dates have different impacts on the noise and odor data. The odor data background collect should be considered up until the activated sludge process was placed in service in August 2007. But the noise data is impacted by the construction activities to some extent until the construction was completed. In the later phases of the construction the work was of a lighter nature, more surface work, as opposed to the heavier construction

that took place when the aeration basins, clarifier, blower building and dissolve air floatation building were being built. .

The noise and odor data are presented separately in the sections below.

Noise:

The results of the noise monitoring at the wastewater treatment plant are presented in the following graph.



As the graph shows, the noise levels recorded prior to construction, those recorded in 2005, showed some variation due to normal plant operations. Variation in noise levels during the entire construction period were less than 5 decibels from preconstruction conditions. The data shows that as construction was winding down in August of 2008 the noise levels around the plant site returned to their lowest preconstruction levels. Additionally, the noise complaints received by the plant staff have not increased since the construction has been completed on October 1, 2008.

The noise averages exceeded 54 decibels once at two locations during the construction at the plant. Recent noise monitoring has recorded noise at all sites around the plant at less than 53 decibels which is actually less than pre-construction conditions.

Instantaneous peak noise levels did increase during construction as expected due to heavy equipment and demolition work. Those instantaneous peaks were also returning to pre-construction levels when the last monitoring was completed in August 2008. Note that the noise peaks in August 2007 are associated with demolition of the trickling filters and hauling off the media from the filters. The instantaneous peak noise levels recorded around the plant site perimeter were less than typical traffic noise (see comparison chart below). During the August 2008 monitoring construction was mostly surface site work that did not require

heavy construction equipment but did require work from rubber tired backhoes, trucks and skid steers.

The comparison charts below give some comparative noise levels for environmental noise in decibels (dB). The table is helpful in understanding the volume levels of various common sounds and assigning more meaning to decibel readings from the sites around the plant.

Decibel (Loudness) Comparison Chart

Environmental Noise	
Weakest sound heard	0dB
Whisper Quiet Library	30dB
Normal conversation (3-5')	60-70dB
Telephone dial tone	80dB
City Traffic (inside car)	85dB
Train whistle at 500', Truck Traffic	90dB
Subway train at 200'	95dB
OSHA Daily Permissible Noise Level Exposure	
Hours per day	Sound level
8	90dB
6	92dB
4	95dB
3	97dB
2	100dB
1.5	102dB
1	105dB
.5	110dB
.25 or less	115dB

All the OSHA allowed exposed levels and expose times in the second part of the table above are well above those expected and recorded at the wastewater treatment plant. So another, perhaps better comparison may be found in the perceptions of increases in decibel levels table below.

Perceptions of Increases In Decibel Level	
Imperceptible Change	1dB
Barely Perceptible Change	3dB
Clearly Noticeable Change	5dB
About Twice as Loud	10dB
About Four Times as Loud	20dB

This table indicates that the changes in noise were clearly notable during construction but the changes from pre-construction to post construction should be imperceptible. And this is confirmed by the lack of complaints received

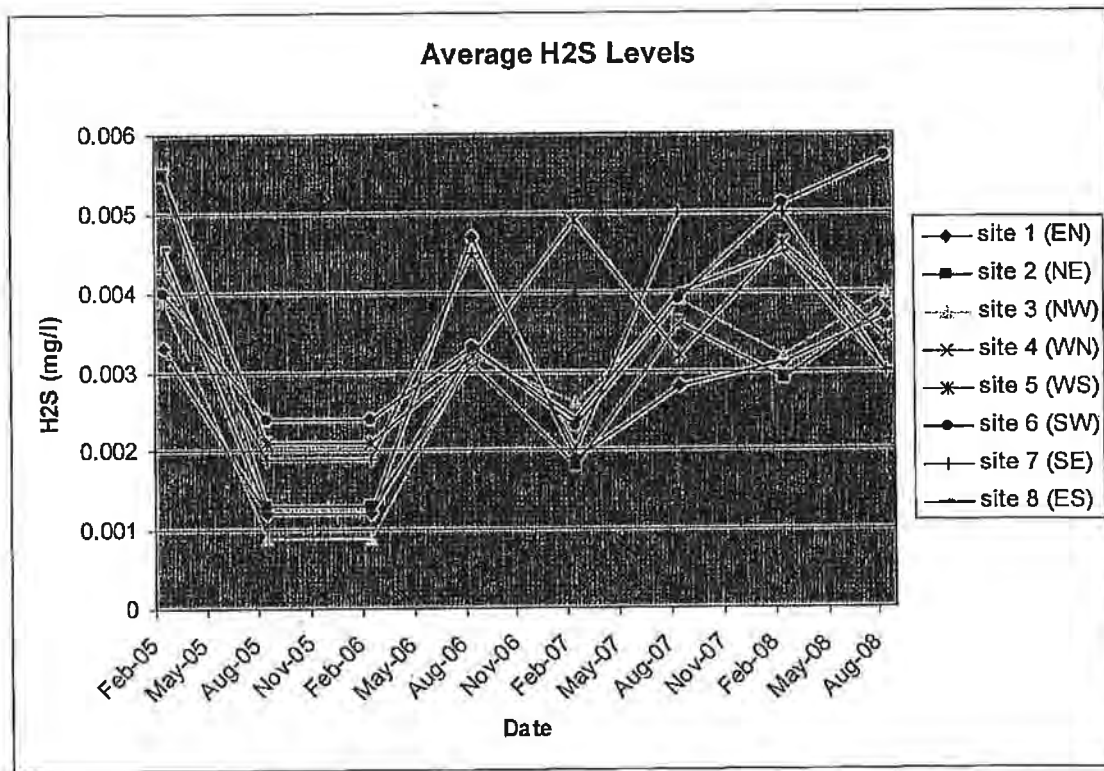
from the public on noise level since the construction has been substantially completed and the construction related noise reduced.

This data confirms the city has met its commitment to 'no net increase in noise' resulting from the new processes.

Odor:

Although scentometers are the acceptable and enforceable measurement method typically used for odors, they yield only detectable dilution levels for odors. The county commissioners wanted a more quantifiable measure and hydrogen sulfide levels were proposed since they could be measured with instruments and are often associated with wastewater odors. So H₂S levels were proposed and accepted as a significant component of odor to be monitored at the plant. The advantage of using H₂S is that it is a metered value that can be used to trace the source of an odor back into the plant site which will aid with finding the best method to eliminate or treat the offensive odor.

The results of the odor monitoring at the wastewater treatment plant is summarized in the table below.



In the graph above, H₂S levels from the eight monitoring sites located around the perimeter of the plant are shown. Note that the construction began in January 2006 and that the new activated sludge system came on line in August 2007. At that time the trickling filters were starved and died off which produced uncontrollable odors at localized areas in the plant.

H₂S is detectable by humans at concentrations as low as 0.5 parts per billion or 0.005 parts per million (which equals milligrams per liter, mg/L, shown in the chart). H₂S causes nuisance odor in the 0.25 to 0.3 parts per million range. So the H₂S levels recorded in this study are, with all but 4 exceptions, below typical human detection limits. And all the results collected indicate levels well below the nuisance odor levels.

The concentrations exceeded typical human detection levels twice before the new treatment process was on line and twice at site 6 on the south west side of the plant since the process was started.

The closest structures or buildings to the southwest site are the blower building and the headworks building. The blower building has no treatment processes. It only houses mechanical equipment and has no odor potential. The headworks building was not altered during this improvement project, so any change in odor at that location is due to changes in the raw sewage coming into the plant.

Although generally the odor levels increase slightly during the construction phase of the project, the first readings taken at the plant, which was prior to the construction beginning, were the highest recorded. The results are variable and do not indicate a clear trend as five of the initial H₂S readings were above all but one of the concentrations measured in the last set of data.

We recommend that H₂S monitoring should continue into the future for two reasons. First, to see if a clear pattern is established in the data and, secondly, to set more accurate post activated sludge data which could aid in analyzing future problems should they occur.

These odor readings are impacted by the weather conditions, particularly wind, during the monitoring. But during the collection of the data at the wastewater treatment plant no accommodations to the monitoring schedule was made due to weather conditions. In other words, whether the conditions were windy or calm the monitoring took place.

Attachments:

1. Draft Noise and Odor Monitoring and Control Plan, 9/2004 (revised 1/2005 and 12/2005)
2. Map of Monitoring Site Locations at the WWTP
3. Spreadsheet of Odor Data
4. Spreadsheet of Noise Data

September 26, 2004 (revised 1/4/05, revised 12/7/05)

Draft Odor and Noise Monitoring and Control Plan

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Background

The City of Boulder must construct improvements to its wastewater treatment facilities to meet new discharge limitation for ammonia that will take effect in 2008.

Boulder County, as a condition of its 1041 Matters of State Interest approval for the wastewater treatment plant upgrade project approval, required the City of Boulder to limit odor and noise to the currently existing levels at the plant. Although the city's utilities division intention was to continue to address noise and odor complaints as they occur as we have in the past, a practice which has yielded favorable community response. The county commissioners felt that this was inadequate and required plans to establish the existing levels of odors and noise, monitor the odors and noise from the plant, and set up a methodology to address odor and noise problems should they exceed the levels currently existing at the plant. Obviously, the city felt that Boulder County should only hold the wastewater treatment plant to the county wide limits imposed in their existing ordinances and that if these were inadequate the county should revise their standards county wide.

However, this plan is provided to meet the conditions of the 1041 approval. Since the utilities division, based upon industry experience, believes that the facility's new processes will not increase odors or noise in any way. The noise will be controlled via noise attenuation features that will be built into the new structures and odors will still be primarily from solids processing and anoxic raw sewage which will not be changed because of this project.

Each plan is broken into three segments to address the 1041 approval conditions:

- 1) Establishing the Baseline Levels of the existing treatment processes
- 2) Ongoing Monitoring to Demonstrate Compliance with the 1041 requirements
- 3) A Strategy for Addressing Noise and Odor Excedances

Existing Site and Process Descriptions

The existing treatment processes at the plant include liquid stream and solids handling units.

Liquid Stream Treatment

The wastewater passes through the headworks processes in which grit, rags and large solids are removed from the flow stream. Solids removed in these primary treatment units are disposed of in the landfill. These processes and the headworks building are removing materials from the raw sewage. Raw sewage is a primary odor source in the treatment plant. The headworks buildings, due to the gases associated with the raw sewage, have large fans which add to the noise and move large volumes of air out of the headworks building.

After large and heavy materials are removed the sewage passes into the primary clarifiers. These units settle out rapidly settling and floating materials. The floating and settling solids are wasted to the solids handling processes which are addressed below. Neither the processes in the headworks nor the primary clarifiers are planned to be changed with this project so no impact to noise or odor is expected.

The liquid treatment stream continues through the fixed film or trickling filter units for removal of organic materials that is converted into biomass and reduces the Biochemical Oxygen Demand (BOD) of the wastewater. The wastewater has to be pumped from the primary clarifier elevation up to the tops of the trickling filters. This pumping station generates noise.

The fixed film process can generate odors as the zoogeal mass grows thick and creates anaerobic zones under the aerobic portion of the organic mat before sloughing off. The anaerobic areas create odors. Any plugging of the underdrain system or short circuiting within the trickling filter can result in additional anaerobic zones and odors.

The wastewater then flows to the solids contact process in which settled solids are recycled back into the flow stream to achieve a flocculated or larger particle which settles at higher velocities in the next process, the final clarifiers. The Solids Contact Process is aerated with large blowers that keep the sewage and returned sludge aerated and well mixed. The blowers, as well as the return sludge pumps, are noise sources in the existing process. Since the solids contact process is aerobic, no significant odors are generated in the process.

The final clarifiers remove the biomass generated from the conversion of wastewater organics into microbiological cell growth during the biological treatment process. The biosolids are wasted, via pumping, to the solids handling processes.

After the final clarifiers, part of the liquid stream is pumped over a fixed film nitrification process to remove ammonia. This is an aerobic process and has little odor associated with it. There is noise associated with the pumping required in this process.

Last, the wastewater is disinfected with chlorine and dechlorinated prior to discharge to Boulder Creek. There is no noise or foul odor associated with the disinfection/dechlorination process.

Occasionally the treatment chambers and units are taken out of service for inspection and cleaning. During the cleaning process odors develop that can be worse than normal operation.

Solids Handling and Treatment

The solids wasted from the primary clarifier as scum and sludge along with the biomass wasted from the secondary clarifiers under-flows are combined and fed into the solids thickener. This process collects the underflows from the primary and secondary clarifiers and settles the solids again into a thickened form. The thickened sludge is pumped from the bottom of the thickener to the digester which breaks down unstable materials. After digestion, the sludge is again thickened in centrifuges before being loaded into trucks for land application.

These solids handling facilities are major contributors to odors in most wastewater treatment plants. Additionally, one product of the digestion process is methane gas which is used to run generators on site. These generators produce energy that is sold back to Xcel Energy to help defray the operating cost of the wastewater treatment plant. These generators are noisy units and have resulted in noise complaints in the past.

However, these solids handling units, with one exception that is explained in the proposed improvements section, will not be modified in this project. So no increase in noise or odor is expected from these processes due to the upgrade project.

Proposed Site and Process Description

The raw sewage and solid handling processes will be basically unchanged after this project with the exception of the addition of a DAF (Dissolved Air Flootation) sludge thickening unit. This process off gases to some degree but the units will be enclosed and the gases will be containable. The addition of air to the sludge removes the anaerobic nature of the solids and serves to 'freshen' the sludge. Both of these factors should result in reduced odors at the plant.

(As of 12/2005 the conversion of the gravity thickeners to DAF thickeners has not been awarded. This process was deleted from the awarded project due to budgetary constraints. A separate DAF to thicken only the waste activated sludge is in the conceptual design phase.)

Biological Treatment Upgrades

The fixed film processes will be replaced with activated sludge process. The activated sludge process, like the fixed film process was initially developed to achieve secondary treatment, that is removal of BOD. However, the activated sludge process has been adapted to provide removal of additional pollutants over time. The nature of the system allows flexibility of operation for the removal of ammonia, the constituent we are required to remove in this upgrade.

The activated sludge process will replace the trickling filter towers with aerated basins. These basins have controllable oxygen concentrations and no 'dead air' or unmixed zones. An anoxic zone will be required to achieve sludge conditioning for improved settling and nitrogen removal. However, these zones are relatively small and no more odiferous than the primary clarifiers. The odor associated with these basins is typically described as 'earthy' but not objectionable. These basins will be located on the west side of the site. The blowers providing aeration will be a noise source as will the return pumps which recycle the mixed liquid within the activated sludge basins.

UV Disinfection System

The existing chlorination/dechlorination system will be replaced with a Ultra Violet Light disinfection (UV) system. The UV system will require a backup power source in the form of an onsite generator which will be a source of noise. There should be no odor concerns associated with the UV disinfection process.

(As of 12/2005 the UV disinfection system has not been awarded due to budgetary constraints. The city hopes to add this process back into the project when overall costs become clear or, if that's not possible, to include it in phase 2.

Construction Disturbances

Transitional odor sources will develop during construction but will be short term between the time the units are taken off line and when the units are demolished or cleaned. Of

draft noise and odor control plan

primary concern are the trickling filter processes both secondary treatment filters and nitrification filter. These units will have to be disinfected and flushed with high flow rates to clean them of potential putrifaction sources. Additionally, the noise associated with the construction will be significant in level but relatively short lived. Anticipated noisy construction phases will be the demolition of existing treatment units and earthmoving.

Noise Monitoring and Control Plan

The intent of this implementing this plan is to establish the existing noise level at the Boulder wastewater treatment plant. To monitor the noise generated at the site the following procedure will be followed.

Equipment

The noise will be monitored using a sound meter manufactured by Casella or equal manufacturer or meter. The meter will be calibrated and used per the manufacturers recommendations. Any irregularities with the meter will be reported in the Noise Monitoring Report. The same caliber of meter will be used in all phases of the noise monitoring; baseline, monitoring and problem resolution.

The monitoring may be performed by plant staff or contracted out to an environmental consultant. The operators will receive training regarding the nature of noise and use of the sound meter. Alternatively, the monitoring may be contracted out to an environmental testing company. Due to the cost of the meters, training, calibration and shipping, using an outside testing company may be best for the city.

Establishing Baseline Noise Levels

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There are two monitoring locations more or less evenly spaced on each side of the plant. The eight monitoring sites will be representative of noise, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. Also, note that these locations are used for both noise and odor test points. These points will be marked by survey stakes and tied to existing features at the plant. Aerial photographs showing the location of the monitoring points are also attached.

ATTACH SITE MAP & DETAIL MAP OF LOCATIONS

Frequency and Duration of testing: Existing baseline noise levels will be established using noise levels the eight test locations at multiple sampling periods. The sampling periods are intended to cover various atmospheric conditions that occur at the site. The locations will be monitored with different operational conditions at the facility. However, a round of monitoring must be completed prior to the beginning of construction because certain phases of the construction will be quite loud. Noise levels will be recorded two times each year before the construction of the upgrades begins in February and May or August. Each site will be monitored for a minimum of five minutes to establish a peak and average sound level.

Record Keeping and Reporting: Results of the monitoring will be recorded in a 'Noise Level Monitoring Report'. Records will be saved in permanent files and a report summarizing the results will be sent to the Boulder County Land Use department. The report will contain average and peak noise levels recorded during the baseline study. This report will be available to the public for a minimal copying fee.

City of Boulder
75th Street Wastewater Treatment Plant

Noise Level Monitoring Report Form

Date: _____

Operator: _____

General weather conditions: _____

Wind: _____

Temperature: _____

Other details: _____

Decibel Meter Instrument notes:

Readings from monitoring points: (from the south west corner of the site around the plant counter-clockwise)

Average/Peak/Major Component Frequency

South side of plant, west monitoring point: _____

South side of plant, east monitoring point: _____

East side of plant, South Monitoring point: _____

East Side of plant, North monitoring point: _____

North side of plant, east monitoring point: _____

North side of plant , west monitoring point: _____

West side of plant, north monitoring point: _____

West side of plant, south monitoring point: _____

Comments: _____

Signed: _____

Monitoring Future Noise Levels:

Future noise levels will be monitored after the construction of the new is complete. The noise levels will be checked using the equal caliber of equipment and the same locations that were used to establish the baseline noise levels in the initial testing.

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of noise, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. These locations assure future access and will not be impacted by the treatment upgrades project. Also, note that these locations are used for both noise and odor test points. These points will be marked by metal survey stakes and tied, measured distances, to existing features at the plant. Locations drawings are attached to in the 'Baseline Monitoring' section.

Frequency and Duration of testing: The noise levels will be tested ~~semi-annually~~ As in the baseline monitoring, noise levels will be monitored for a minimum of five minutes at each location to determine a peak and average noise level.

Reporting and Record Keeping: A report form will be used to record the readings of the decibel meter. The results of the noise level monitoring will be compiled and summarized in an annual report. This report will be sent to the Boulder County Land Use Department and kept on file at the plant for public distribution if requested for a minimal copying fee set by the city policy. This charge is currently \$0.25 per sheet. But the report will be available for perusal and selection of particular sheets to be copied at the plant.

Weather conditions and any significant operational conditions will be recorded on the report form. Results will be recorded on a standard form, also attached in the 'Baseline Monitoring' section.

Addressing Excedences:

When noise readings higher than the average or peak established baseline are recorded, the wastewater treatment plant staff or the environmental tester will investigate the cause of any unexplainable increase in noise. The highest recorded noise levels should be closest to the offending machine or process unless the sound is subject to wind or echoing effects. In any case, an investigation will be performed to determine the source of the problem.

Locations: A preliminary sweep of the area near the problem site should locate the general source of the noise. But it may be necessary to monitor the buildings, outside machinery, and noise sources throughout the site to locate the source of increased noise. The decibel level and frequency output from each component will be monitored to determine the probable cause of the increased noise.

This monitoring will include defining the frequency of the loudest component of the noise at the perimeter monitoring sites and the loudest frequencies of each of the individual buildings and outside machinery or noise source. This will allow identification of the problem source and also indicate which frequency could be reduced to result the greatest reduction in overall noise.

Reduction Measures: Once the problem noise source has been identified, the remedy will be found. This could be installing mufflers on exhaust pipes, additional sound proofing added to buildings or other constructed noise reduction features. This less expensive or maintenance type solutions will be addressed in-house by plant staff. If this fails to reduce the problem then consulting expertise will be brought in to evaluate and reduce the problem noise source.

Odor Monitoring and Control Plan

Equipment:

Odor will be monitored using a meter that records all sulfur compounds present like the Jerome X-31 or equal. The meter will be calibrated and used per the manufacturers recommendations. Any irregularities with the meter will be reported in the Odor Monitoring Report. The same caliber of meter will be used in all phases of the odor monitoring; baseline, monitoring and problem resolution.

The monitoring may be performed by plant staff or contracted out to an environmental consultant. The operators will receive training regarding the nature of odor and use of the monitoring equipment. Alternatively, the monitoring may be contracted out to an environmental testing company. Due to the cost of the meters, calibration and shipping, using an outside testing company may be best for the city.

Establishing Baseline Odor Levels

Locations: Locations will be the same sites used for noise monitoring. The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of odor, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached in the noise monitoring section. These points will be marked by metal survey stakes and tied to existing features at the plant. Detailed locations drawings are also attached.

Frequency and Duration of Testing: Existing baseline odor levels will be established using odor levels the eight test locations at multiple sampling periods. The sampling periods are intended to cover various atmospheric conditions that occur at the site. The locations will be monitored with different operational conditions at the facility. However, all monitoring must be completed prior to the beginning of construction because certain phases of the construction will be quite loud. Odor levels will be recorded twice times each year before the construction of the upgrades begins in February and May or August. Each site will be monitored for a minimum of five minutes to establish a peak and average odor level.

Record Keeping and Reporting: Results of the monitoring will be recorded on the following 'Odor Level Monitoring Report Form'. Records will be saved in permanent files and a report summarizing the results will be sent to the Boulder County Land Use department. The report will contain average and peak odor constituents levels recorded during the baseline study. This report will be available to the public for a minimal copying fee.

City of Boulder
75th Street Wastewater Treatment Plant

Odor Level Monitoring Report Form

Date: _____

Operator: _____

General weather conditions: _____

Wind: _____

Temperature: _____

Other details: _____

Odor components meter notes:

Readings from monitoring points: (from the south west corner of the site around the plant counter-clockwise)

Average/Peak/Major Component
concentration

South side of plant, west monitoring point: _____

South side of plant, east monitoring point: _____

East side of plant, South Monitoring point: _____

East Side of plant, North monitoring point: _____

North side of plant, east monitoring point: _____

North side of plant , west monitoring point: _____

West side of plant, north monitoring point: _____

West side of plant, south monitoring point: _____

Comments: _____

Signed: _____

Monitoring Future Odor levels:

Future odor levels will be monitored after the construction of the new is complete. The odor levels will be checked using the equal caliber of equipment and the same locations that were used to establish the baseline odor levels in the initial testing.

Locations: The locations to be monitored are sites surrounding the existing plant footprint that will also encompass the footprint of the proposed construction. There two monitoring locations evenly spaced on each side of the plant. The eight monitoring sites will be representative of odor, not at the edge of the plant, but on the outside of the all plant processes existing and proposed. A map of these locations is attached. These locations assure future access and will not be impacted by the treatment upgrades project. Also, note that these locations are used for both noise and odor test points. These points will be marked by metal survey stakes and tied, measured distances, to existing features at the plant. Locations drawings are attached to in the 'Baseline Monitoring' section.

Frequency and Duration of testing: The odor levels will be tested ~~semi-annually~~. As in the baseline monitoring, odor levels will be monitored for a minimum of five minutes at each location to determine a peak and average odor level.

Reporting and Record Keeping: A report form will be used to record the readings of the odor component meter. The results of the odor level monitoring will be compiled and summarized in an annual report. This report will be sent to the Boulder County Land Use Department and kept on file at the plant for public distribution if requested for a minimal copying fee set by the city policy. This charge is currently \$0.25 per sheet. But the report will be available for perusal and selection of particular sheets to be copied at the plant.

Weather conditions and any significant operational conditions will be recorded on the report form. Results will be recorded on a standard form, also attached in the 'Baseline Monitoring' section.

Addressing Excedences

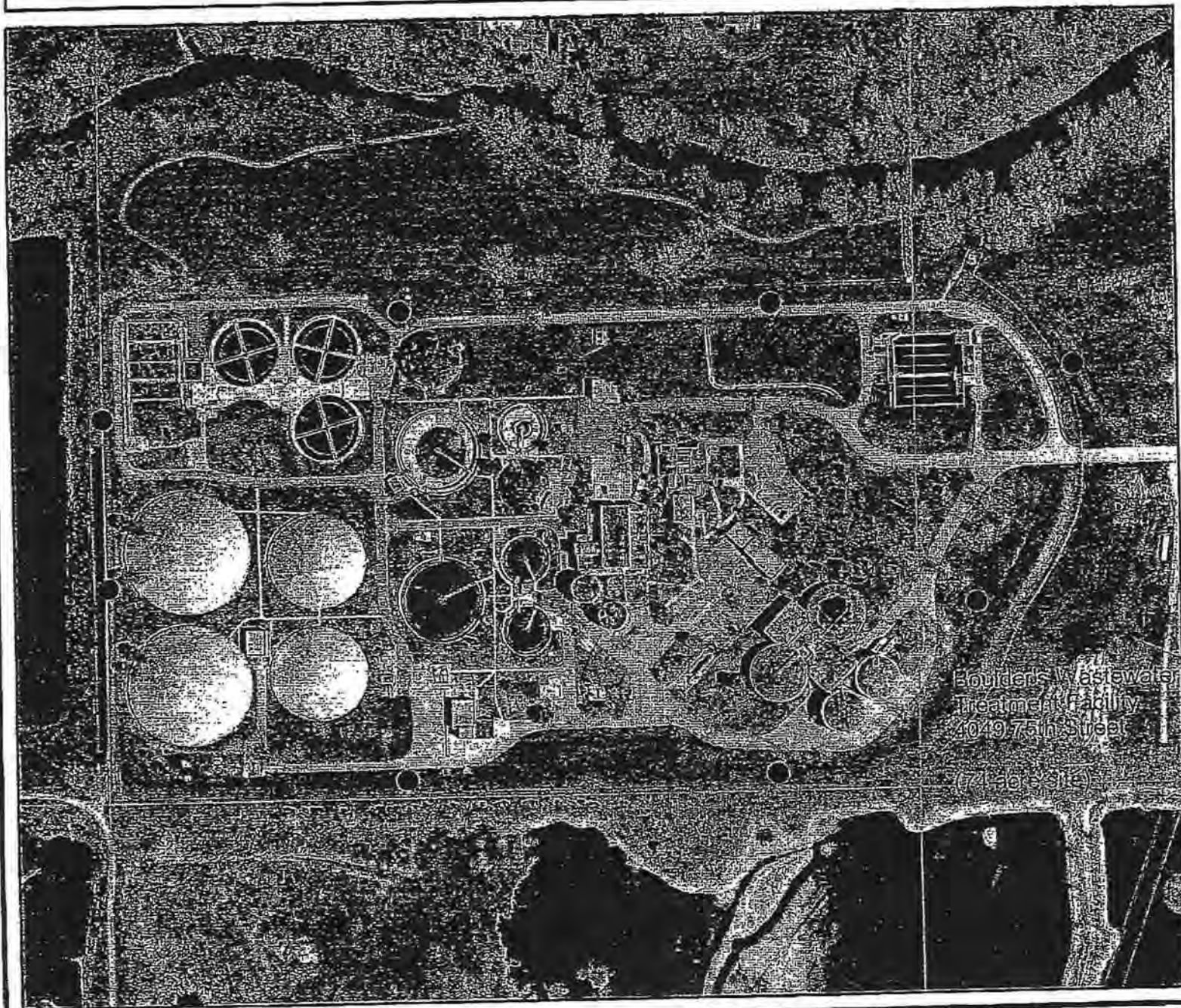
When odor component readings higher than the average or peak established baseline are recorded, the wastewater treatment plant staff or the environmental tester will investigate the cause of any unexplainable increase in odor. The highest recorded odor concentrations should be closest to the offending process unless the odor is subject to wind or buffeting effects. In any case, an investigation will be performed to determine the source of the problem.

Locations: A preliminary sweep of the area near the problem site should locate the general source of the odor. But it may be necessary to monitor the buildings, outside machinery, and odor sources throughout the site to locate the source of increased odor. The sulfur compound levels and specific sulfur compound output from each component will be monitored to determine the probable cause of the increased odor.

This monitoring will include defining the sulfur compound with the highest concentration at the perimeter monitoring sites and the highest concentrations of each of the individual buildings and outside machinery and odor source. This will allow identification of the problem source and also indicate which compound could be reduced to result the greatest overall odor reduction.

Reduction Measures: Once the problem odor source has been identified, the remedy will be found. This could be installing scubbers on exhaust fan discharge pipes, additional air containment added to buildings or other constructed odor reduction measures. This less expensive or maintenance type solutions will be addressed in-house by plant staff. If this fails to reduce the problem then consulting expertise will be brought in to evaluate and reduce the problem odor source.


Boulder WWTP Noise and Odor Monitoring Sites




LEGEND

●
Sample Points
(locations approx.
staked on site)

- Text Street Names
- Main Roads
- Arterial
- Highway
- Street Centerlines
- Survey Polygons
- Ownership Parcels
- City Limits


 N
 1:2658


 Maplink
 City of Boulder
The information depicted on this map is provided as graphical representation only. The City of Boulder provides no warranty, expressed or implied, as to the accuracy and/or completeness of the information contained herein.

ATTACHMENT Z

Odor

Compilation of Odor concentrations for Boulder's WWTP prior to Completion of the Activated Sludge Process, The table contains averaged data over the 3 year period.

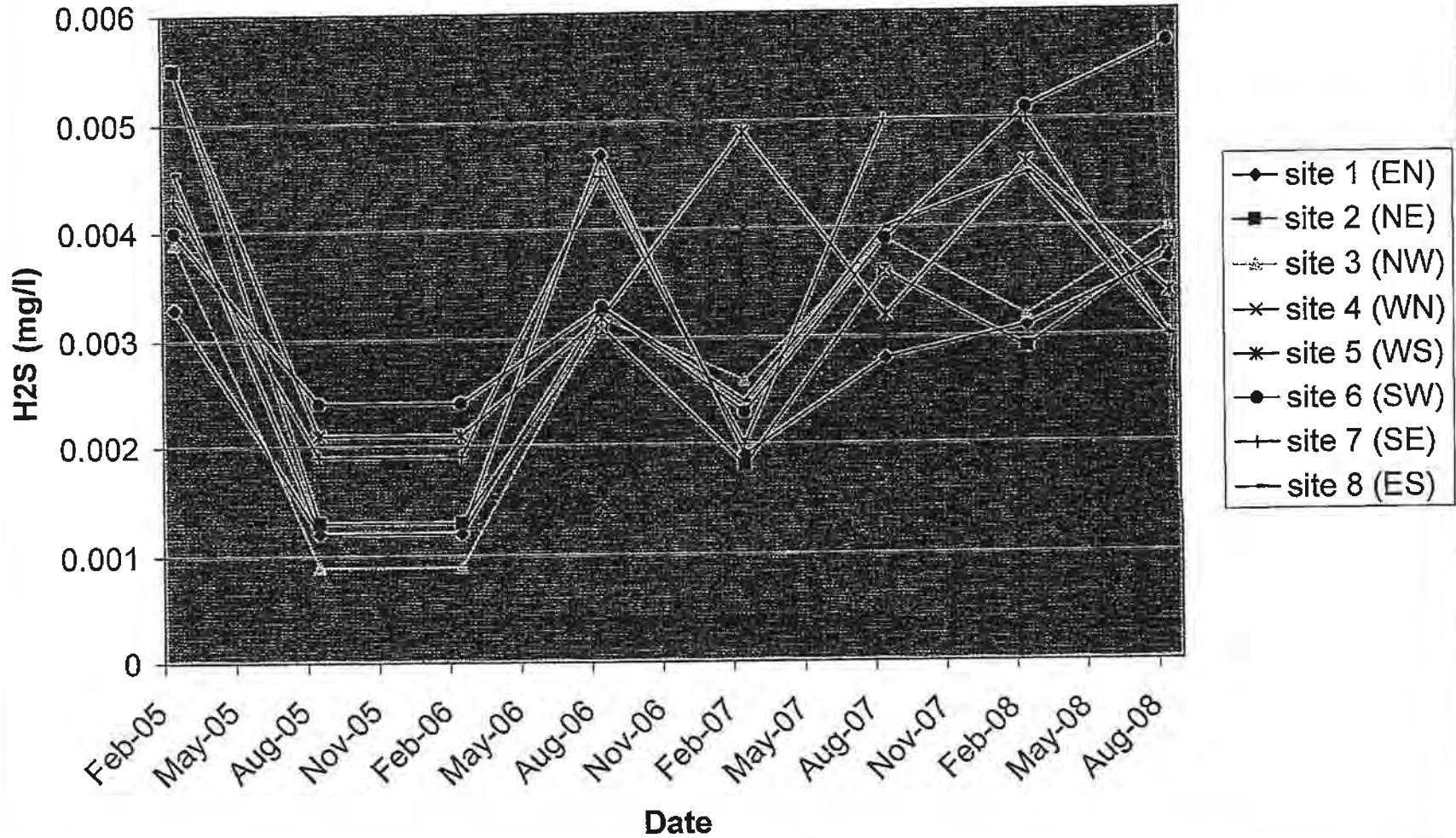
Date	Sample Point*	All H2S data in parts per million (or mg/l) units							
		1	2	3	4	5	6	7	8
	Average	0.0033	0.0055	0.0039	0.0032	0.0055	0.004	0.0043	0.004556
2/25/2005	Maximum								
2/28/2005	Peak	0.004	0.01	0.005	0.004	0.007	0.005	0.005	0.006
	Average	0.0012	0.0013	0.0009	0.0029	0.0021	0.0024	0.0019	0.0012
8/12/2005	Maximum								
	Peak	0.003	0.003	0.001	0.007	0.007	0.004	0.003	0.002
	Average	0.0012	0.0013	0.0009	0.0029	0.0021	0.0024	0.0019	0.0012
2/15/2006	Maximum								
	Peak	0.003	0.003	0.001	0.007	0.007	0.004	0.003	0.002
	Average	0.0047	0.0031	0.0032	0.0031	0.0032	0.0033	0.0045	0.0033
8/24/2006	Maximum								
	Peak	0.006	0.004	0.004	0.004	0.004	0.004	0.008	0.004
	Average	0.0019	0.0018	0.0026	0.004	0.0049	0.0023	0.002	0.0024
2/22/2007	Maximum								
	Peak	0.002	0.002	0.005	0.005	0.008	0.003	0.002	0.003
	Average	0.0028	0.0036	0.0039	0.0036	0.0032	0.0039	0.005	0.004
8/16/2007	Maximum								
	Peak	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.005
	Average	0.0031	0.0029	0.0032	0.0038	0.0046	0.0051	0.005	0.0045
2/26/2008	Maximum								
	Peak	0.004	0.004	0.004	0.005	0.005	0.006	0.006	0.005
	Average	0.0037	0.0038	0.004	0.0038	0.0034	0.0057	0.003	0.003
8/28/2008	Maximum								
	Peak	0.004	0.004	0.006	0.004	0.004	0.013	0.004	0.004

* Sample points were located around the perimeter of the plant along the flood control berm.
 2 sample points atop the berm in each cardinal compass direction, ie- west, north, east and south.
 Sample site were numbered starting with the site north of the gate as #1, proceeding counter clockwise around th
 Points 2 and 3 on the north side of the site, points 4 and 5 on the west side, points 6 and
 7 on the south side and points 8 and 1 on the east side of the site.

		Average H2S levels								
Site		1	2	3	4	5	6	7	8	
1	2/25/2005	0.0033	0.0055	0.0039	0.0032	0.0055	0.004	0.0043	0.004556	Pre Construction
2	8/12/2005	0.0012	0.0013	0.0009	0.0029	0.0021	0.0024	0.0019	0.0012	Pre Construction
3	2/15/2006	0.0012	0.0013	0.0009	0.0029	0.0021	0.0024	0.0019	0.0012	Construction
4	8/24/2006	0.0047	0.0031	0.0032	0.0031	0.0032	0.0033	0.0045	0.0033	Construction
5	2/22/2007	0.0019	0.0018	0.0026	0.004	0.0049	0.0023	0.002	0.0024	Construction
6	8/16/2007	0.0028	0.0036	0.0039	0.0036	0.0032	0.0039	0.005	0.004	Construction
7	2/26/2008	0.0031	0.0029	0.0032	0.0038	0.0046	0.0051	0.005	0.0045	AS Online
8	8/28/2008	0.0037	0.0038	0.004	0.0038	0.0034	0.0057	0.003	0.003	AS Online

		Peak H2S levels								
Site		1	2	3	4	5	6	7	8	
1	2/25/2005	0.004	0.01	0.005	0.004	0.007	0.005	0.005	0.006	Pre Construction
2	8/12/2005	0.003	0.003	0.001	0.007	0.007	0.004	0.003	0.002	Pre Construction
3	2/15/2006	0.003	0.003	0.001	0.007	0.007	0.004	0.003	0.002	Construction
4	8/24/2006	0.006	0.004	0.004	0.004	0.004	0.004	0.008	0.004	Construction
5	2/22/2007	0.002	0.002	0.005	0.005	0.008	0.003	0.002	0.003	Construction
6	8/16/2007	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.005	Construction
7	2/26/2008	0.004	0.004	0.004	0.005	0.005	0.006	0.006	0.005	AS Online
8	8/28/2008	0.004	0.004	0.006	0.004	0.004	0.013	0.004	0.004	AS Online

Average H2S Levels



Compilation of Sound Readings for Boulder's WWTP prior to Startup of the Activated Sludge Process
 The table contains averaged data over the 3 year period.

Date	Sample Point*								Site Condition	
	1	2	3	4	5	6	7	8		
	Average	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	preconstruction
2/25/2005	Maximum	51.6	51.6	51.6	51.6	51.6	51.7	51.6	51.6	preconstruction
2/28/2005	Peak	74.9	74.9	74.5	76.1	74.7	76	75.3	75.7	preconstruction
	Average	51.6	53.5	52.3	51.6	52.5	52.2	52.3	51.6	preconstruction
8/12/2005	Maximum	51.6	51.6	51.7	51.7	52.1	51.6	51.6	51.6	preconstruction
	Peak	62.57	64.7	63.8	64.5	64.5	63	63.6	73.1	preconstruction
	Average	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.7	preconstruction
2/16/2006	Maximum	51.6	51.6	51.6	51.9	51.6	51.6	51.6	52	preconstruction
	Peak	63.5	62.5	63.3	63.7	63.2	72.6	65.6	62.5	preconstruction
	Average	51.9	51.6	51.6	51.6	51.6	51.6	51.6	51.6	construction
8/24/2006	Maximum	52.2	51.6	51.6	51.8	51.6	51.7	51.6	51.6	construction
	Peak	80.5	77.3	77.4	77.7	77.1	77.6	77.2	77.2	construction
	Average	51.8	51.9	51.9	51.7	51.9	52.3	51.8	52.3	construction
2/22/2007	Maximum	52	52.2	52.2	51.9	52.3	53.1	52	52.9	construction
	Peak	73.7	74.2	77.9	76.7	74.5	75.3	71.6	74.4	construction
	Average	53.6	52.7	53.3	54	53.4	54.3	55.4	53.8	construction
8/16/2007	Maximum	55.6	53.9	54.9	55.4	55.1	55.5	57.4	55.7	construction
	Peak	83.4	80.9	82.6	85.7	83.1	83.4	87.9	83.5	construction
	Average	52.1	51.6	51.6	51.6	52.3	51.9	52.2	51.6	construction
2/26/2008	Maximum	53.6	52	51.9	51.7	54.6	52.8	53	51.9	construction
	Peak	90.5	89.7	87.5	91.1	97.6	96	96.8	96	construction
	Average	51.6	51.6	51.6	51.7	51.6	51.6	51.7	51.6	
8/28/2008	Maximum	51.7	51.7	51.7	51	51.8	52.1	52	51.6	
	Peak	81.7	79.3	80	84.5	81.1	82.4	82.7	83.9	

* Sample points were located around the perimeter of the plant along the flood control berm.
 2 sample points atop the berm in each cardinal compass direction, ie- west, north, east and south.
 Sample site were numbered starting with the site north of the gate as #1, proceeding counter clockwise around the site.
 Points 2 and 3 on the north side of the site, points 4 and 5 on the west side, points 6 and 7 on the south side and points 8 and 1 on the east side of the site.

ATTACHMENT 4

Average Noise Levels

