

NARRATIVE QUESTIONNAIRE

HEIGHT EXCEPTION

A.	General Property Information:	
1.	Property Address or Parcel Identification Number (PIN):	6450 York Street, Denver, Colorado 80229
2.	Applicant's Name:	Metro Wastewater Reclamation District Attn: William F. Brennan
3.	Property Owner's Name:	Metro Wastewater Reclamation District
4.	Current Zoning of the Subject Property:	I-3
5.	Future Land Use Plan Designation:	None

B.	Background Information:	YES	NO	
1.	Is this request an amendment to an existing land use case?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, what was the previous case number?
2.	Is this application an attempt to correct a violation of some kind?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, please provide a copy of the violation.

The following pages contain specific questions about the nature of your request. Therefore, it is in your best interest to answer them in as much detail as possible, to help limit the number of follow-up questions and review cycles.

DO NOT ANSWER WITH A 'YES' OR 'NO' OR 'N/A' – PLEASE BE SPECIFIC!

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C. Background Information:

1. **Proposal Description:** Describe why a height exception is needed, and why the existing requirements of the Land Development Code cannot be met.

The Metro Wastewater Reclamation District (Metro District or District) is conducting a Nuisance Struvite and Dewaterability Improvements Project (Project) at the District's existing Robert W. Hite Treatment Facility (RWHTF). The Project will occur within the existing site boundary of the RWHTF and it is consistent with the Development Plan for the site, which supports the District's amended Conditional Use Permit. The RWHTF site, which is located in unincorporated Adams County, is zoned I-3 and has a maximum building height of 50 feet.

As described in CDPHE's 10-year water quality roadmap, nitrogen and phosphorus are necessary to support the growth of the algae and aquatic plants that provide food and habitat for fish and smaller aquatic organisms. However, excess nitrogen and phosphorus can cause water quality problems that result in serious risks to human and animal health and damage to the economy. In June 2012, CDPHE adopted a new nutrient management control regulation (Regulation 85) establishing treatment requirements for many domestic and some industrial wastewater dischargers, as well as requirements for storm water dischargers. In order to meet CDPHE's Regulation 85, the District recently upgraded the RWHTF to provide for biological phosphorus removal (BPR). However, BPR followed by digestion of solids promotes an environment that is ideal for formation of magnesium ammonium phosphate (struvite) within the solids process and deterioration of digested sludge dewatering performance. Formation of struvite impacts the efficiency of treatment process by collecting on pipe walls and reducing flow to and from processes, and significantly increases the amount of maintenance required to remove the struvite from the system. The purpose of the Project is to install a system that reduces the potential for nuisance struvite within the solids process at the RWHTF and improves dewaterability of the biosolids. The PDPR facility will remove constituents that form struvite from the wastewater stream and convert them to a beneficially reusable fertilizer product (approximately 20 percent of the struvite generated will be captured within the AirPrex™ reactor for beneficial use. The remaining struvite will be removed with the biosolids).

The Project includes construction of an 83-foot high Pre-dewatering Phosphorus Recovery (PDPR) facility, which includes a process reactor (AirPrex™) located on top of a one-story building and associated access system consisting of monorails, steel walkways, platforms, and stairs. A lightening protection system with lightening rods, expected to be no more than five feet above the reactor, will be installed on the facility. The 83-foot height exception request does not include the lightening protection height. Ancillary equipment, such as pumps, blowers, and dumpsters, will be located in the one-story building. In the future (potentially 10 to 20 years), a second reactor may be constructed to accommodate additional population growth within the service area. The potential future second reactor will be no taller than the proposed PDPR facility of 81-feet. A Site Plan with the proposed PDPR and the potential future second reactor, and design drawings of the proposed facility are included in this application package.

To accommodate growth projections, the Metro District is currently expanding its dewatering operation, dewatered biosolids storage, and load-out facilities at the RWHTF. **Continued on page 7B**

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C. Background Information:

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Dewatering is a 24-hour per day, seven-day per week operation and this Project helps optimize dewatering operations.

The PDPR facility height, which includes the AirPrex™ reactor height and building of 83 feet is required by the manufacturer to provide the necessary treatment and performance for the removal of constituents that form struvite from the wastewater stream and convert them to a beneficially reusable fertilizer product. The RWHTF site is largely built-out with minimal area available to accommodate a new facility, which impacts the overall footprint available for the AirPrex™ improvements. The AirPrex™ reactor size (i.e., volume) is based on the number of hours liquid will be retained within the AirPrex™ reactor. The proposed design volume provides for an acceptable hydraulic retention time (HRT) at current flows, as well as projected future flows through 2035. Once an acceptable HRT is established, the AirPrex™ reactor geometry is then determined to establish a proper height to diameter ratio that, based on the manufacturer's experiences, is optimal for effective treatment and reliable performance. The height to diameter ratio requirements for the RWHTF process resulted in a tall AirPrex™ reactor.

The height of the access system has increased by two feet over the initial submittal, which included 81 feet above grade as the highest point for the structures. To facilitate maintenance, a monorail system has been designed on the top level of the access system to allow Metro District staff to safely lift heavy objects from grade to the top of the AirPrex™ reactor. The addition of the monorail system requires the top level of the access stairs to be increased by two additional feet to allow for adequate headspace between the bottom of the monorail and the top of platform. The revised request of 83 feet above grade accounts for the monorail system.

The District obtained Site Location Approval (Approval No. 4726) for the Project from CDPHE on April 12, 2018; thus, approving the preliminary design of the PDPR facility. Paul Kim, P.E., is the CDPHE Water Quality Control Division Engineering Section Senior Review Engineer for the project; Mr. Kim may be reached by phone (303-692-3279) or email (paul.kim@state.co.us) for questions regarding CDPHE's review and approval of the Project.

Solids dewatering is an essential operation at the RWHTF to meet permit requirements. Interruption would significantly impact the Metro District's ability to manage biosolids. Influent wastewater flows average approximately 135 million gallons per day. The treatment process generates waste material called sludge, which is continuously produced and treated. Treated sludge, called biosolids, is produced at a rate of approximately 1,000 gallons per minute, which equates to approximately 1.4 million gallons of biosolids generated per day. The dewatering process is used to concentrate the biosolids by separating the solids from the liquids. The concentrated biosolids are hauled off-site, which currently requires the use of approximately 22 semi-trailer trucks every day. **Continued on page 7C.**

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C. Background Information:

1. **Proposal Description:** Describe why a height exception is needed, and why the existing requirements of the Land Development Code cannot be met.

Wastewater (from homes and businesses) is conveyed to the RWHTF for treatment. Treatment consists of stabilizing the organic matter and reducing disease-causing organisms within the material. Wastewater goes through numerous processes and dewatering is one of the final steps. Biosolids are organic solids that are produced from the wastewater treatment process. The dewatering process removes excess water from the biosolids, via centrifuges, which ends with recycling the material through either land application (for crops or soil reclamation) or composting. Biosolids management is the responsibility of the Metro District's Resource Recovery and Reuse (RR&R) Department. The RR&R Department manages, markets, transports, and distributes the District's biosolids once it has been digested and dewatered. The District's current approach to biosolids management is highly diversified and includes land application of Class B biosolids on several permitted sites.

The success of the Metro District's Biosolids Management Program is achieved by use of METROGRO farmland and numerous private farms in six eastern Colorado counties. In addition, backup plans to land application (bulk storage and private composting) provide reliability for ultimate disposal while providing beneficial use. This Project is not changing this process. Biosolids contain valuable nutrients and organic matter that improve the soil. It is important to note that biosolids are not raw sewage.

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2. **Benefit:** Describe how the proposed height exception provides a demonstrated benefit to the city.

The AirPrex™ improvements are important to the treatment process as it will allow the RWHTF to achieve BPR, which helps reduce the potential of excess nutrients in the effluent discharge to the South Platte River and mitigate BPR-related solids treatment and biosolids transport challenges. These improvements help the residents of Commerce City by improving the water quality in the South Platte River and by reducing the number of biosolids hauling trucks coming to and leaving the RWHTF.

The Project will allow the RWHTF to achieve BPR and mitigate BPR-related solids treatment and biosolids transport challenges. In 2016, the District completed a Pilot Study of the AirPrex™ system at the RWHTF that demonstrated a reduction in orthophosphate (OP) concentration, which modeling has shown will: (1) improve the BPR performance, resulting in less phosphorus discharged to the South Platte River, improving water quality of the river to benefit the aquatic ecosystem and the community (including the City of Commerce City and South Adams County); and (2) reduce biosolids hauling and land application, resulting in less truck/rail traffic to and from the RWHTF. The Project will improve the efficiency of the operations of the treatment processes at the RWHTF by reducing the amount of maintenance required to control nuisance scaling on solids process pipes and equipment.

By approving the proposed Height Exception, the Metro District can install a system that will mitigate the formation of struvite, which affects the efficiency and effectiveness of the solids treatment process. In addition, improved dewatering of the biosolids reduces truck traffic entering and leaving the RWHTF. The PDPR is expected to reduce the number of biosolids hauling trucks coming to and leaving the site by an average of two per day.

The Metro District's Service Area includes the City and County of Denver and parts of Adams, Arapahoe, Douglas, Jefferson, and Weld counties. The District serves 50 entities directly, including 22 Member Municipalities, 26 Special Connectors, and two corporate connectors. South Adams County Water and Sanitation District is a Member Municipality and serves Commerce City.

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3a. What uses are located adjacent to the subject property?

North: Metro District's Administration Building (Agriculture, City and County of Denver)

South: Denver Water Recycled Water Treatment Plant (Public, Commerce City)

East: Suncor Refinery (PUD, Commerce City)

West: Xcel Energy Cherokee Generating Station (Industrial, City and County of Denver)

A zoning map is included in this application package.

3b. **Neighborhood and Surroundings:** Explain why the height exception will not have an adverse effect on the existing and proposed land uses in the area.

The Project will not have an adverse effect on the surrounding and proposed land uses in the area, as the RWHTF is surrounded by industrial use. The proposed PDPR facility will be built near the center of the RWHTF's 134-acre site, which is zoned as I-3, heavy industrial. In addition, the proposed 83-foot PDPR facility will be built northwest of the 88-foot Biosolids Dewatering and Storage Facility (BDSF) building. The City recently approved a Height Exception for the BDSF in January 2017. The proposed PDPR facility is designed to look similar to existing buildings and structures in the vicinity. Renderings of the proposed PDPR facility and the potential future second reactor on the RWHTF site and in relation to the BDSF are included in this application package.

Solids processing is an existing treatment process at the RWHTF and air emissions are currently released in the continuously operated solids dewatering process by the dewatering centrifuges. The centrifuges remove water and gas from the solids stream by imparting large centrifugal forces on the liquid. The AirPrex™ improvements, located upstream of dewatering, will strip some of the gases dewatering operations currently remove, thus shifting the point at which emissions are released. The AirPrex™ system includes an aeration process to strip carbon dioxide from the wastewater stream, which results in the potential to also strip residual dissolved sulfides and ammonia. Dedicated odor control systems are not currently employed for the dewatering operation and it is also expected odor control will not be required for the AirPrex™ improvements since the net emissions are not expected to increase with this Project.

Both the dewatering facility and the AirPrex™ reactor are located near the center of the RWHTF, approximately 580 feet from the nearest property line, which allows for additional space for dilution of odorous compounds before they reach the fence line and potentially impact adjacent properties. Furthermore, emissions from the AirPrex™ reactor will be released much higher in elevation than the current dewatering system, allowing for more dilution and dispersion than the existing dewatering facilities, thus reducing impacts at ground level. During the conceptual design phase of the Project, five Metro District staff toured four operating AirPrex™ installations in Europe, all of which were uncovered and did not use odor control equipment to treat emissions from the AirPrex™ reactor. During these visits, District staff noted no significant odors around the AirPrex™ reactors at grade level. Mild odors were noticeable when staff were standing on platforms around the top of the AirPrex™ reactors.

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NARRATIVE QUESTIONNAIRE

3a. What uses are located adjacent to the subject property?

North: See page 9A

South: See page 9A

East: See page 9A

West: See page 9A

3b. **Neighborhood and Surroundings:** Explain why the height exception will not have an adverse effect on the existing and proposed land uses in the area.

Based on the combination of the height of release (over 70 feet above grade), the spacing from the nearest fence line (over 580 feet), and the District's field experiences in Europe, it is anticipated the AirPrex™ improvements will not negatively impact air quality of the properties surrounding the RWHTF.

Under a separate planning-level project, the Metro District hired a consulting firm specializing in emissions modeling to estimate the impacts from an AirPrex™ reactor's emissions. This study used several data points for offgas concentrations of hydrogen sulfide and ammonia recorded at a small-scale AirPrex™ pilot that operated at the RWHTF for several months to help project full-scale impacts. The odor report, which was finalized in June 2018, indicated that if the AirPrex™ reactor were 'located very close to a fence line, it may pose an offsite odor risk, whereas if there is a buffer between the system and the fence line, it is less likely to require odor control.' Considering the location of the reactor and 580-foot buffer, impacts to adjacent properties are not expected. If the system does negatively impact adjacent properties, the design of the AirPrex™ reactor includes provisions that will allow for a cover to be installed on top of the AirPrex™ reactor with the ability to direct off-gasses to a dedicated treatment system.

In addition to not having an adverse effect to the neighborhood and the surroundings, no adverse effects are anticipated to birds and wildlife in the area. The aerated reactor will create an agitated water surface that will detract birds and wildlife from entering and residing in the reactor. The conditions of the proposed reactor are similar to the existing aeration basins on the site, which do not adversely affect birds and wildlife.

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| 4. | Light and Air: Explain why the height exception will not severely reduce light and air in adjacent areas. |
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The proposed PDPR facility will not reduce light or air quality to the adjacent areas. Lighting to neighbors will not be reduced as the system is located near the center of the RWHTF's 134-acre site and minimal low-glare lighting, which will facilitate operations and maintenance of the system, will be installed on the PDPR facility. As described in Part 3b, the Project is not expected to increase net air and odor emissions associated with solids treatment at the RWHTF.

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| 5. | Traffic: Will the height exception create or increase traffic and/or parking problems for the surrounding area? (Explain or demonstrate how this exception will reduce, alleviate, or not affect traffic circulation or vehicle parking on the adjacent public streets.) |
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The Project will not increase traffic and/or parking problems for the surrounding area. Installation of the PDPR facility will improve dewaterability and reduce the volume of biosolids, thereby reducing the number of biosolids hauling trucks entering and leaving the RWHTF site by an average of two per day, which will be a benefit to the City.

Construction of the Project will not affect the traffic circulation or vehicle parking on the adjacent public streets since the work is occurring onsite at the RWHTF, which is not accessible to the public.

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| 6. | Public Safety: Will the construction/operation for which the height exception is needed create a police, fire, or building safety hazard for the tenants or adjacent properties? |
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The construction and operation of the proposed Project will not create a police, fire or building safety hazard to staff or adjacent properties. The RWHTF is a secure facility with security fencing around the entire site and two security gates for access. The security gates are manned 24/7 and guards only allow access of authorized personnel onto the site. No public access is allowed; therefore, the proposed Project will not impact the safety of the public.

The proposed Project ancillary facilities will comply with the current fire and building codes.

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| 7. | Established Property: Will the height exception cause a real or perceived loss in surrounding property values? Will it substantially or permanently injure the appropriate use of adjacent conforming property? |
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The Project will not cause a real or perceived loss in surrounding property values. The proposed PDPR facility is located near the center of the RWHTF's 134-acre site, which is surrounded by other industrial zoned properties.