Boulder County Gross Reservoir Air, Noise, and Visual Analyses

April 6, 2023

Introduction and Analysis Details

- Analyses
  - Started by working with Boulder County to identify the “project area” or the potential impacts area – with ongoing consideration of project area during analyses
  - Gathered construction data from Denver Water, including location and timing of equipment and processes, equipment quantities, and specifications
    - 2022 – 2027 with an analysis for each year
    - Vehicle fugitive dust and tailpipe emissions
    - Earthmoving fugitive dust
    - Concrete batch plant
    - Crushing and screening
    - Blasting and drilling
    - Generators
    - Wind erosion

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Analysis Details, continued

- Considered impacts for separate years and geographic locations to develop worse case situations for air, noise, and visual impacts from construction
- Conducted air quality and noise quantitative analyses of the ongoing and upcoming impacts
- Ongoing work on visual impacts – planning for a distance radius from light sources to rank nearest to furthest, with consideration for elevations for line-of-sight potential
- Developed a spreadsheet that calculates, organizes, and presents impacts for residences in the project area
- This impacts score assessment for individual residences is meant to assist Boulder County and the community advisory working group members in determining appropriate distribution of funds based on air quality, noise, and visual

Air and Noise

- Noise
  - Completed a baseline monitoring ambient noise assessment for informational purposes
  - Conducted quantitative noise modeling to predict construction noise levels with the industry standard SoundPLAN model
  - The model inputs of receptors (residences), terrain information, noise sources, etc. The output is noise levels in decibels (dB) at each receptor that was determined to be in the project area.
- Air Quality
  - Conducted quantitative air quality modeling to predict potential construction air quality impacts with the EPA dispersion modeling program AERMOD
  - Pollutants modeled includes nitrogen oxides (NO_X), carbon monoxide (CO), and particulate matter sized both 10 and 2.5 microns (PM_{10}, and $PM_{2.5}$)
    - Particulate matter represents fugitive dust at different sized particles
  - The model inputs of receptors, terrain data, meteorological data, and emissions source rates. The output is air quality impacts per pollutant in micrograms per meter cubed ($\mu g/m^3$) at each receptor (residence).

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Results

- Noise
  - dB impact at each resident included in the study area
  - On the 1-5 ranking scale, with 5 being the most impacted, 132 residences with a 3, 115 residences with a 4, and 74 residences with a 5
- Air Quality
  - $\mu g/m^3$ impact at each resident included in the study area
  - Criteria pollutants modeled combined into one impact value, with a higher valuation placed on particulate matter (fugitive dust)
  - On the 1-5 ranking scale, with 5 being the most impacted, 49 residences with a 3, 9 residences with a 4, and 5 residences with a 5.
- Visual
  - Considering elevation (line of sight) and proximities between residences and construction areas lighting sources, and roadways. Also coordinated with Boulder County for general knowledge of line of sight.
    - Finalizing a 1-5 scale similar to noise and air with consideration of elevations and distances to light sources

Results, Continued

- For a final result, noise, visual, and air quality are weighted together to end with a single ranking number:
  - 35% noise
  - 35% visual
  - 30% air quality
- Air Quality high impact areas
  - Gross Dam Rd., Juniper Heights Rd., Crescent Lake Rd., Pika Rd.
- Noise high impact areas
  - Gross Dam Rd., Lakeshore Park and Drive, Tunnel 19, Coal Creek Canyon Dr.
- The expectations for visual results are that we show higher impacts for residents with line of sight and nearer to construction/light sources

Questions