TECHNICAL APPENDIX

2025-2030

Transportation Mode Shift

- Inputs
  - AADT in 2025 = 12,626 vehicles
  - Anticipated annual AADT growth = 0.5% (From CTDOT Planning Office)
  - Expected transportation mode shift to walking and biking = 20%
  - Average trip = 2.5 miles (From Google Environmental Insights for 2022 in boundary trips)

2025: Project design, environmental/historic review, and permitting; 12,626 AADT

2026: Complete Street construction; 12,626 2025 AADT x 0.5 growth = 12,690 2026 AADT

2027: (12,690 2026 AADT x 0.5 growth) x .20 travel mode shift x 2.5 average passenger miles x 365 days x 400 grams CO_2/mile = 931,042,000 grams CO_2 (931,042.00 kilograms CO_2); 931,042.00 kilograms CO_2 equates to 931.04 MTCO2e in 2027

2028: (12,754.00 2027 AADT x 0.5 growth) x .20 travel mode shift x 2.5 average passenger miles x 365 days x 400 grams CO_2/mile = 935,714,000 grams CO_2 (935,714.00 kilograms CO_2); 935,714.00 kilograms CO_2 equates to 935.71 MTCO2e in 2028

2029: (12,818 2028 AADT x 0.5 growth) x .20 travel mode shift x 2.5 average passenger miles x 365 days x 400 grams CO_2/mile = 940,459,000 grams CO_2 (940,459.00 kilograms CO_2); 940,459.00 kilograms CO_2 equates to 940.46 MTCO2e in 2029

2030: (12,883 2029 AADT x 0.5 growth) x 0.20 travel mode shift x 2.5 average passenger miles x 365 days x 400 grams CO_2/mile = 945,204,000 grams CO_2 (945,204.00 kilograms CO_2); 945,204.00 kilograms CO_2 equates to 945.20 MTCO2e in 2030

Total: A total of 3,752.42 MTCO2e will be reduced due to travel mode shift between 2025 and 2030.

More Transit Ridership

- Inputs
  - AADT in 2025 = 12,626 vehicles
  - Anticipated annual AADT growth = 0.5% (from CTDOT Planning Office)
  - Expected transportation mode shift to transit = 10%
  - Average trip = 2 miles (From Google Environmental Insights for 2022 in boundary trips)

2025: Project design, environmental/historic review, and permitting; 12,626 AADT

2026: Complete Street construction; 12,626 2025 AADT x 0.5% growth = 12,690 2026 AADT

2027: (12,690 2026 AADT x 0.5 growth) x 365 days x 0.10 new transit use x 2 average passenger miles x 400 grams CO_2/mile = 372,416,800 grams CO_2 (372,416.80 kilograms CO_2); 372,416.80 kilograms CO_2 equates to 372.42 MTCO2e in 2027

2028: (12,754 2027 AADT x 0.5 growth) x 365 days x 0.10 new transit use x 2 average passenger miles x 400 grams CO_2/mile = 374,285,600 grams CO_2 (374,285.60 kilograms CO_2); 374,285.60 kilograms CO_2 equates to 374.18 MTCO2e in 2028

2029: (12,818 2028 AADT x 0.5 growth) x 365 days x 0.10 new transit use x 2 average passenger miles x 400 grams CO_2/mile = 376,183,600 grams CO_2 (376,183.60 kilograms CO_2); 376,183.60 kilograms CO_2 equates to 376.18 MTCO2e in 2029

2030: (12,883 2029 AADT x .05 growth) x 365 days x 0.10 new transit use x 2 average passenger miles x 400 grams CO_2/mile = 378,081,600 grams CO_2 (378,081.60 kilograms CO_2); 378,081.60 kilograms CO_2 equates to 378.08 MTCO2e in 2030

Total: A total of 1,500.97 MTCO2e will be reduced due to more transit ridership between 2025 and 2030.

Less Congestion and Idling

- Inputs
  - AADT in 2025 = 12,626 vehicles
  - Anticipated annual AADT growth = 0.5%
  - Expected transportation mode shift to transit = 10%
  - Expected mode shift to bike/ped= 20%
  - Average trip = 2.5 miles
  - Minutes of saved time (2025-2030) = 0.8 minutes

2025: Project design, environmental/historic review, and permitting; 12,626 AADT

2026: Complete Street construction; 12,626 2025 AADT x 0.5 growth = 12,690 2026 AADT

2027: ((12,690 2026 AADT x .05 growth) – ((12,690 2026 AADT x .05 growth) x 0.20 travel mode shift) – ((12,690 2026 AADT x .05 growth) x 365 days x 0.10 new transit use)) x 0.8 minutes idle time savings x 35.28 grams CO_2/minute = 229,930,132.32 grams CO_2 (229,930.13 kilograms CO_2); 229,930.13 kilograms CO_2 equates to 229.93 MTCO2e in 2027

2028: ((12,754 2027 AADT x 0.5 growth) – ((12,754 2027 AADT x 0.5 growth) x 0.20 travel mode shift) – ((12,754 2027 AADT x 0.5 growth) x 365 days x 0.10 new transit use)) x 0.8 minutes idle time savings x 35.28 grams CO_2/minute = 231,083,929.44 grams CO_2 (231,083.93 kilograms

CO_2); 231,083.93 kilograms CO_2 equates to 231.08 MTCO2e in 2028

2029: ((12,818 2028 AADT x 0.5 growth) – ((12,818 2028 AADT x 0.5 growth) x 0.20 travel mode shift) – ((12,818 2028 AADT x 0.5 growth) x 365 days x 0.10 new transit use)) x 0.8 minutes idle time savings x 35.28 grams CO_2/minute = 232,255,754.64 grams CO_2 (232,255.75 kilograms CO_2); 232,255.75 kilograms CO_2 equates to 232.26 MTCO2e in 2029

2030: ((12,883 2029 AADT x 0.5 growth) – ((12,883 2029 AADT x 0.5 growth) x 0.20 travel mode shift) – ((12,883 2029 AADT x 0.5 growth) x 365 days x 0.10 new transit use)) x 0.8 minutes idle time savings x 35.28 grams CO_2/minute = 233,427,579.84 grams CO_2 (233,427.58 kilograms CO_2); 233,427.58 kilograms CO_2 equates to 233.43 MTCO2e in 2030

Total: A total of 926.70 MTCO2e will be reduced due to less idling between 2025 and 2030.

Green Infrastructure

- Inputs
    - Number of trees planted = 100 trees
    - GHG emissions reductions (2025-2030) = 3,175.15 CO_2 grams /year

2025: Project design, environmental/historic review, and permitting

2026: Complete Street construction

2027: XXX trees x 3,175.15 CO_2 grams /year = 317,515 grams CO_2 (317.515 kilograms CO_2); 317.515 kilograms CO_2 equates to 0.32 MTCO2e in 2027

2028: XXX trees x 3,175.15 CO_2 grams /year = 317,515 grams CO_2 (317.515 kilograms CO_2); 317.515 kilograms CO_2 equates to 0.32 MTCO2e in 2028

2029: XXX trees x 3,175.15 CO_2 grams /year = 317,515 grams CO_2 (317.515 kilograms CO_2); 317.515 kilograms CO_2 equates to 0.32 MTCO2e in 2029

2030: XXX trees x 3,175.15 CO_2 grams /year = 317,515 grams CO_2 (317.515 kilograms CO_2); 317.515 kilograms CO_2 equates to 0.32 MTCO2e in 2030

Total: A total of 1.3 MTCO2e will be reduced due to carbon capture by street trees between 2025 and 2030.

2025-2050

Transportation Mode Shift

Total: A total of 23,690.25 MTCO2e will be reduced due to travel mode shift between 2025 and

2050.

More Transit Ridership

A total of 9,476.10 MTCO2e will be reduced due to more transit ridership between 2025 and 2050.

Less Congestion and Idling

Use same formula

Presume idling reduction benefits decrease over time due to growth:

- 0.80 minutes per trip between 2025-2030
- 0.75 minutes per trip between 2030-2035
- 0.70 minutes per trip between 2035-2040
- 0.65 minutes per trip between 2040-2045
- 0.60 minutes per trip between 2045-2050

A total of 5,071.52 MTCO2e will be reduced due to less idling between 2025 and 2050.

Green Infrastructure

Presume carbon sequestration benefits increase over time due to trees maturing:

- Young street trees (boxelders, hedge maples) will reduce 3,175.15 grams of atmospheric CO_2 annually between 2025-2030
- Maturing streets will reduce 12,473.78 grams of atmospheric CO_2 annually between 2035-2040
- Mature street will reduce 21,772.40 grams of atmospheric CO_2 annually between 2040-2050

Total: A total of 30.87 MTCO2e will be reduced due to carbon capture by street trees between 2025 and 2050.

Total Project

Total: A total of 6,181.39 MTCO2e will be reduced due to the project between 2025 and 2030.

Total: A total of 38,268.77 MTCO2e will be reduced due to the project between 2025 and 2050.