# ORDINANCE NO. 02-2026

## AN ORDINANCE OF WEST HAVEN CITY, UTAH, ADOPTING AN IMPACT FEE FOR TRANSPORTATION, STORM WATER, PARKS, RECREATION, OPEN SPACE, AND TRAILS IN CONFORMANCE WITH THE PROVISIONS OF UTAH'S IMPACT FEES ACT, TITLE 11, CHAPTER 36a; ADOPTING THE IMPACT FEE FACILITIES PLANS (IFFP) AND IMPACT FEE ANALYSIS (IFA) FOR THE SAME AND EACH SUMMARY OF THE IFFP AND IFA FOR TRANSPORTATION, STORM WATER, PARKS, RECREATION, OPEN SPACE, AND TRAILS IN CONFORMANCE WITH THE PROVISIONS OF UTAH'S IMPACT FEES ACT, TITLE 11, CHAPTER 36a; AND ESTABLISHING AN EFFECTIVE DATE FOR THESE ACTIONS.

**BE IT ORDAINED BY THE CITY COUNCIL OF WEST HAVEN CITY, UTAH, AS FOLLOWS:**

**Section 1. Recitals:**

WHEREAS, the City of West Haven (herein "City") is a municipal corporation duly organized and existing under the laws of the State of Utah; and,

WHEREAS, in conformance with the provisions of the laws of the State of Utah, the City Council, as the governing body of the City, may exercise all legislative powers by ordinance; and,

WHEREAS, in conformance with the provisions of the laws of the State of Utah, the governing body of the City may pass any ordinance to regulate, require, prohibit, govern, control, or supervise any activity, business, conduct, or condition authorized by State law or any other provision of law; and,

WHEREAS, the City Council finds that in conformance with the provisions of Utah Code Ann. Title 11, Chapter 36A – Impact Fee Act (hereinafter "Impact Fee Act"), the City is authorized to enact and promulgate certain impact fees within the City; and

WHEREAS, the City Council finds that in conformance with the provisions of the Impact Fee Act, the City has in the past enacted and promulgated certain impact fees within the City; and,

WHEREAS, UCA §11-36a-301 requires that, before amending or enacting new impact fees, a City shall prepare an Impact Fee Facilities Plan; and,

WHEREAS, the UCA §11-36-501 and §11-36-503 require that a City post on the Utah Public Notice Website a notice of intent to prepare an Impact Fee Facilities Plan and Impact Fee Analysis, respectively; and, WHEREAS, pursuant to UCA §11-36-501 and §11-36a-503, the City Council finds that a notice of intent to prepare an Impact Fee Facilities Plan and an Impact Fee Analysis for each of the following: Transportation, Storm Water, Parks, Recreation, Open Space, and Trails, was posted on April 7, 2025, on the Utah Public Notice Website, and is attached as **Exhibit A**; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-301 et.seq., the City has complied with preparing an Impact Fee Facilities Plan and a summary of the Impact Fee Facilities Plan (UCA §11-36a-502 (1)(b)) designed to be understood by a lay person for Transportation (referred to as "Transportation" or "Roads"), and it is attached as **Exhibit B**; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-301 et.seq., the City has complied with preparing an Impact Fee Facilities Plan and a summary of the Impact Fee Facilities Plan (UCA §11-36a-502 (1)(b)) designed to be understood by a lay person for Storm Drain and Storm Water ("Storm Water"), and it is attached as **Exhibit C**; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-301 et.seq., the City has complied with preparing an Impact Fee Facilities Plan and a summary of the Impact Fee Facilities Plan (UCA §11-36a-502 (1)(b)) designed to be understood by a lay person for Parks, Recreation, Open Space, and Trails (referred to as "Parks" or "Park"), and it is attached as **Exhibit D**; and,

WHEREAS, the City Council finds that each of the attached Impact Fee Facilities Plans determines the public facilities required to serve development resulting from new development activity; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-303, the City has prepared a written Impact Fee Analysis and a summary of the Impact Fee Analysis designed to be understood by a lay person for Transportation, and it is attached as **Exhibit E**; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-303, the City has prepared a written Impact Fee Analysis and a summary of the Impact Fee Analysis designed to be understood by a lay person for Storm Water, and it is attached as **Exhibit F**; and,

WHEREAS, the City Council finds that in conformance with the provisions of UCA §11-36a-303, the City has prepared a written Impact Fee Analysis and a summary of the Impact Fee Analysis designed to be understood by a lay person for Parks, and it is attached as **Exhibit D**; and, WHEREAS, the City Council finds that they have reviewed each attached Impact Fee Facilities Plan and determined that the City's plan for financing system improvements establishes that impact fees on development activities are necessary to maintain a proposed level of service as contained in Utah Code §11-36a-302 (3) Impact Fee Facilities Plan Requirements; and,

WHEREAS, in conformance with the provisions of Utah Code §11-36-302, §11-36-304, and §11-36-305, the City Council finds that each attached Impact Fee Facilities Plan (contained in Exhibits B, C, and D) and Impact Fee Analysis (contained in Exhibits E, F, and D) has been prepared, calculated, and conforms in every way with the provisions and requirements of the Impact Fee Act; and,

WHEREAS, the City Council finds that the imposition and collection of Impact Fees are necessary to provide the public facilities required by the demands and needs of new development, at existing service levels, necessary to preserve public health, safety, and welfare; and,

WHEREAS, the City Council finds that each of the impact fees, as calculated under the provisions and requirements of the Impact Fee Act, is a fair and equitable means of providing public facilities to serve new development; and,

WHEREAS, the City Council finds that they have based impact fee amounts calculated on realistic estimates and that the assumptions underlying those estimates are disclosed in each Impact Fee Analysis and are consistent with requirements of the Impact Fees Act; and,

WHEREAS, pursuant to UCA §11-36a-401, the City Council finds that the City may not impose impact fees that exceed the highest fee justified by an Impact Fee Analysis; and,

WHEREAS, pursuant to UCA §11-36a-504, the City Council finds that a notice to hold a public hearing with the intent to adopt an impact fee enactment ordinance for Transportation, Storm Water, and Parks was posted on ____________, 2025, on the Utah Public Notice Website and meets the Notice requirements contained in the Impact Fee Act; and,

WHEREAS, the City Council finds that the City has given public notice of each proposed Impact Fee Facility Plan and Impact Fee Analysis and their corresponding summaries and has made a copy of each available as required before the date of the public hearing; and,

WHEREAS, the City Council finds that the City held a public hearing to hear public comment in accordance with the notice and hearing requirements of UCA §10-9a-205 and 10-9a-502; and, WHEREAS, the City Council finds that prior to enacting an impact fee, the City is required to establish one or more service areas within which it shall calculate and impose impact fees for various land use categories; and,

WHEREAS, the City Council finds that the Impact Fee Service Area for each Impact Fee Analysis and the geographic area where the proposed public facilities will be located include the entire City incorporated boundaries, and as amended through annexations; and,

WHEREAS, the City Council finds that UCA §11-36a-601 requires special individualized accounting for impact fees; and,

WHEREAS, the City seeks to be in compliance with current statutory requirements; and,

WHEREAS, the City Council finds that the public convenience and necessity, public safety, health, and welfare is at issue in this matter and requires the adoption of each of the Impact Fee Facilities Plans and Impact Fees Analysis and associated summaries for Transportation, Storm Water, and Parks by the City together with the adoption of a Transportation Impact Fee, Storm Water Impact Fee, and a Parks Impact Fee.

NOW, THEREFORE, BE IT ORDAINED by the City Council of West Haven City as follows:

**Section 2. Recitals and Exhibits:**

The Recitals and all Exhibits of this Ordinance are integral to the enactment and administration of Impact Fees, and the City Council hereby fully incorporates, approves, and adopts the Recitals and Exhibits as part of the enactment of this Impact Fee Ordinance.

**Section 3. Impact Fee Service Area Established:**

The Transportation, Storm Water, Parks Impact Fee Service Area is the City's incorporated boundaries, as amended through annexations, and is hereby designated as one service area.

**Section 4. Adoption of Each Impact Fee Facilities Plan and Summary:**

The City Council hereby adopts each of the Impact Fee Facilities Plans and corresponding summaries for Transportation, Storm Water, and Parks as attached as Exhibits B, C, and D.

**Section 5. Adoption of Each Impact Fee Analysis and Summary:**

The City Council hereby adopts each of the Impact Fee Analysis and corresponding summaries for Transportation, Storm Water, and Parks, as attached as Exhibits E, F, and D.

## Section 6. Transportation Impact Fee Enacted:

That based on and in consideration of the above-listed findings of the City Council, a Transportation Impact Fee is hereby enacted as described and detailed in this Ordinance, said fee having been determined to comport with applicable law and the findings of the Transportation Impact Fee Analysis.

The Transportation Impact Fees imposed by this Ordinance shall be paid before, and as a condition of, the issuance of a building permit or other applicable City-issued permit for any Development Activity or New Development in the amount listed per the Land Use Category in the table below, or by using the formula for Non-Standard Transportation Impact Fee, also described below. The Building Official or the Community Development Director may calculate the impact fee for any single-family or multi-family dwelling, and the City Engineer shall calculate the impact fee for all other uses or when calculating the impact fee using the formula for Non-Standard Impact Fees.

The Transportation Impact Fee Facilities Plan, as contained in Exhibit B, and the Transportation Impact Fee Analysis, contained in Exhibit E, shall be used in cases where clarification is required regarding the analysis, methodology, and formula used in calculating the Impact Fees. If any conflict arises between the table below, the Non-Standard Impact Fee formula, and the Impact Fee Analysis, the City Manager shall reconcile and interpret the correct methodology and formula for calculating the Impact Fees. The City Manager may contact the professionals who certified the Impact Fee Facilities Plan and Impact Fee Analysis for assistance in clarifying the methodology and formula used to calculate the Impact Fees.

The City Council may require the collection of Impact Fees on a Development Activity being annexed to the City's incorporated limits if the annexation area impacts Public Facilities and/or System Improvements.

| Land Use Category | ITE Code | Demand Unit* | Average Daily Trips | Pass By Reduction | Pass By Trips Reduced | Total Trips | Proposed Impact Fee |
|---|---|---|---|---|---|---|---|
| **Cost per Trip** | | | | | | | **$298.38** |
| Single Family Residential | 210 | Unit | 9.43 | 0% | - | 9.43 | $2,814 |
| Multi Family Low Rise** | 220 | Unit | 6.74 | 0% | - | 6.74 | $2,011 |
| Multi Family Mid Rise*** | 221 | Unit | 4.54 | 0% | - | 4.54 | $1,355 |
| Senior Adult Housing-Detached | 251 | Unit | 4.31 | 0% | - | 4.31 | $1,286 |
| Senior Adult Housing-Attached | 252 | Unit | 3.24 | 0% | - | 3.24 | $967 |
| Assisted Living | 254 | Beds | 2.60 | 0% | - | 2.60 | $776 |
| Hotel | 310 | Rooms | 7.99 | 0% | - | 7.99 | $2,384 |
| Light Industrial | 110 | KSF | 4.08 | 0% | - | 4.08 | $1,217 |
| Industrial Park | 130 | KSF | 3.37 | 0% | - | 3.37 | $1,006 |
| Mini Warehouse | 151 | KSF | 1.45 | 0% | - | 1.45 | $433 |
| Elementary School | 520 | Students | 2.27 | 0% | - | 2.27 | $677 |
| Middle/Jr. High School | 522 | Students | 2.10 | 0% | - | 2.10 | $627 |
| High School | 525 | Students | 1.94 | 0% | - | 1.94 | $579 |
| Daycare Center | 565 | KSF | 47.62 | 0% | - | 47.62 | $14,209 |
| Nursing Home | 620 | Beds | 3.06 | 0% | - | 3.06 | $913 |
| Clinic | 630 | KSF | 37.60 | 0% | - | 37.60 | $11,219 |
| Church | 560 | KSF | 7.60 | 0% | - | 7.60 | $2,268 |
| General Office | 710 | KSF | 10.84 | 0% | - | 10.84 | $3,234 |
| Medical Dental Office | 720 | KSF | 36.00 | 0% | - | 36.00 | $10,742 |
| Free-Standing Discount Superstore | 813 | KSF | 50.52 | 28% | 14.15 | 36.37 | $10,853 |
| Hardware/Paint Store | 816 | KSF | 8.07 | 26% | 2.10 | 5.97 | $1,782 |
| Shopping Center/General Commercial | 820 | KSF | 37.01 | 34% | 12.58 | 24.43 | $7,288 |
| New Car Sales | 841 | KSF | 27.84 | 0% | - | 27.84 | $8,307 |
| Tire Store | 848 | KSF | 27.69 | 0% | - | 27.69 | $8,262 |
| Supermarket | 850 | KSF | 93.84 | 36% | 33.78 | 60.06 | $17,920 |
| Convenience Market w/ Gas Pumps | 853 | KSF | 624.20 | 66% | 411.97 | 212.23 | $63,324 |
| Discount Club | 857 | KSF | 42.26 | 23% | 9.72 | 32.54 | $9,709 |
| Home Improvement Superstore | 862 | KSF | 30.74 | 48% | 14.76 | 15.98 | $4,770 |
| Department Store | 875 | KSF | 22.88 | 0% | - | 22.88 | $6,827 |
| Pharmacy/Drugstore w/ Drive Thru | 881 | KSF | 108.40 | 49% | 53.12 | 55.28 | $16,496 |
| Drive-In Bank | 912 | KSF | 100.35 | 47% | 47.16 | 53.19 | $15,869 |
| Quality Restaurant | 931 | KSF | 83.84 | 44% | 36.89 | 46.95 | $14,009 |
| High Turnover/Sit Down Restaurant | 932 | KSF | 107.20 | 43% | 46.10 | 61.10 | $18,232 |
| Fast Food with Drive Thru | 934 | KSF | 467.48 | 50% | 233.74 | 233.74 | $69,743 |
| Quick Lube | 941 | KSF | 69.57 | 0% | - | 69.57 | $20,758 |
| Self-Service Car Wash | 947 | Wash Stalls | 108.00 | 0% | - | 108.00 | $32,225 |

Source for trip statistics is the Institute of Traffic Engineers (ITE) Manual, 11th Edition. Adjustment factors can be found using the "List of Land Uses with Vehicle Pass-By Rates and Data." Land use categories indicated are not all inclusive. Refer to ITE manual for appropriate category and adjustment factors if not found in this report. For non-standard uses, the non-standard formula can be used. Each land use within proposed development will be evaluated.

* KSF: 1,000 Square Feet

** Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

*** Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

### NON-STANDARD IMPACT FEES

The City reserves the right under the Impact Fees Act to assess an adjusted fee to fairly assess the impact that a non-standard land use will have upon public facilities.[1] This adjustment could result in a different impact fee if the City determines that a particular user may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis.

FORMULA FOR NON-STANDARD TRANSPORTATION IMPACT FEES:

**Total Demand Units x Estimate Trips per Unit x Adjustment Factors x $298.38 = Impact Fee per Unit**

## Section 7. Storm Water Impact Fee Enacted:

That based on and in consideration of the above-listed findings of the City Council, a Storm Water Impact Fee is hereby enacted as described and detailed in this Ordinance, said fee having been determined to comport with applicable law and the findings of the Storm Water Impact Fee Analysis.

Storm Water Impact Fees imposed by this Ordinance shall be paid before, and as a condition of, the issuance of a building permit or other applicable City-issued permit for any Development Activity or New Development in the amount listed for single-family lot categories in the table below. For all other Development Activities, including multi-family housing, the Storm Water Impact Fee shall be calculated using the formula $0.21 per impervious square foot multiplied by the number of impervious square feet on the lot. The Building Official or the Community Development Director may calculate the impact fee for Development Activities on any single-family lot based on the table, and the City Engineer shall calculate the impact fee for all other Development Activities, including multi-family housing, using the above formula of $0.21 per impervious square foot multiplied by the number of impervious square feet on the lot.

The Storm Water Impact Fee Facilities Plan, as contained in Exhibit C, and the Storm Water Impact Fee Analysis, as contained in Exhibit F, shall be used in cases where clarification is required regarding the analysis, methodology, and formula used for the calculation of the Impact Fees. If any conflict arises between the table below, the above storm water impact fee formula for non-residential, or the Impact Fee Analysis, the City Manager shall reconcile and interpret the correct methodology and formula for calculating the Impact Fees. The City Manager may contact the professionals who certified the Impact Fee Analysis for assistance in clarifying the methodology and formula used to calculate the Impact Fees.

The City Council may require the collection of Impact Fees on a Development Activity being annexed to the City's incorporated limits if the annexation area impacts Public Facilities and/or System Improvements.

Table 11: Maximum Impact Fee Schedule by Lot Size

| Single-Family Lot Categories | Average Impervious SF* | Average Impervious % of Category | Impact Fee for Lot Category |
|---|---|---|---|
| ¼ acre and less | 4,281 | 39.3% | $916.68 |
| Greater than ¼ acre up to ½ acre | 6,108 | 28.0% | $1,307.89 |
| Greater than ½ acre up to 1 acre | 7,626 | 17.5% | $1,632.94 |
| Greater than 1 acre up to 2 acres | 8,962 | 10.3% | $1,919.01 |
| Greater than 2 acres up to 3 acres | 9,563 | 7.3% | $2,047.70 |
| Greater than 3 acres up to 4 acres | 11,454 | 6.6% | $2,452.61 |
| Greater than 4 acres | 13,027 | | $2,789.44 |
| *Amended IFFP July 2025 | | | |

All other development including multi-family housing will be charged $0.21 per impervious square foot.

## <u>Section 8.</u> <u>Parks Impact Fee Enacted:</u>

That, based on and in consideration of the above-listed findings of the City Council, a Parks Impact Fee is hereby enacted as described and detailed in this Ordinance, said fee having been determined to comport with applicable law and the findings of the Parks Impact Fee Analysis.

The Parks Impact Fees imposed by this Ordinance shall be paid before, and as a condition of, the issuance of a building permit or other applicable City-issued permit for any Development Activity or New Development in the amount listed in the table below or by using the formula for Non-Standard Parks, Recreation, Open Space, and Trails Impact Fee, also described below. The Building Official or the Community Development Director may calculate the impact fee for any single-family or multi-family dwelling using the table below, and the City Engineer shall calculate the impact fee using the formula for Non-Standard Parks, Recreation, Open Space, and Trails Impact Fee.

The Parks Impact Fee Facilities Plan and Impact Fee Analysis, as contained in Exhibit D, shall be used in cases where clarification is required regarding the analysis, methodology, and formula used for the calculation of the Impact Fees. If any conflict arises between the table below, the Non-Standard Impact Fee formula, and the Impact Fee Analysis, the City Manager shall reconcile and interpret the correct methodology and formula for calculating the Impact Fees. The City Manager may contact the professionals who certified the Impact Fee Analysis for assistance in clarifying the methodology and formula used to calculate the Impact Fees.

The City Council may require the collection of Impact Fees on a Development Activity being annexed to the City's incorporated limits if the annexation area impacts Public Facilities and/or System Improvements.

## PARKS AND RECREATION IMPACT FEE CALCULATION

Utilizing the estimated value per capita within the system and the value per capita to provide the same level of improvements, the total fee per capita is shown in **TABLE 6.1** below. The impact fee also includes a buy-in fee which development activity will contribute toward the excess capacity of system. It is anticipated that new development will also pay general taxes similar to existing development for the general operation and maintenance of the system.

TABLE 6.1: ESTIMATE OF IMPACT FEE VALUE PER CAPITA

| TYPE OF IMPROVEMENT | | | TOTAL COST PER CAPITA |
|---|---|---|---|
| Combined | | | $1,452 |
| **OTHER COMPONENTS TO FEE** | **ADDITIONAL VALUE** | **DEMAND SERVED** | **TOTAL VALUE PER CAPITA** |
| Impact Fee Credit | - | 9,850 | $0 |
| Professional Expense | $10,850 | 9,850 | $1 |
| | | **Estimate of Impact Fee Per Capita** | **$1,453** |

TABLE 6.2: IMPACT FEE PER HOUSEHOLD

| | AVERAGE HH SIZE[1] | FEE PER HH | EXISTING FEE PER HH | % CHANGE |
|---|---|---|---|---|
| Single-Family | 3.62 | $5,260 | $2,144 | 145% |
| Multi-Family | 2.65 | $3,850 | $1,796 | 114% |

Single family residential is defined as any single unit detached housing. Multi-family is defined as any residential unit not considered single family.

[1] Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates
Table B25033: Total Population in Occupied Housing Units by Tenure by Units in Structure
Table DP04: Selected Housing Characteristics

### Non-Standard Impact Fee

The proposed fees are based on population growth. The Impact Fees Act allows the City to assess an adjusted fee that more closely matches the true impact that the land use will have upon parks and recreation facilities.[1] This adjustment could result in a different impact fee if the City determines that a particular land use may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis. The formula for determining a non-standard impact fee is found below.

FORMULA FOR NON-STANDARD PARKS AND RECREATION IMPACT FEES:

**Estimated Population per Unit x $1,453 = Impact Fee per Unit**

## Section 9. Consolidated Fee Schedule:

That any schedule of impact fees previously set out in the City's Consolidated Fees and Fines Schedule is hereby repealed.

## Section 10. Adjustment of Impact Fee:

Pursuant to UCA §11-36a-402, the City Manager may adjust the standard impact fee at the time the fee is charged to respond to: (a) unusual circumstances in specific cases, or (b) a request for a prompt and individualized impact fee review for the development activity of the state, a school district, or a charter school and an offset or credit for a public facility for which an impact fee has been or will be collected; and (c) for the City Manager to ensure that the impact fees are imposed fairly.

The City Manager may adjust the calculation of the amount of the impact fee to be imposed on a particular development based on studies and data submitted by the developer. The City Manager may also contact and seek counsel from the Community Development Director, City Engineer, City Attorney, the professionals who certified the Impact Fee Facilities Plan and the Impact Fee Analysis, and/or the Office of the Property Rights Ombudsman for assistance when adjusting the impact fee.

Any individual, developer, or entity who believes they are entitled to consideration of an Impact Fee adjustment, credit, or reimbursement shall file a written request with the City Manager within 30 (thirty) days of the impact fee being paid. The written request for an Impact Fee adjustment, credit, or reimbursement shall set forth, in detail and specificity, the grounds and asserted facts for which an adjustment, credit, or reimbursement is warranted. Any Impact Fee adjustment, credit, or reimbursement granted by the City Manager shall be memorialized in written form.

**Section 11. Impact Fee Credits:**

Pursuant to UCA §11-36a-402(2), the City Manager shall ensure that a developer, including a school district or a charter school, shall receive a credit against or proportionate reimbursement of an impact fee if the developer: (a) dedicates land for a System Improvement; (b) builds or dedicates some or all of a System Improvement; or (c) dedicates a public facility that the City and the developer agree will reduce the need for a System Improvement.

Pursuant to UCA §11-36a-402(3), the City Manager shall give a credit against impact fees for any dedication of land for, improvement to, or new construction of, any system improvements provided by the developer if the facilities: (a) are System Improvements; or (b) are dedicated to the public and offsets the need for an identified System Improvement.

**Section 12. Impact Fee Exemption and Prohibitions:**

The City Manager may exercise an impact fee exemption for development activities attributed to low-income housing, the state, school district, charter school, or a development activity with a broad public purpose, as further described in UCA §11-36a-403.

Pursuant to the process and criteria outlined specifically in West Haven City Ordinance 12-2024 (adopted May 1, 2024, by the City Council), and any applicable Utah Code, the City Manager, or their designee, may grant an exemption or elimination for the payment of impact fees for newly constructed moderate-income housing units.

Pursuant to the process and criteria outlined specifically in West Haven City Ordinance 11-2024 (adopted May 1, 2024, by the City Council), and any applicable Utah Code, the City Manager or their designee, which includes the Building Official, Community Development Director, and City Engineer shall grant an exemption or elimination for the payment of impact fees for an accessory dwelling unit (ADU), which is a subordinate dwelling, which has its own eating, sleeping, and sanitation facilities either within or attached to a single-family residential building; or within a detached accessory structure associated with a single-family dwelling, as defined in West Haven City Code §157.455.

The Building Official, Community Development Director, City Engineer, or City Manager shall not assess an impact fee on action or development activity that would violate UCA §11-36a-202.

**Section 13. Conflicts Between Ordinance & Impact Fee Act:**

If any conflict should occur or arise between this Ordinance and the Impact Fees Act, as amended, the Impact Fees Act shall prevail.

**Section 14. Use of Impact Fees:**

Impact Fees collected by the City shall be used to: (a) Pay for the Public Facilities or System Improvements provided for by this Ordinance and the Impact Fee Facilities Plans and/or Impact Fee Analysis, attached as Exhibits B, C, D, E, and F; (b) Reimburse funds to the City for a Development Activity or New Development's Proportionate Share of Public Facilities or System Improvement already constructed by the City; (c) Reimburse funds or grant Impact Fee credits to individuals or entities who dedicate land, construct and dedicate some or all Public Facilities or System Improvements where those Public Facilities or System Improvements are beyond an individual's or entity's Proportionate Share; and (d) Any other use authorized by the Impact Fees Act or law.

**Section 15. Accounting of Impact Fees:**

The City shall account for Impact Fees collected in accordance with UCA §11-36a-601, as amended.

**Section 16. Expenditure of Impact Fees:**

In accordance with UCA §11-36a-602 and as amended, the City may expend Impact Fees for a System Improvement: (a) identified in the Impact Fee Facilities Plan or Impact Fee Analysis, and (b) for the specific Public Facility type for which the fee was collected. The City shall expend or encumber the Impact Fees for a permissible use within six (6) years of their receipt; except the City may hold the fees for longer than six (6) years if it identifies, in writing: (a) an extraordinary and compelling reason why the fees should be held longer than six (6) years; and (b) an absolute date by which the fees shall be expended.

**Section 17. Refund of Impact Fees:**

In accordance with UCA §11-36a-603 and as amended, the City Manager shall refund an Impact Fee to the individual or entity listed, as described in UCA §11-36a-603, plus interest earned, as calculated by the post-judgment interest rate for the State of Utah pursuant to UCA §15-1-4 when the following circumstances exist: (1) the Developer does not proceed with the Development Activity and has filed a written request for a refund to the Development Review Committee; (2) the Impact Fee has not been spent or encumbered; and (3) no impact has resulted.

**Section 18. Interpretation of Impact Fees:**

The City Council hereby designates the City Manager to interpret this Ordinance as necessary for the fair administration of Impact Fees. In interpreting this Ordinance, the City Manager may use the entirety of this Ordinance and the Impact Fee Act. The City Manager may also contact and seek counsel from the City Attorney, the professionals who certified the Impact Fee Facilities Plan and the Impact Fee Analysis, and/or the Office of the Property Rights Ombudsman for assistance in clarifying the methodology and formula used to calculate the Impact Fees.

**Section 19. Impact Fee Challenge:**

***Request for Relevant Information***. In accordance with UCA §11-36a-701(2), any individual, developer, or entity who has paid the Impact Fee (i.e., the individual or entity listed on the building permit or other applicable City-issued permit by which the impact fee was assessed and collected) who believes the Impact Fee does not meet the requirements of law may file a written request with the City Manager for relevant information.

Within two (2) weeks of receipt of the request for relevant information, the City Manager shall provide the individual, developer, or entity with the impact fee analysis, the impact fee facilities plan, and any other relevant information relating to the impact fee.

***Administrative Appeals Procedure***. The City has established this administrative appeal process under UCA §11-36a-703 in good faith to provide an appeals process for challenging the validity of an impact fee.

In accordance with §11-36a-701 and §11-36a-703, after receiving the impact fee analysis, the impact fee facilities plan, and any other relevant information relating to the impact fee, the individual, developer, or entity required to pay an Impact Fee may file an appeal challenging the legal validity of the City's Impact Fee. The appeal shall be filed with the City Manager, providing detailed and specific grounds for the appeal under the Impact Fee Act and all facts relied upon by the appealing party.

The appeal shall be filed within the time limits outlined in §11-36a-702, depending on what basis the applicant cites to under section of §11-36a-701(3) for the challenge of the impact fee.

Upon the City's receipt of the administrative appeal, the Appeal shall be heard by the City Appeal Hearing Officer. The Appeal Hearing Officer shall be the same individual appointed under West Haven City Code §157.035. The Appeal Hearing Officer shall abide by the following procedures regarding conducting an appeal hearing as outlined in the West Haven City Code: §157.036(A) and (B); §157.037(C), (D), (E), and (F); and any other applicable West Haven City Code sections regarding the authority of the Appeal Hearing Officer.

The City Appeals Hearing Officer shall hold a hearing and shall render its decision on the administrative appeal no later than thirty (30) days after the challenge to the Impact Fee is filed with the City.

***District Court Review.*** After the City Appeals Hearing Officer's final decision, an adversely affected party may petition the Second Judicial District Court in Weber County for review of the decision.

**Section 20. Repealer of Conflicting Enactments:**

All prior orders, ordinances, and resolutions of the City, or any portions thereof, that conflict with the provisions of this Ordinance as enacted and adopted are hereby repealed to the extent of such conflict. This repeal shall not be interpreted to reinstate any act, order, or resolution, or any part thereof, that has previously been repealed.

**Under UCA §11-36a-401, the impact fees outlined in this Ordinance shall not take effect until ninety (90) days after the adoption of this Ordinance. Until the new impact fees are enacted ninety (90) days after the adoption of this Ordinance, the current impact fees outlined in the West Haven City Code shall be valid and applicable. Ninety days after the adoption of this Ordinance, the West Haven City Council repeals the entirety of the "Impact Fees" section of the West Haven City Code, specifically: §§33.020, 33.021, 33.022, 33.023, 33.024, 33.025, 33.026, and 33.027. This Ordinance shall be listed in the West Haven City Code under "TABLE OF SPECIAL ORDINANCES, X. IMPACT FEES".**

**Section 21. Savings Clause:**

If any provision of this Ordinance shall be held or deemed to be or shall, in fact, be invalid, inoperative or unenforceable for any reason, such reason shall not have the effect of rendering any other provision or provisions hereof invalid, inoperative or unenforceable to any extent whatever, this Ordinance and the provisions of this Ordinance being deemed to be the separate independent and severable act of the City Council of West Haven City.

**Section 22. Date of Effect:**

BE IT FURTHER ORDAINED that this Ordinance shall be approved on the 21st day of January 2026, shall be published or posted as required by law, and shall become effective 90 (ninety) days after the approval date in accordance with UCA §11-36a-401(2).

DATED this 21st day of January 2026.

WEST HAVEN CITY, a municipal corporation

by: Rob Vanderwood
Mayor Rob Vanderwood

Attested and recorded

Emily Green
Emily Green, City Recorder

| | | | |
|---|---|---|---|
| ~~Mayor Rob Vanderwood~~ | ~~Yes~~ | ~~No~~ | n/a |
| Councilmember Carrie Call | Yes x | No | |
| Councilmember Kim Dixon | Yes x | No | |
| ~~Councilmember Nina Morse~~ | ~~Yes~~ | ~~No~~ | n/a |
| Councilmember Ryan Saunders | Yes x | No | |
| Councilmember Ryan Swapp | Yes ✓ | No | |

## RECORDER'S CERTIFICATION

STATE OF UTAH )
: ss.
County of Weber )

I, EMILY GREEN, the City Recorder of West Haven, Utah, in compliance with UCA §10-3-713 and UCA §10-3-714 do hereby certify that the above and foregoing is a full and correct copy of **"AN ORDINANCE OF WEST HAVEN CITY, UTAH, ADOPTING AN IMPACT FEE FOR TRANSPORTATION, STORM WATER, PARKS, RECREATION, OPEN SPACE, AND TRAILS IN CONFORMANCE WITH THE PROVISIONS OF UTAH'S IMPACT FEES ACT, TITLE 11, CHAPTER 36a; ADOPTING THE IMPACT FEE FACILITIES PLANS (IFFP) AND IMPACT FEE ANALYSIS (IFA) FOR THE SAME AND EACH SUMMARY OF THE IFFP AND IFA FOR TRANSPORTATION, STORM WATER, PARKS, RECREATION, OPEN SPACE, AND TRAILS IN CONFORMANCE WITH THE PROVISIONS OF UTAH'S IMPACT FEES ACT, TITLE 11, CHAPTER 36a; AND ESTABLISHING AN EFFECTIVE DATE FOR THESE ACTIONS."** adopted and passed by the City Council of West Haven, Utah, at a regular meeting thereof on January 21, 2026 which appears of record in my office, with the date of posting or publication being January 21, 2026.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the City this 21st day of January 2026.

Emily Green
City Recorder

## Exhibit A - Notice of Intent to Prepare Road, Storm Water, and Park Impact Fee Facilities Plan and Impact Fee Analysis

### PUBLIC NOTICE

**Public Body:** West Haven City Council

**Subject:** Notice of Intent of Preparation of Road Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Title**: Notice of Intent of Preparation

**Notice Type**: Notice of Intent to Prepare Road Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Date: April 7, 2025**

**Description/Agenda:**
West Haven City, Utah, in accordance with the requirements of Utah Code Ann. §§11-36a-501 and 11-36a-503, posts a notice of its intent to prepare a Road Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City. The areas that will be included in the Impact Fee Facilities Plan and Impact Fee Analysis are all areas within the legal West Haven City limits and the declared annexation areas of West Haven City, Utah. For additional information regarding the City's intent to prepare a Road Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City, please contact Shawn Warnke, West Haven City Manager, at shawnw@westhavencity.com

**Notice of Special Accommodations:** If you need special accommodations to participate in a City Council Meeting, please call the City Recorder, Emily Green, at 801-731-8311. Please provide at least 24 hours notice for adequate arrangements to be made.

**PUBLIC NOTICE**

**Public Body:** West Haven City Council

**Subject:** Notice of Intent of Preparation of Storm Water Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Title**: Notice of Intent of Preparation

**Notice Type**: Notice of Intent to Prepare Storm Water Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Date: April 7, 2025**

**Description/Agenda:**
West Haven City, Utah, in accordance with the requirements of Utah Code Ann. §§11-36a-501 and 11-36a-503, posts a notice of its intent to prepare a Storm Water Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City. The areas that will be included in the Impact Fee Facilities Plan and Impact Fee Analysis are all areas within the legal West Haven City limits and the declared annexation areas of West Haven City, Utah. For additional information regarding the City's intent to prepare a Storm Water Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City, please contact Shawn Warnke, West Haven City Manager, at shawnw@westhavencity.com

**Notice of Special Accommodations:** If you need special accommodations to participate in a City Council Meeting, please call the City Recorder, Emily Green, at 801-731-8311. Please provide at least 24 hours notice for adequate arrangements to be made.

**PUBLIC NOTICE**

**Public Body:** West Haven City Council

**Subject:** Notice of Intent of Preparation of Park Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Title**: Notice of Intent of Preparation

**Notice Type**: Notice of Intent to Prepare Park Impact Fee Facilities Plan and Impact Fee Analysis

**Notice Date: April 7, 2025**

**Description/Agenda:**
West Haven City, Utah, in accordance with the requirements of Utah Code Ann. §§11-36a-501 and 11-36a-503, posts a notice of its intent to prepare a Park Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City. The areas that will be included in the Impact Fee Facilities Plan and Impact Fee Analysis are all areas within the legal West Haven City limits and the declared annexation areas of West Haven City, Utah. For additional information regarding the City's intent to prepare a Park Impact Fee Facilities Plan and Impact Fee Analysis for West Haven City, please contact Shawn Warnke, West Haven City Manager, at shawnw@westhavencity.com

**Notice of Special Accommodations:** If you need special accommodations to participate in a City Council Meeting, please call the City Recorder, Emily Green, at 801-731-8311. Please provide at least 24 hours notice for adequate arrangements to be made.

## Exhibit B - Transportation Impact Fee Facilities Plan

# West Haven City Transportation Capital Facilities Plan and Impact Fee Facilities Plan

## West Haven, Utah

**October 2025**

TRANSPORTATION ENGINEERING

**A-Trans Engineering**
**P.O. Box 521651**
**Salt Lake City, Utah 84152**
**(801) 949-0348 mobile**
**atrans@comcast.net**

TRAFFIC STUDY

# West Haven City Transportation Capital Facilities Plan and Impact Fee Facilities Plan

**West Haven City, Utah**

October 2025

Prepared by:

**A-Trans Engineering, LLC**
P.O. Box City, 521651
Salt Lake City, Utah 84152
(801) 949-0348
atrans@comcast.net

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**List of Acronyms and Definitions**

AADT Annual Average Daily Traffic
FAR Federal Aid Route
ITE Institute of Transportation Engineers
K-factor A percentage rate that is applied to the daily traffic volumes to determine the peak hour volumes.
LOS Level of Service (LOS) is a measure of the delay at the intersection which allows a relative rating of congestion. LOS is a qualitative rating of traveler satisfaction from A to F, with a LOS A corresponding to a roadway that has the greatest amount of excess capacity, and LOS F corresponds to a roadway that has far exceeded its reasonable operating capacity.

OD Origin-Destination
RTP Regional Transportation Plan
SR State Route
WFRC Wasatch Front Regional Council
UDOT Utah Department of Transportation
vpd vehicles per day
vph vehicles per hour

**Executive Summary**

Infrastructure planning is essential for communities to understand and fiscally plan for both the immediate short-term needs while planning for the future needs. This Capital Facilities Plan (CFP) provides both the recommended transportation short and long-term needs for West Haven City. This traffic analyses include planning-level recommendations and the Impact Fee Facilities Plan (IFFP) concentrates on a 6-10 year outlook. The implementation of impact fees is only applicable to this short-term planning.

The following report provides transportation information to support the economic analysis of the updated transportation impact fee calculations. The following items were requested by the economic analysis consultant:

1. Current level of service (LOS B, C, D, etc.)
2. Capital cost to the City of transportation system improvements over the next 10 years to maintain existing level of service (Coordination with Gardner Engineering)
3. Excess capacity on City owned system roads
4. LOS if no new road construction over the next 10 years
5. Current PM Peak Hour Trips
6. PM Peak Hours Trips attributable to growth over the next 10 years
7. Road capacity (PM Peak Hour Trips) of proposed new system roads to meet new growth over the next 10 years.
8. Road capacity (Daily trips) of proposed new system roads to meet new growth through 2040 (full build-out).

The following resources were utilized in the analysis:

- West Haven Roadway City Street Map 2018
- West Haven Trails Map Overview 2019
- West Haven City General Plan December 2014
- Western Weber Planning Area General Plan 7/22/2022
- Western Weber Future Active Transportation Map 8-16-2022
- UDOT's Traffic on Utah Highways
- WFRC Projections

The analysis considers collector and arterial roadways. PM peak counts were collected at the critical intersections within the City to provide existing AADT (Average Annual Daily Traffic) and determine a K-factor for the other roads in the City. A Synchro model of the City's existing critical intersections was developed in the transportation model.

Analysis of the projected traffic along the major roadways within West Haven City for 2028 shows the recommended improvements. Traffic on the City roadways is derived from three contributors.

1. Traffic already on the roadway from existing development within and without the City,
2. Traffic that will be generated from future development within the City based on land use zoning
3. Background traffic which is trips that are generated from outside the City.

To offset the impact of the increased traffic from within and without West Haven City, the following roadway and signal improvement recommendations are made. The actual need and timing for these improvements will depend on where development occurs and how quickly development happens. The projects are organized into priority groups represented by time frames: current to 2028/2033, 2050.

Summaries of the recommendations are shown in Tables ES-1 through ES-4 and Figure ES-1 and ES-2.

**Table ES-1: 2028 / 2033 Recommended Roadway Widening and Sizing Improvements**

| Project # | Road | From | To | Improvement |
|---|---|---|---|---|
| 6 | 3600 South | 2700 West | Midland Drive | Widen Road from 2 to 5 lanes |
| 7 | Connector | 3300 South | 3600 South | New Road – 5 lanes |
| 4 | Connector | 1800 South | 2100 South | New Road – 5 lanes |
| TBA | Wilson Lane | 2700 West | 2400 West | Partial New Road – from 2 to 3 lanes |
| 5 | 1800 South | 2700 West | 1950 West | Widen Road from 2 to 5 lanes |
| UDOT | Midland Drive | Hinckley | 3300 South | Widen Road from 3 to 5 lanes – UDOT |
| UDOT | Midland Drive | 3300 South | 1900 West | Widen Road from 3 to 5 lanes – UDOT |
| 1 | 3300 South | 4700 West | 5100 West | Widen Road from 2 to 3 lanes |
| TBA | 3300 South | 3500 West | ~3200 West | Widen Road from 2 to 5 lanes |
| 2 | 5100 West | 3300 South | 4000 South | Widen Road from 2 to 3 lanes |
| 3 | 2700 West | 2150 South | 2550 South | Widen Road from 2 to 3 lanes |

**Table ES-2: 2028 / 2033 Intersection Control and Geometric Improvements**

| Project # | Intersection | | Improvement |
|---|---|---|---|
| 11 | 1800 South | 1900 West | Signal - UDOT |
| 8 / Part of #4 | 1800 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| TBA / UDOT | Midland Drive | 3300 South | Alternative Intersection (Roundabout)[1]- UDOT |
| 9 | 4000 South | 5100 West | Signal – UDOT |
| 10 | 4000 South | 4300 West | Signal – UDOT |
| UDOT | Midland Drive | Hunter | Signal – Development Driven – UDOT |
| UDOT | 4000 South | Hunter (3050 West) | Signal – Development Driven - UDOT |
| 12 / Part of #7 | 3300 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| 13 | 2700 West | 3600 South | Alternative Intersection (Roundabout)[1] |

1 -For more information pertaining to why roundabouts are recommended please see Section 12. Unique Design Considerations.

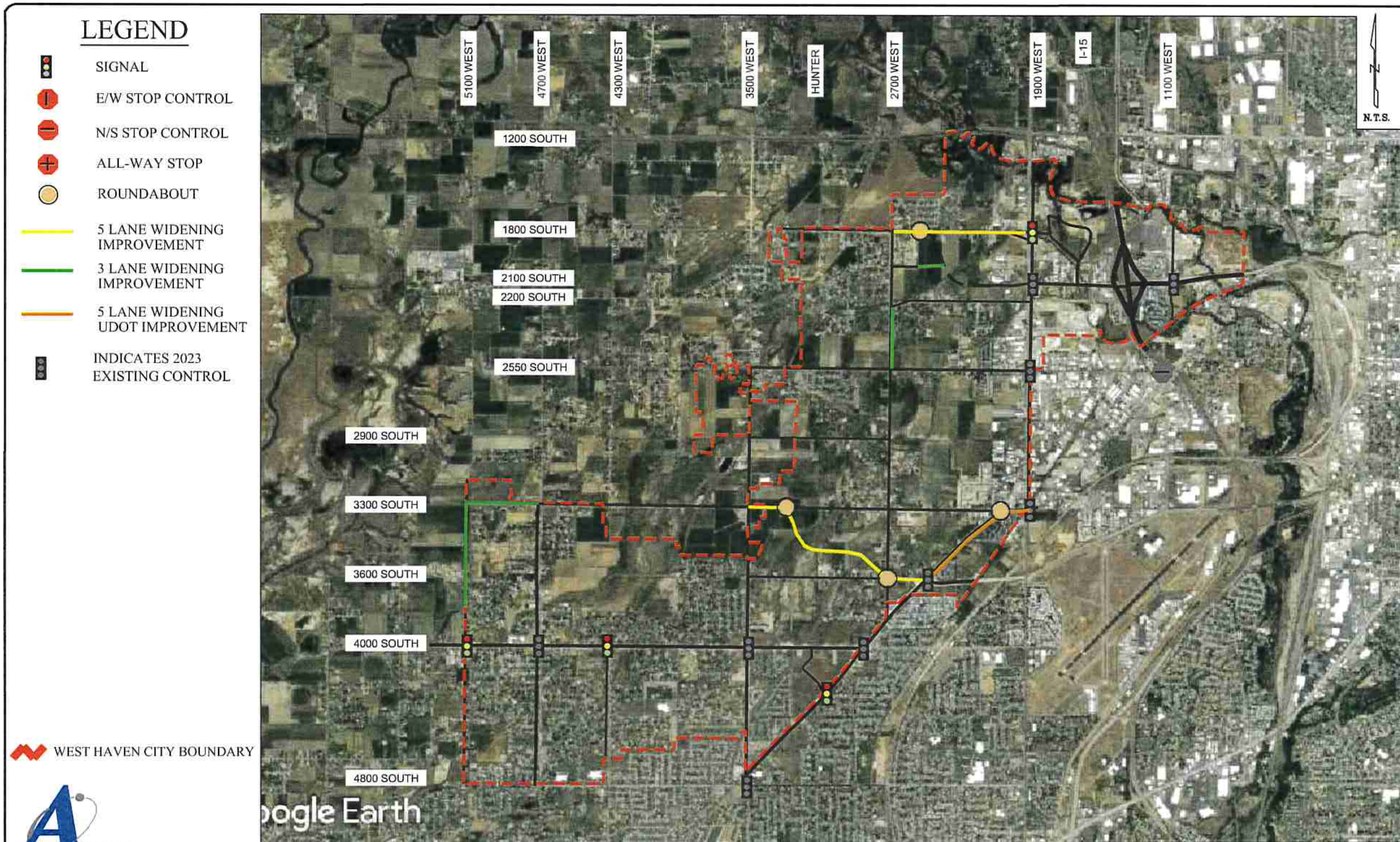
- TBA – Indicates Master Planned Project not included in this project window for impact fee analysis
- UDOT - Indicates Master Planned Projects on UDOT owned routes

**Table ES-3: 2050 Recommendations**

| Roadway | From | To | 2050 Recommended Improvement |
|---|---|---|---|
| 4000 South | 5100 West | 4700 West | Widen Road from 3 to 5 Lanes – UDOT |
| 2550 South | West Border | 1900 West | Widen Road from 3 to 5 Lanes |
| 1800 South | 2050 West | 1900 West | Realignment and widening from 2 to 3 lanes |
| 1800 South | 1900 West | 1700 West | New 3 lanes road connecting 1900 West to Retail Loop |
| 1800 South | West Border | 2700 West | Widen Road from 2 to 3 Lanes |
| 3500 West | 3300 South | 4000 South | Widen Road from 3 to 5 Lanes |
| 3500 West | 4000 South | 4800 South | Widen Road from 3 to 5 Lanes |
| 2700 West | North Border | 2175 South | Widen Road from 2 to 3 lanes |
| 2700 West | 2550 South | Midland Drive | Widen Road from 2 to 3 Lanes |
| Canal Crossing | North Border | 1100 West | New Road - 3 Lane |
| Retail Loop | 1750 West | 1625 West | Complete and Widen the Retail Loop to 3 Lanes (This includes the northern portion of the Loop Road) |
| 1100 West | North Border | South Border | Widen Road from 2 to 3 Lanes |

**Table ES-4: 2050 Intersection Control Improvements**

| Intersection | | Improvement |
|---|---|---|
| 1625 West | 2100 South | Signal – UDOT |
| 2700 West | 1800 South | Signal |
| 2700 West | 2550 South | Signal |
| 2700 West | 2900 South | Signal |
| 2700 West | 3300 South | Signal |
| 3500 West | 2550 South | Signal |
| 3500 West | 3300 South | Signal |

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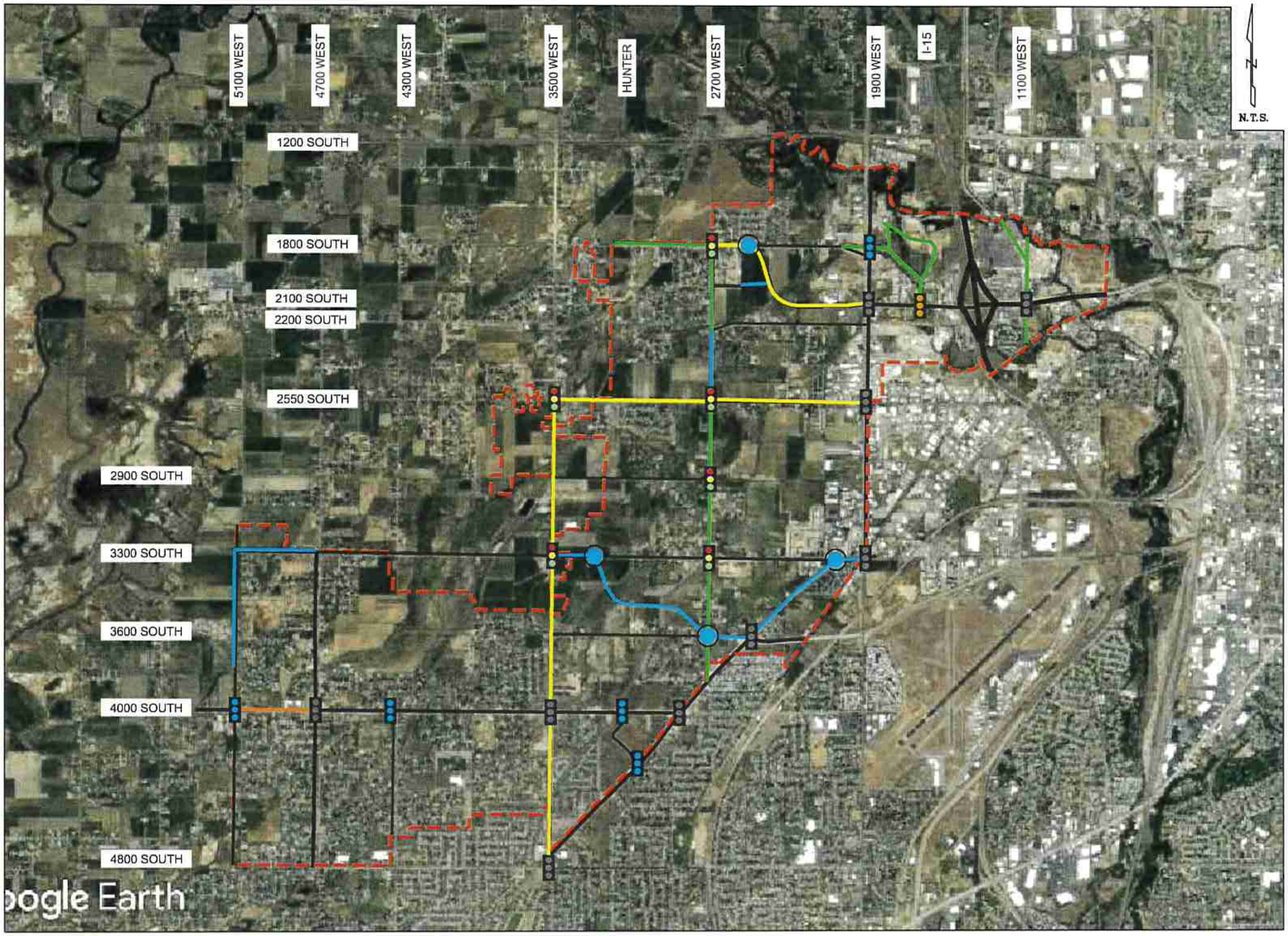
Phone: 801-949-0348 Fax: 801-582-6252

Figure ES-1

2028 / 2033 NETWORK RECOMMENDATIONS




## LEGEND

- SIGNAL
- E/W STOP CONTROL
- N/S STOP CONTROL
- ALL-WAY STOP
- ROUNDABOUT
- 5 LANE WIDENING IMPROVEMENT
- 3 LANE WIDENING IMPROVEMENT
- 5 LANE WIDENING UDOT IMPROVEMENT
- INDICATES 2023 EXISTING CONTROL
- NEW SIGNAL UDOT IMPROVEMENT
- INDICATES 2028 / 2033 RECOMMENDED CONTROL
- INDICATES 2028/2033 IMPROVEMENT
- WEST HAVEN CITY BOUNDARY

A-TRANS

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P.O. BOX 521651, SLC, UT 84152
Phone: 801-949-0348 Fax: 801-582-6252

Figure ES-2

2050 BUILDOUT RECOMMENDATIONS

## 1. Introduction

The purpose of this report is to provide West Haven City a transportation capital improvements plan and support for the impact fee facilities plan (IFFP) and subsequent impact fee analysis (IFA) which calculates the impact fee amounts. Collector and arterial streets are included in the analysis; local roads are not shown and will be subdivision-specific as they develop. The exact alignment of all new roadways is to be determined. As this is a Planning Level document, design specific or safety related improvements were not considered within this report.

The following transportation analysis identifies the current usage of the city's infrastructure and how future City growth will impact the roadways. This will aid the City in long-term transportation infrastructure planning and budgeting.

This analysis provides West Haven City with the projected volumes along the primary routes and intersections of the City for the future condition of 2028 and 2033. Also included are the 2050 projected volumes on the primary routes. The level of service and capacity that can be expected if improvements are made by the recommended year are provided. Additionally, the No Build analysis assumes that no improvements to the city's infrastructure are made. Using this information and proposed project costs, the City's financial consultant can complete the requirements of UCA 11-36a-304 for an impact fee analysis and calculate the maximum legal transportation impact fees that can be assigned to the new growth.

## 2. Roadway Network

The primary routes within West Haven City are 1900 West, 3500 West, Midland Drive, Hinckley Drive, 2100 South, 2550 South and 4000 South. Table 1 shows the classification, ownership, number of lanes and speed limit of the major roadways within West Haven City.

**Table 1: Road Network Classification**

| Roadway | From | To | UDOT Route | Speed Limit | Existing Number of Lanes |
|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | RT 3308 | 25 | 3 |
| 4000 South | 5100 West | 4700 West | SR 37 | 45 | 3 |
| 4000 South | 4700 West | 3500 West | SR 37 | 45 | 5 |
| 4000 South | 3500 West | Midland Drive | SR 37 | 50 | 5 |
| 3600 South | 3500 West | 2700 West | | 35 | 2 |
| 3600 South | 2700 West | Midland Drive | | 35 | 2 |
| Hinckley Drive | Midland Drive | East Border | SR 79 | 50 | 5 |
| Connector | 3300 South | 3600 South | | Unbuilt | Unbuilt |
| 3300 South | 5100 West | 3500 West | RT 3362 | 40 | 2 |
| 3300 South | 3500 West | Midland Drive | RT 3362 | 40 | 3 |
| 2900 South | West Border | 2700 West | | 30 | 2 |
| 2550 South | West Border | 2700 West | RT 3364 | 40 | 3 |
| 2550 South | 2700 West | 1900 West | RT 3364 | 40 | 3 |
| 2200 South | 2700 West | 1900 West | | 35 | 2 |
| Connector | 1800 South | 2100 South | SR 104 | Unbuilt | Unbuilt |
| 2100 South | 1900 West | I-15 | SR 104 | 45 | 5 |
| 2100 South | I-15 | East Border | SR 104 | 50 | 5 |
| Wilson Lane | 2700 West | 2400 West | | 25 | 2[1] |
| 1800 South | West Border | 2700 West | RT 3366 | 40 | 2 |
| 1800 South | 2700 West | 1900 West | RT 3366 | 40 | 2 |
| 5100 West | 3300 South | 4800 South | | 40 | 2 |
| 4700 West | 4000 South | 4800 South | RT 3359 | 25 | 3 |
| 4700 West | 3300 South | 4000 South | SR 134 | 40 | 2 |
| 4300 West | 4000 South | 4800 South | | 30 | 2 |
| 3500 West | 4000 South | 4800 South | RT 3358 | 35 | 3 |
| 3500 West | 3300 South | 4000 South | RT 3358 | 40 | 3 |
| 2700 West | North Border | Midland Drive | | 35 | 2 |
| Canal Crossing | North Border | 1100 West | | Unbuilt | Unbuilt |
| 1900 West | 2100 South | Midland Drive | SR 126 | 55 | 5 |
| 1900 West | North Border | 2100 South | SR 126 | 55 | 5 |
| Retail Loop | 1900 West | 1625 West | | 25 | 2[1,2] |
| 1100 West | North Border | South Border | RT 3368 | 25 | 2 |
| Midland Drive | 3500 West | 4000 South | SR 108 | 50 | 5 |
| Midland Drive | 4000 South | Hinckley | SR 108 | 50 | 5 |
| Midland Drive | Hinckley | 3300 South | SR 108 | 50 | 3 |
| Midland Drive | 3300 South | 1900 West | SR 108 | 50 | 3 |

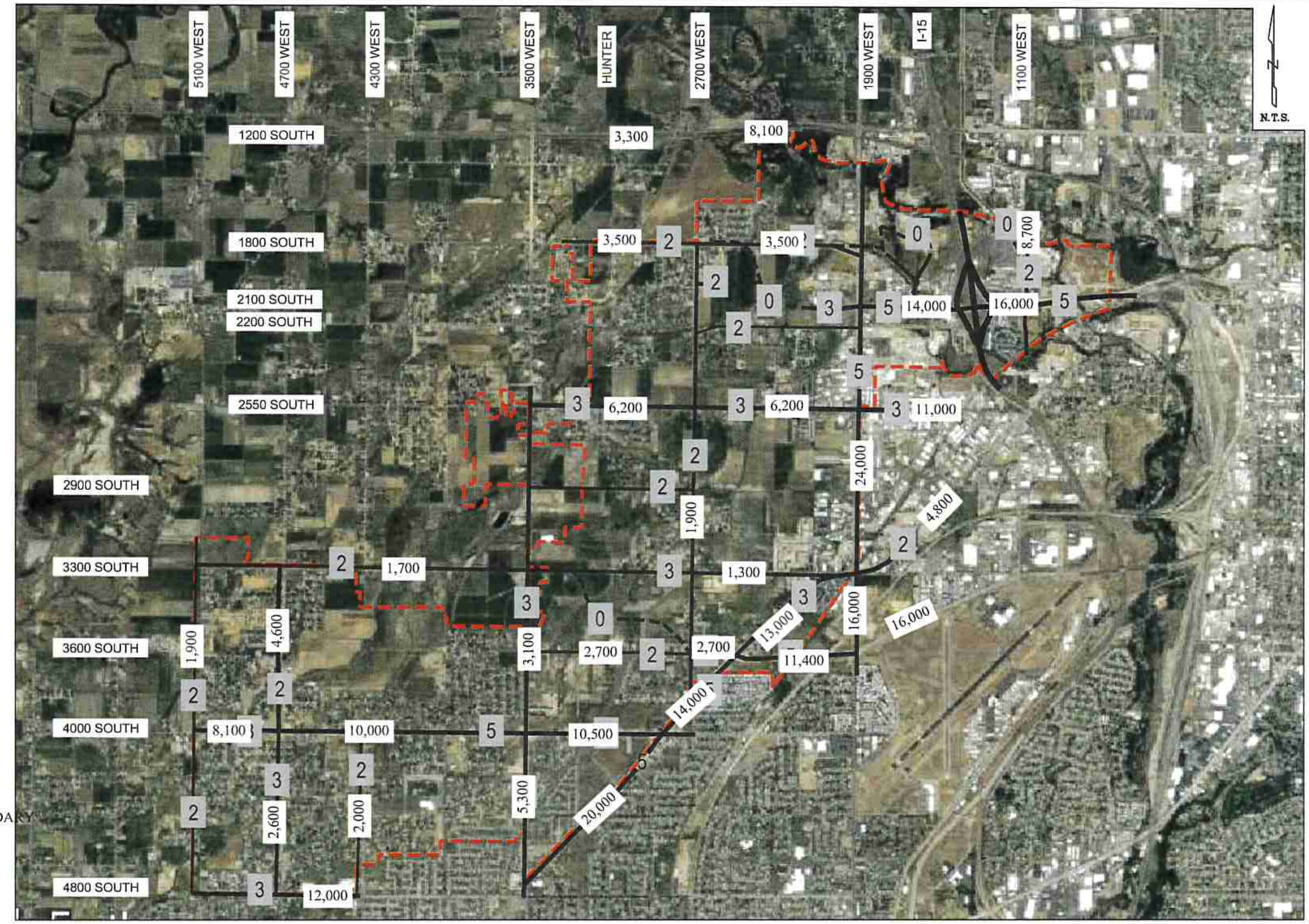
1. Partially Completed
2. This segment includes both the northern loop and south loop of the retail loop.

### 3. Existing Average Annual Daily Traffic

A base or existing condition average annual daily traffic (AADT) is determined for each road segment within the study area. This is derived from applying a K-factor to the existing traffic counts collected in connection with this study and UDOT's Traffic on Utah Highways AADT. The K-factor is a percentage rate that is applied to the daily traffic volumes to determine the peak hour volumes.

A K-factor of 11.5% was determined from comparing UDOT's Traffic on Utah Highways AADT and peak hour traffic count volumes at locations where both UDOT and new count data were available. The range of the K-factors was 7% to 16%. To determine the AADT along each road segment, a 11.5% K-factor was applied indicating that the PM peak represents 11.5% of the daily traffic volumes.

For several road segments within the study area, both methods of determining the AADT are available. In this case engineering judgment is utilized to determine the AADT that best represents the road segment and will be utilized within the study. Several factors are considered including reliability of data, length of segment and the exact location of data collection. Based on the 2023 turning movement counts, the corresponding UDOT AADT and the calculated K-factor, a current estimated AADT along each roadway segment was determined. The existing condition AADT is shown in Figure 1.




# LEGEND

AADT (XXXX)
2021 DATA FROM UDOT TRAFFIC ON UTAH HIGHWAYS OR EXISTING TRAFFIC COUNTS WITH K FACTOR APPLIED

—#— NUMBER OF LANES

AADT (XXXX) - DAILY TRAFFIC

WEST HAVEN CITY BOUNDARY

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Phone: 801-949-0348 Fax: 801-582-6252

Figure 1

EXISTING AVERAGE ANNUAL DAILY TRAFFIC

## 4. Existing Intersection Control

An inventory of all intersection controls and major intersections within West Haven City was performed for the existing condition. This inventory is shown in Figure 2.

Existing traffic counts requested by the city were collected in April of 2023 during the PM peak period. Additional intersections were included from data taken from UDOT's Signal Performance Metrics as well as data already possessed by A-Trans Engineering. The following intersections have existing 2023 turning movement counts:

1. 1100 West / 2100 South
2. 1900 West / 2100 South
3. 1900 West / 2550 South
4. 2550 South / 2300 West
5. 2700 West / 2550 South
6. 1900 West / Midland Drive
7. 3500 West / 3300 South
8. 4700 West / 3300 South
9. 1900 West / Hinkley Drive
10. Midland Drive / Hinkley Drive
11. Midland Drive / 4000 South
12. 3500 West / 4000 South
13. 4700 West / 4000 South
14. Midland Drive / 2900 West
15. Midland Drive / 4275 South (Hunter)
16. Midland Drive / 3100 West
17. Midland Drive / 4600 South
18. Midland Drive / Commercial Access
19. 4000 South / 5100 West
20. 4000 South / 4300 West

The existing geometry of these intersections is shown in Figure 3. The existing traffic turning movement counts for the PM peak period are shown in Figure 4.

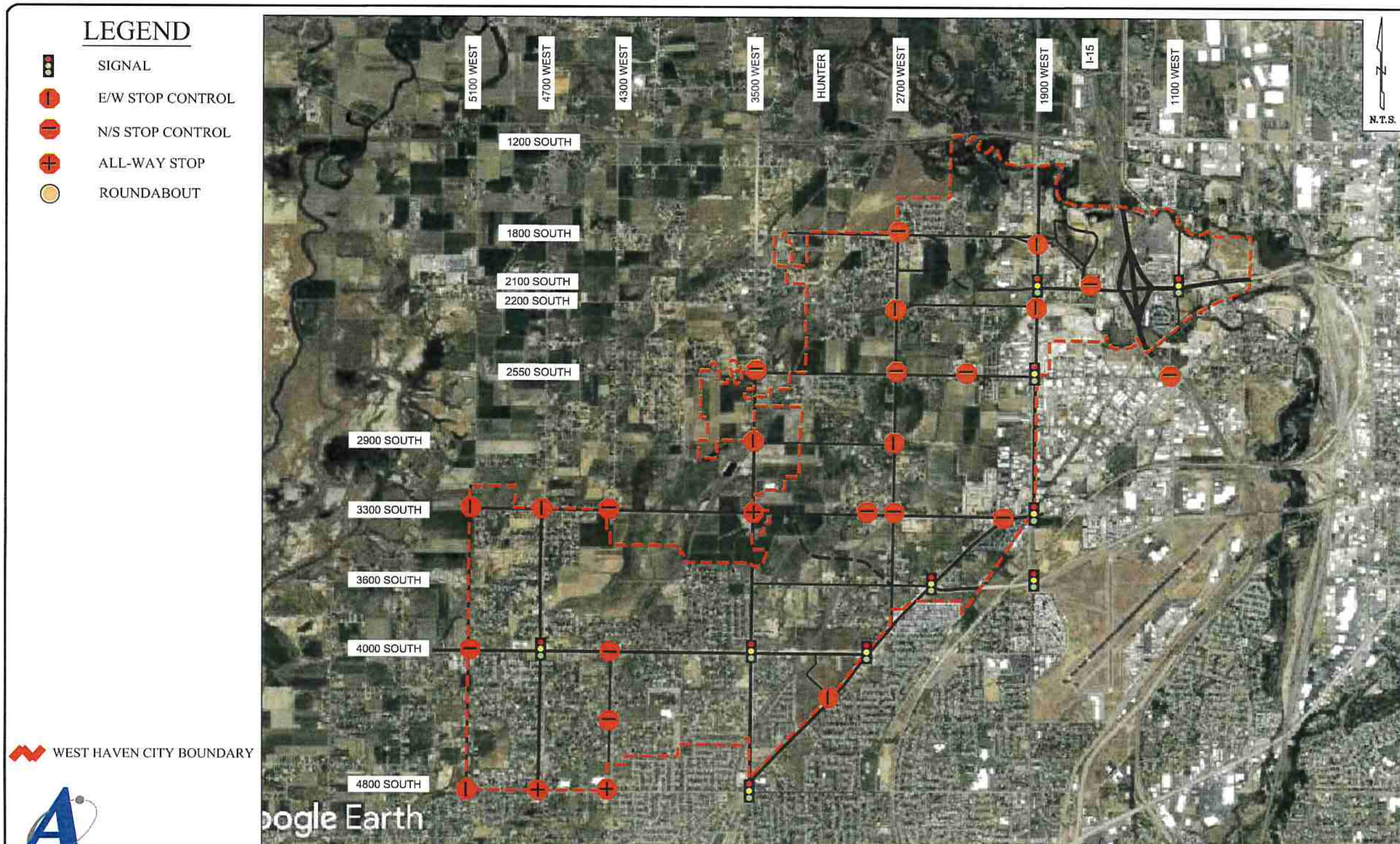


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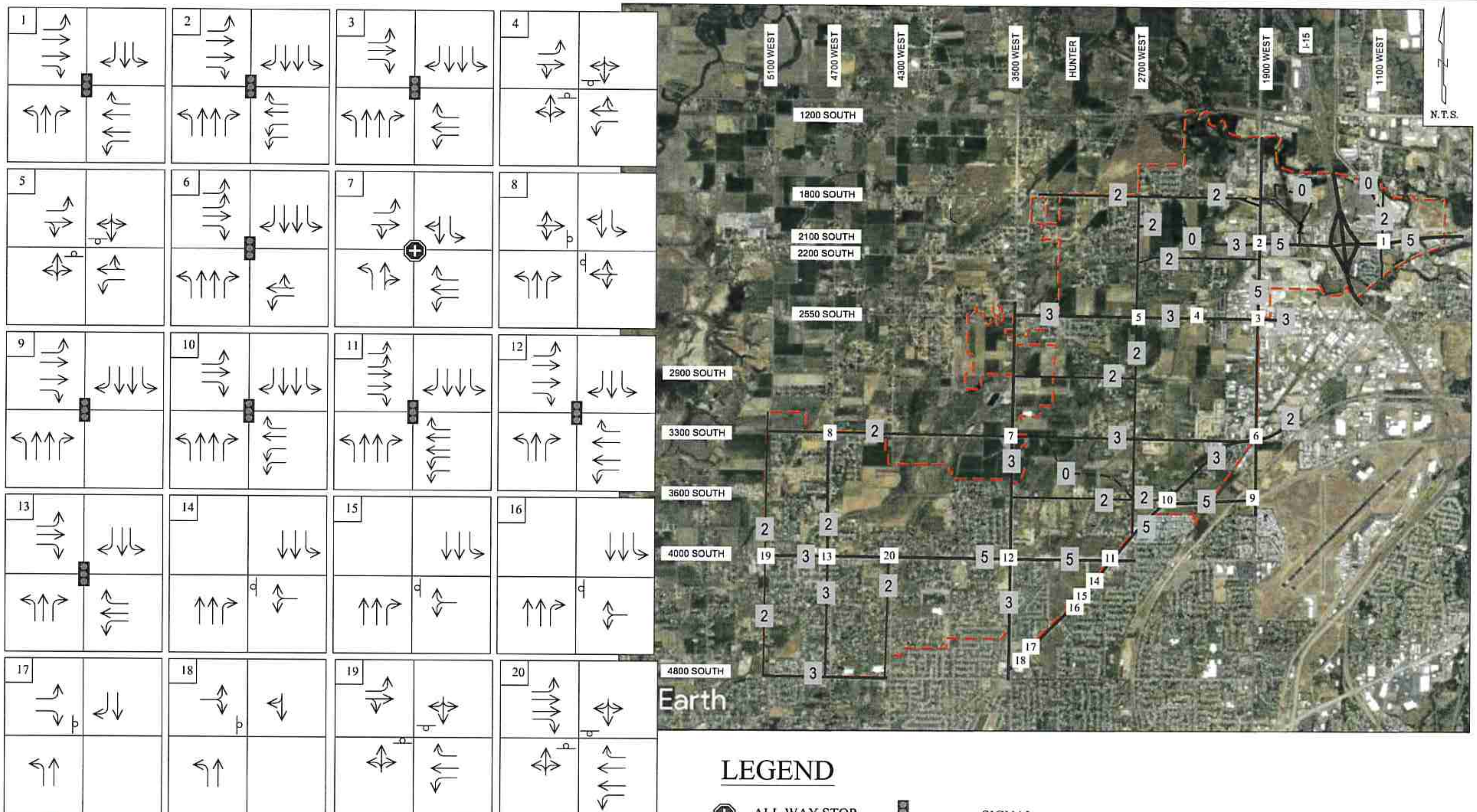
Figure 2

EXISTING INTERSECTION CONTROL




LEGEND

ALL WAY STOP

SIGNAL

STOP SIGN

—#— NUMBER OF LANES

—#— INTERSECTION NUMBER

WEST HAVEN CITY BOUNDARY

A-TRANS TRANSPORTATION ENGINEERING
P.O. BOX 521651, SLC, UT 84152
Phone: 801-949-0348 Fax 801-582-6252

Figure 3

EXISTING GEOMETRY

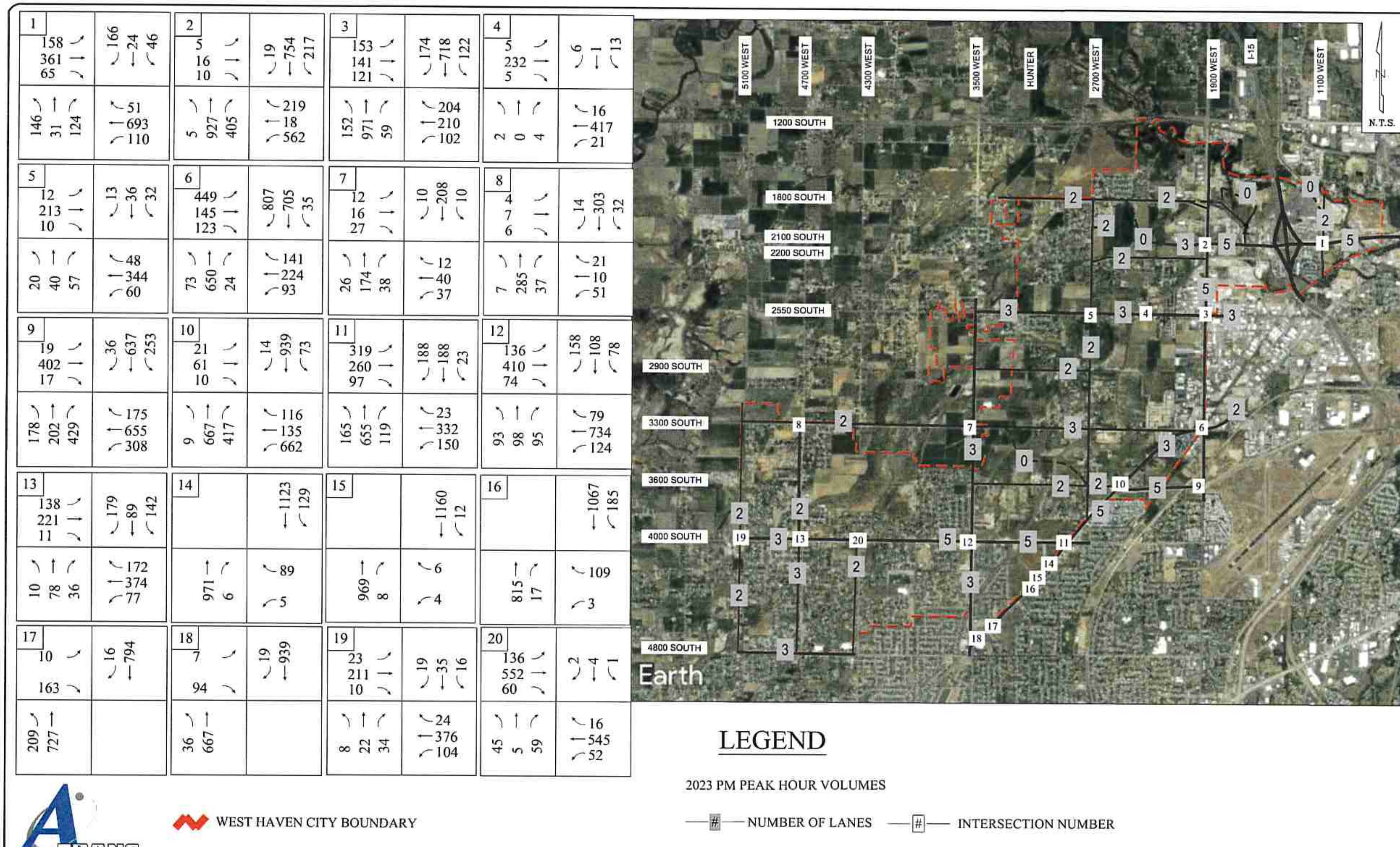



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Figure 4

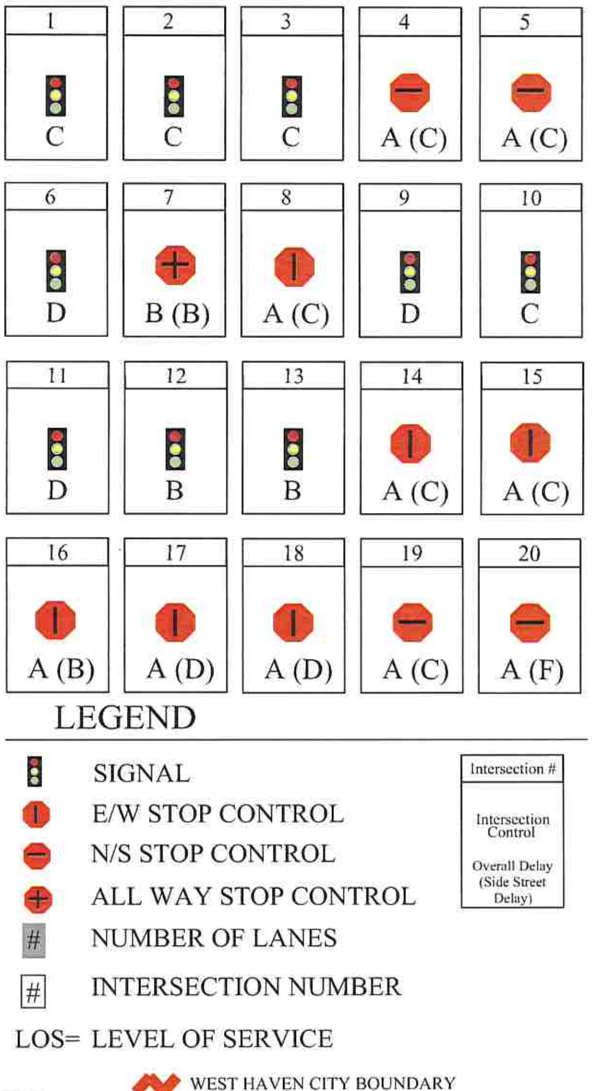
2023 EXISTING TURNING MOVEMENT COUNTS

Existing intersection level of service (LOS) analysis was provided for the PM peak hour for 20 locations within the City. LOS is a measure of the delay at the intersection which allows a relative rating of congestion. This is not the same as the functional classification of the road which indicates the purpose of the road. Functional classification is used to identify whether the road is to primarily serve the neighborhood (local roads), the regional traffic (arterials) or the roads connecting neighborhoods to the regional roads (collectors). These will be discussed further when roadway capacities are discussed.

Table 2 shows the Highway Capacity Manual LOS range by delay for unsignalized and signalized intersections and accesses. Figure 5 shows the existing intersection level of service.

**Table 2: Intersection LOS – Delay Relationship**

| | Unsignalized | Signalized |
|---|---|---|
| Level of Service | Total Delay per Vehicle (sec) | Total Delay per Vehicle (sec) |
| A | ≤ 10.0 | ≤ 10.0 |
| B | > 10.0 and ≤ 15.0 | > 10.0 and ≤ 20.0 |
| C | > 15.0 and ≤ 25.0 | > 20.0 and ≤ 35.0 |
| D | > 25.0 and ≤ 35.0 | > 35.0 and ≤ 55.0 |
| E | > 35.0 and ≤ 50.0 | > 55.0 and ≤ 80.0 |
| F | > 50.0 | > 80.0 |



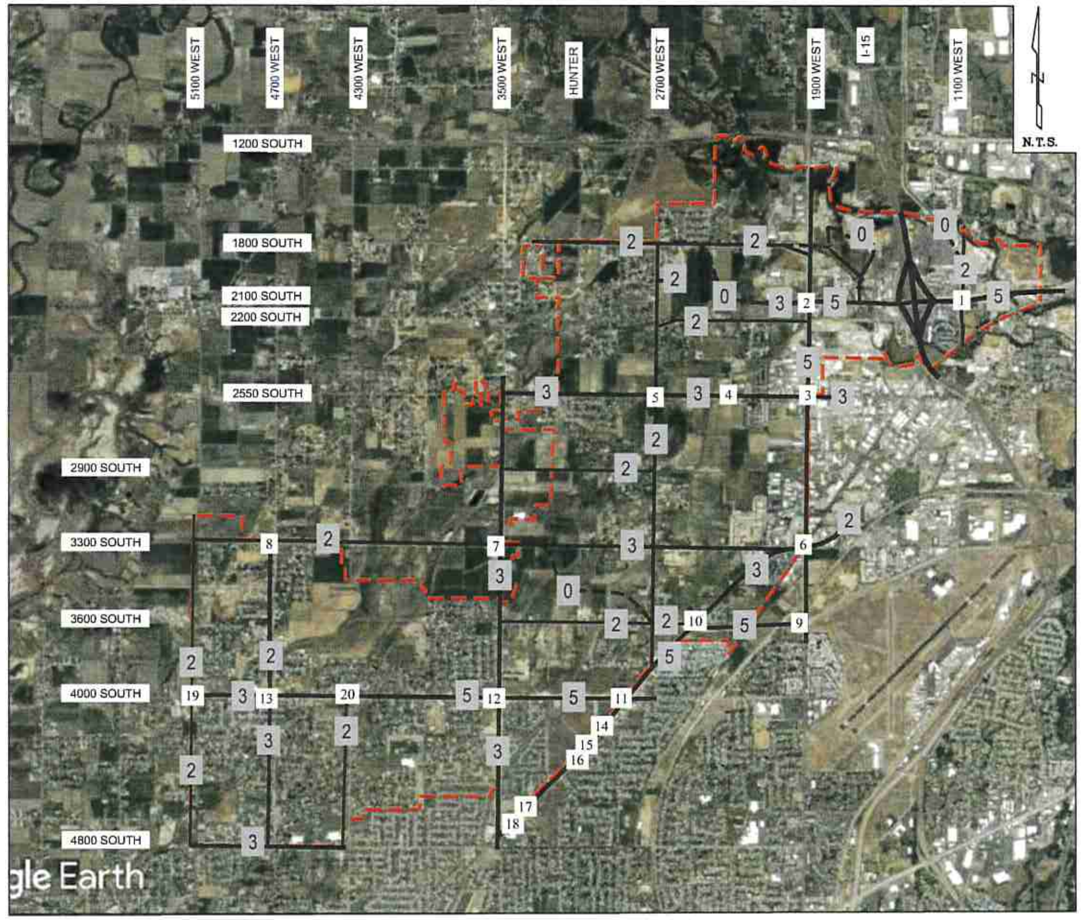




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Figure 5

EXISTING LEVEL OF SERVICE

### 5. Speed Considerations

The posted speed limit provides an indication of the function of the roadway, meaning is it operating as a local street, collector or arterial. Slower speeds are appropriate for local roads that provide circulation within neighborhoods and faster speeds are appropriate for arterials roads that provide circulation on a regional level. Generally speeds limit ranges for the roadways classifications are as follows:

| Functional Classification | Speed Limit Ranges |
|---|---|
| • Major Arterial (125'-150' ROW) – UDOT | 40- 60 mph |
| • Minor Arterial (100'-110' ROW) | 30- 40 mph |
| • Major Collector (80'-84' ROW) | 30- 35 mph |
| • Minor Collector (66'-70' ROW) | 25- 30 mph |
| • Local Collector (56'- 60' ROW) | 20-25 mph |

Existing speed limits within the city are shown in Figure 6.

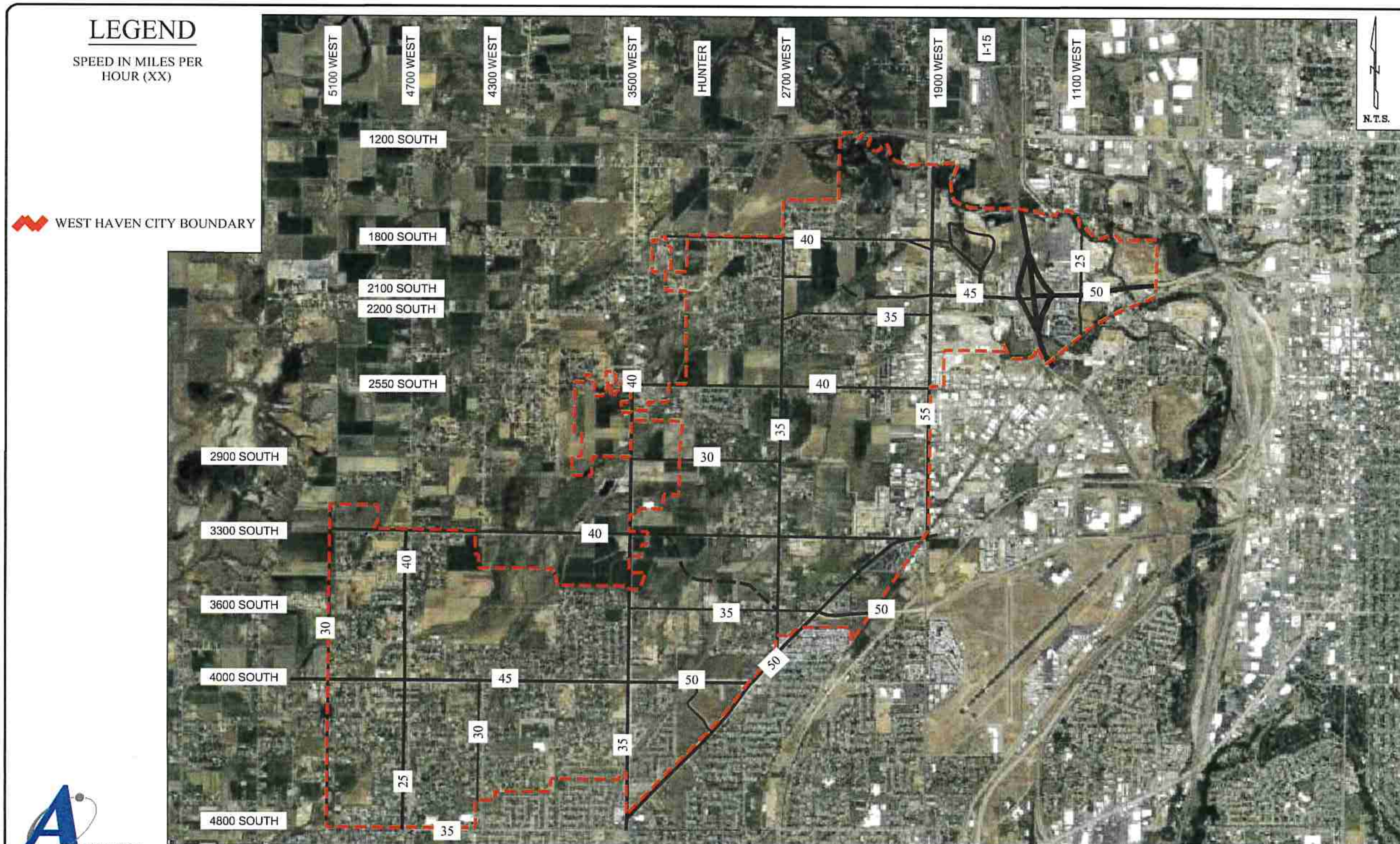


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Figure 6

POSTED SPEED LIMIT (MPH)

## 6. Existing & Proposed Level of Service (LOS)

Traffic volumes on the city's roadway network may continue to increase without causing unreasonable delays or inconveniences to drivers already on the road. However, growth will eventually impact the existing roadway network beyond its functional capacity. At that point, or preferably prior to that point in time, the roadway network will need to be expanded or enhanced in order to function without unreasonable delays or impacts to drivers. System improvements such as new roadways, additional travel lanes, additional turn lanes, automated traffic controls, and geometry improvements will be needed.

Levels of service on roadways are classified by their ability to move traffic without unreasonable delays. The Highway Capacity Manual defines the Level of Service (LOS) for both signalized and unsignalized intersections as a range of average delay. LOS is a qualitative rating of traveler satisfaction from A to F. LOS A corresponds to a roadway that has the greatest amount of excess capacity, and LOS F corresponds to a roadway that has far exceeded its reasonable operating capacity. Delay times and inconveniences on roadways gradually increase between these two operating points. When roadways reach their most efficient capacity, they are operating at a LOS D. Generally, up to that point, traffic volumes have not commenced to decrease in spite of increased delays.

For this study, projects have been selected to maintain a LOS D within the roadway network providing for maximum volume while keeping delays and inconveniences within the limits of toleration. This LOS D rating is based on standard and recommended practices by national guidelines. This LOS D threshold would indicate the PM peak traffic hours operating at this level and then all other times are typically operating at a better LOS.

## 7. Roadway Classification

Functional classification is used to identify whether the road is to primarily serve the neighborhood (local roads), the regional traffic (arterials) or the roads connecting neighborhoods to the regional roads (collectors). The City of West Haven has an existing classification map. This map is shown in Figure 7. Based on the proposed function, speed, access category and future projected volumes, some changes are proposed to the classification map. The proposed classification map is shown in Figure 8 and Table 3 summarizes the roadway classifications and changes to the proposed classification map.

The roadway classification includes the following list within the City although the larger facilities are owned and maintained by UDOT.

- Major Arterial (125'-150' ROW) - UDOT
- Minor Arterial (100'-110' ROW)
- Major Collector (80'-84' ROW)
- Minor Collector (66'-70' ROW)
- Local Collector (56' - 60' ROW)

**Table 3: Classification Summary**

| Roadway | From | To | Current Classification | Proposed Roadway Classification |
|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | ------ | Major Collector |
| 4000 South | 5100 West | 4700 West | ------ | Minor Arterial |
| 4000 South | 4700 West | 3500 West | ------ | Minor Arterial |
| 4000 South | 3500 West | Midland Drive | ------ | Minor Arterial |
| 3600 South | 3500 West | 2700 West | ------ | Minor Collector |
| 3600 South | 2700 West | Midland Drive | Minor Collector | Minor Arterial |
| Hinckley Drive | Midland Drive | East Border | ------ | Minor Arterial |
| Connector | 3300 South | 3600 South | Unbuilt | Minor Arterial |
| 3300 South | 5100 West | 3500 West | ------ | Major Collector |
| 3300 South | 3500 West | Connector | Major Collector | Minor Arterial |
| 3300 South | Connector | Midland Drive | ------ | Major Collector |
| 2900 South | West Border | 2700 West | ------ | Local Collector |
| 2550 South | West Border | 2700 West | Major Collector | Minor Arterial |
| 2550 South | 2700 West | 1900 West | Major Collector | Minor Arterial |
| 2200 South | 2700 West | 1900 West | ------ | Local Collector |
| Connector | 1800 South | 2100 South | Unbuilt | Minor Arterial |
| 2100 South | 1900 West | I-15 | ------ | Minor Arterial |
| 2100 South | I-15 | East Border | ------ | Major Arterial |
| Wilson Lane | 2700 West | 2400 West | Local Collector | Major Collector |
| 1800 South | West Border | 2700 West | Minor Collector | Major Collector |
| 1800 South | 2700 West | Connector | Minor Collector | Minor Arterial |
| 1800 South | Connector | 1900 West | Minor Collector | Major Collector |
| 5100 West | 3300 South | 4800 South | Minor Collector | Major Collector |
| 4700 West | 4000 South | 4800 South | ------ | Major Collector |
| 4700 West | 3300 South | 4000 South | ------ | Minor Arterial |
| 4300 West | 4000 South | 4800 South | ------ | Local Collector |
| 3500 West | 4000 South | 4800 South | ------ | Minor Arterial |
| 3500 West | 3300 South | 4000 South | ------ | Minor Arterial |
| 2700 West | North Border | Midland Drive | ------ | Major Collector |
| Canal Crossing | North Border | 1100 West | Unbuilt | Major Collector |
| 1900 West | 2100 South | Midland Drive | ------ | Minor Arterial |
| 1900 West | North Border | 2100 South | ------ | Minor Arterial |
| Retail Loop | 1900 West | 1625 West | ------ | Major Collector |
| 1100 West | North Border | South Border | ------ | Major Collector |
| Midland Drive | 3500 West | 4000 South | ------ | Minor Arterial |
| Midland Drive | 4000 South | Hinckley | ------ | Minor Arterial |
| Midland Drive | Hinckley | 3300 South | ------ | Minor Arterial |
| Midland Drive | 3300 South | 1900 West | ------ | Minor Arterial |

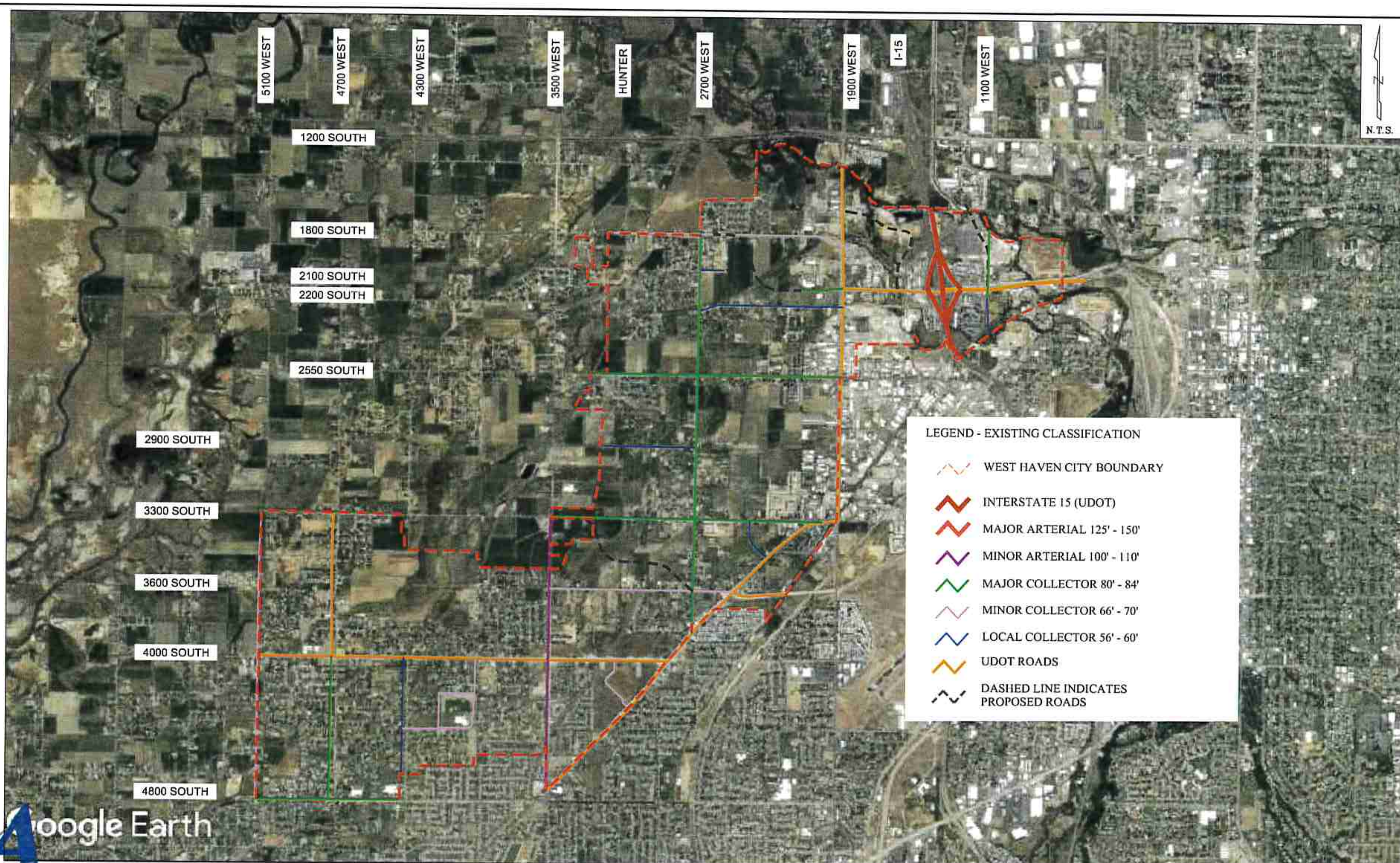


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Figure 7

EXISTING ROADWAY CLASSIFICATION MAP

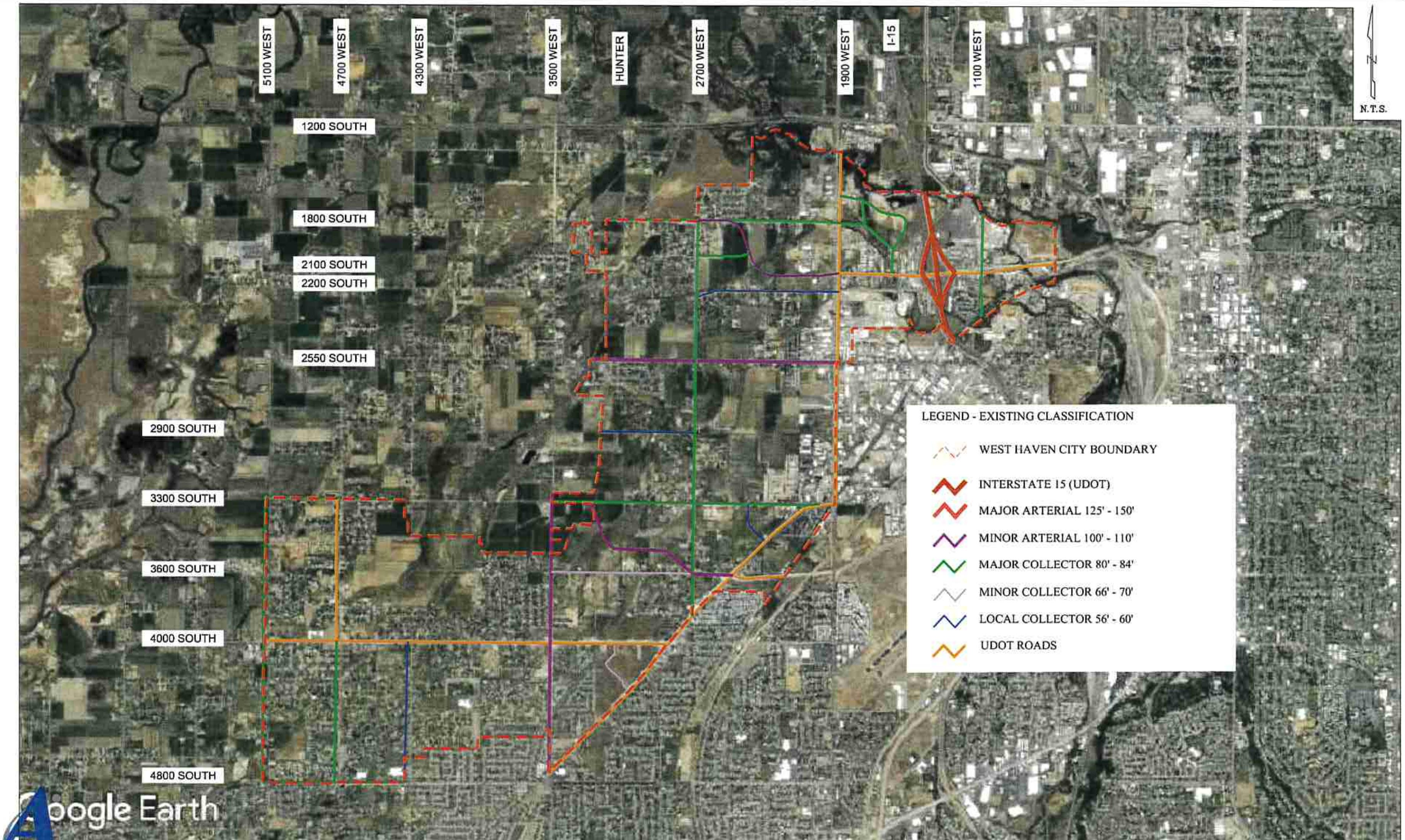


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Figure 8

PROPOSED ROADWAY CLASSIFICATION MAP

## 8. Existing Capacity

Roadway capacity is determined using roadway classification, the AADT, and the number of lanes. Table 4 shows the LOS C, LOS D and LOS E thresholds for arterials and collectors for West Haven City. While capacity generally refers to the threshold where the roadway operates at the highest LOS E, for the purposes of this study the maximum allowable traffic volume is at the LOS D level.

**Table 4: Roadway LOS Thresholds**

| | AADT (vehicles/day) | | | | | |
|---|---|---|---|---|---|---|
| | Arterial | | | Collector | | |
| Number of Lanes | LOS C | **LOS D** | LOS E | LOS C | **LOS D** | LOS E |
| 2 Lane | 10,000 | **11,500** | 15,000 | 9,000 | **10,500** | 13,500 |
| 3 Lane | 11,500 | **13,000** | 16,500 | 10,000 | **11,500** | 15,000 |
| 4 Lane | 25,000 | **29,000** | 36,500 | 19,000 | **22,500** | 28,500 |
| 5 Lane | 26,500 | **30,500** | 39,000 | 21,500 | **25,000** | 31,500 |
| 7 Lane | 40,000 | **46,000** | 59,000 | ------ | ------ | ------ |

Table 5 compares the 2023 AADT to the existing LOS D capacity along each segment and provides the excess capacity on each link. According to existing traffic counts all roadways currently operate at or above LOS D with the exception of 4800 South from 5100 West to 4300 West which is operating 500 vehicles per day above the LOS D capacity threshold.

**Table 5: Existing and Excess Network Capacity**

| Roadway | From | To | 2023 AADT | Existing Number of Lanes | Existing LOS D Capacity (In AADT) | Existing Excess LOS D Capacity (In AADT) | Link Length (feet) |
|---|---|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | 12,000 | 3 | 11500 | -500 | 5280 |
| 4000 South | 5100 West | 4700 West | 8,100 | 3 | 13000 | 4,900 | 2700 |
| 4000 South | 4700 West | 3500 West | 10,000 | 5 | 30500 | 20,500 | 7900 |
| 4000 South | 3500 West | Midland Drive | 10,500 | 5 | 30500 | 20,000 | 4280 |
| 3600 South | 3500 West | 2700 West | 2,700 | 2 | 10500 | 7,800 | 5270 |
| 3600 South | 2700 West | Midland Drive | 2,700 | 2 | 10500 | 7,800 | 1415 |
| Hinckley Drive | Midland Drive | East Border | 11,400 | 5 | 30500 | 19,100 | 2180 |
| Connector | 3300 South | 3600 South | ------ | Unbuilt | ------ | ------ | ------ |
| 3300 South | 5100 West | 3500 West | 1,700 | 2 | 10500 | 8,800 | 10550 |
| 3300 South | 3500 West | Connector | 1,300 | 3 | 11500 | 10,200 | ------ |
| 3300 South | Connector | Midland Drive | 1,300 | 3 | 11500 | 10,200 | 9580 |
| 2900 South | West Border | 2700 West | ------ | 2 | 10500 | ------ | 3450 |
| 2550 South | West Border | 2700 West | 6,200 | 3 | 11500 | 5,300 | 3450 |
| 2550 South | 2700 West | 1900 West | 6,200 | 3 | 11500 | 5,300 | 5260 |
| 2200 South | 2700 West | 1900 West | ------ | 2 | 10500 | ------ | 5250 |
| Connector | 1800 South | 2100 South | ------ | Unbuilt | ------ | ------ | ------ |
| 2100 South | 1900 West | I-15 | 14,000 | 5 | 30500 | 16,500 | 3025 |
| 2100 South | I-15 | East Border | 16,000 | 5 | 30500 | 14,500 | 3670 |
| Wilson Lane | 2700 West | 2400 West | ------ | 2 | 10500 | ------ | ------ |
| 1800 South | West Border | 2700 West | 3,500 | 2 | 10500 | 7,000 | ------ |
| 1800 South | 2700 West | Connector | 3,500 | 2 | 10500 | 7,000 | ------ |
| 1800 South | Connector | 1900 West | 3,500 | 2 | 10500 | 7,000 | 5200 |
| 5100 West | 3300 South | 4800 South | 1,900 | 2 | 10500 | 8,600 | 10900 |
| 4700 West | 4000 South | 4800 South | 2,600 | 3 | 11500 | 8,900 | 5300 |
| 4700 West | 3300 South | 4000 South | 4,600 | 2 | 11500 | 6,900 | 5300 |
| 4300 West | 4000 South | 4800 South | 2,000 | 2 | 10500 | 8,500 | 5300 |
| 3500 West | 4000 South | 4800 South | 5,300 | 3 | 13000 | 7,700 | ------ |
| 3500 West | 3300 South | 4000 South | 3,100 | 3 | 13000 | 9,900 | 5300 |
| 2700 West | North Border | Midland Drive | 1,900 | 2 | 10500 | 8,600 | 14740 |
| Canal Crossing | North Border | 1100 West | ------ | Unbuilt | ------ | ------ | ------ |
| 1900 West | 2100 South | Midland Drive | 25,000 | 5 | 30500 | 5,500 | 8480 |
| 1900 West | North Border | 2100 South | 18,600 | 5 | 30500 | 11,900 | 4680 |
| Retail Loop | 1900 West | 1625 West | No Data | 2 | 10500 | ------ | ------ |
| 1100 West | North Border | South Border | 4,100 | 2 | 10500 | 6,400 | 3340 |
| Midland Drive | 3500 West | 4000 South | 21,000 | 5 | 30500 | 9,500 | 6570 |
| Midland Drive | 4000 South | Hinckley | 21,000 | 5 | 30500 | 9,500 | 3340 |
| Midland Drive | Hinckley | 3300 South | 13,000 | 3 | 13000 | 0 | 3960 |
| Midland Drive | 3300 South | 1900 West | 1,300 | 3 | 11500 | 10,200 | 1070 |

*Existing Capacity is the maximum capacity for roadway to operate at LOS D.

## 9. Future Projected Total AADT

Future projected total AADT is comprised of three variables; existing AADT, future trips generated by West Haven City, and background traffic or pass-by traffic through the city. Due to the location of the city, very little pass by traffic is projected within the city on local roads. The primary routes for traffic passing through the City will be on the major UDOT facilities. Therefore, the future projected total AADT for the city routes is primarily the sum of existing traffic and future West Haven City trips. Table 6 shows the future projected total AADT per route for 2028, 2033, and 2050.

The future projected total AADT for 2028 is shown in Figure 9, the future projected total AADT 2033 is shown in Figure 10. Figure 11 shows the 2050 future projected total AADT.

**Table 6: West Haven City Projected Total Traffic**

| Roadway | From | To | 2028 AADT | 2033 AADT | 2050 AADT | Link Length (feet) |
|---|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | 12,700 | 13,000 | 14,000 | 5280 |
| 4000 South | 5100 West | 4700 West | 10,400 | 11,600 | 15,000 | 2700 |
| 4000 South | 4700 West | 3500 West | 11,800 | 12,800 | 15,500 | 7900 |
| 4000 South | 3500 West | Midland Drive | 13,000 | 14,300 | 18,000 | 4280 |
| 3600 South | 3500 West | 2700 West | 3,500 | 3,900 | 5,000 | 5270 |
| 3600 South | 2700 West | Midland Drive | 3,500 | 3,900 | 5,000 | 1415 |
| Hinckley Drive | Midland Drive | East Border | 14,600 | 16,200 | 21,000 | 2180 |
| Connector | 3300 South | 3600 South | None | 10,500 | 14,000 | ------ |
| 3300 South | 5100 West | 3500 West | 3,500 | 4,400 | 7,000 | 10550 |
| 3300 South | 3500 West | Connector | 6,900 | 9,700 | 18,000 | ------ |
| 3300 South | Connector | Midland Drive | 2,200 | 2,700 | 4,000 | 9580 |
| 2900 South | West Border | 2700 West | ------ | ------ | 6,000 | 3450 |
| 2550 South | West Border | 2700 West | 8,100 | 9,100 | 12,000 | 3450 |
| 2550 South | 2700 West | 1900 West | 8,100 | 9,100 | 12,000 | 5260 |
| 2200 South | 2700 West | 1900 West | ------ | ------ | 5,000 | 5250 |
| Connector | 1800 South | 2100 South | 10,700 | 12,000 | 16,000 | ------ |
| 2100 South | 1900 West | I-15 | 16,700 | 18,000 | 22,000 | 3025 |
| 2100 South | I-15 | East Border | 21,500 | 24,300 | 32,500 | 3670 |
| Wilson Lane | 2700 West | 2400 West | ------ | ------ | 5,000 | ------ |
| 1800 South | West Border | 2700 West | 4,700 | 5,300 | 7,000 | ------ |
| 1800 South | 2700 West | Connector | 9,400 | 12,300 | 21,100 | ------ |
| 1800 South | Connector | 1900 West | 4,000 | 4,300 | 5,100 | 5200 |
| 5100 West | 3300 South | 4800 South | 2,200 | 2,400 | 2,900 | 10900 |
| 4700 West | 4000 South | 4800 South | 3,700 | 4,300 | 6,000 | 5300 |
| 4700 West | 3300 South | 4000 South | 6,700 | 7,800 | 11,000 | 5300 |
| 4300 West | 4000 South | 4800 South | 3,300 | 4,000 | 6,000 | 5300 |
| 3500 West | 4000 South | 4800 South | 6,300 | 6,900 | 8,400 | ------ |
| 3500 West | 3300 South | 4000 South | 3,900 | 4,300 | 5,500 | 5300 |
| 2700 West | North Border | Midland Drive | 3,900 | 5,000 | 8,000 | 14740 |
| Canal Crossing | North Border | 1100 West | None | None | ------ | ------ |
| 1900 West | 2100 South | Midland Drive | 32,000 | 35,500 | 46,000 | 8480 |
| 1900 West | North Border | 2100 South | 24,100 | 26,800 | 35,000 | 4680 |
| Retail Loop | 1900 West | 1625 West | ------ | ------ | 12,000 | ------ |
| 1100 West | North Border | South Border | 6,700 | 8,100 | 12,000 | 3340 |
| Midland Drive | 3500 West | 4000 South | 23,700 | 25,000 | 29,000 | 6570 |
| Midland Drive | 4000 South | Hinckley | 24,700 | 26,500 | 32,000 | 3340 |
| Midland Drive | Hinckley | 3300 South | 17,000 | 19,000 | 25,000 | 3960 |
| Midland Drive | 3300 South | 1900 West | 5,500 | 7,700 | 14,000 | 1070 |

## LEGEND

EXISTING NUMBER OF LANES

2028 IMPROVEMENT NUMBER OF LANES

2028 AADT (XXXX) - DAILY TRAFFIC

WEST HAVEN CITY BOUNDARY

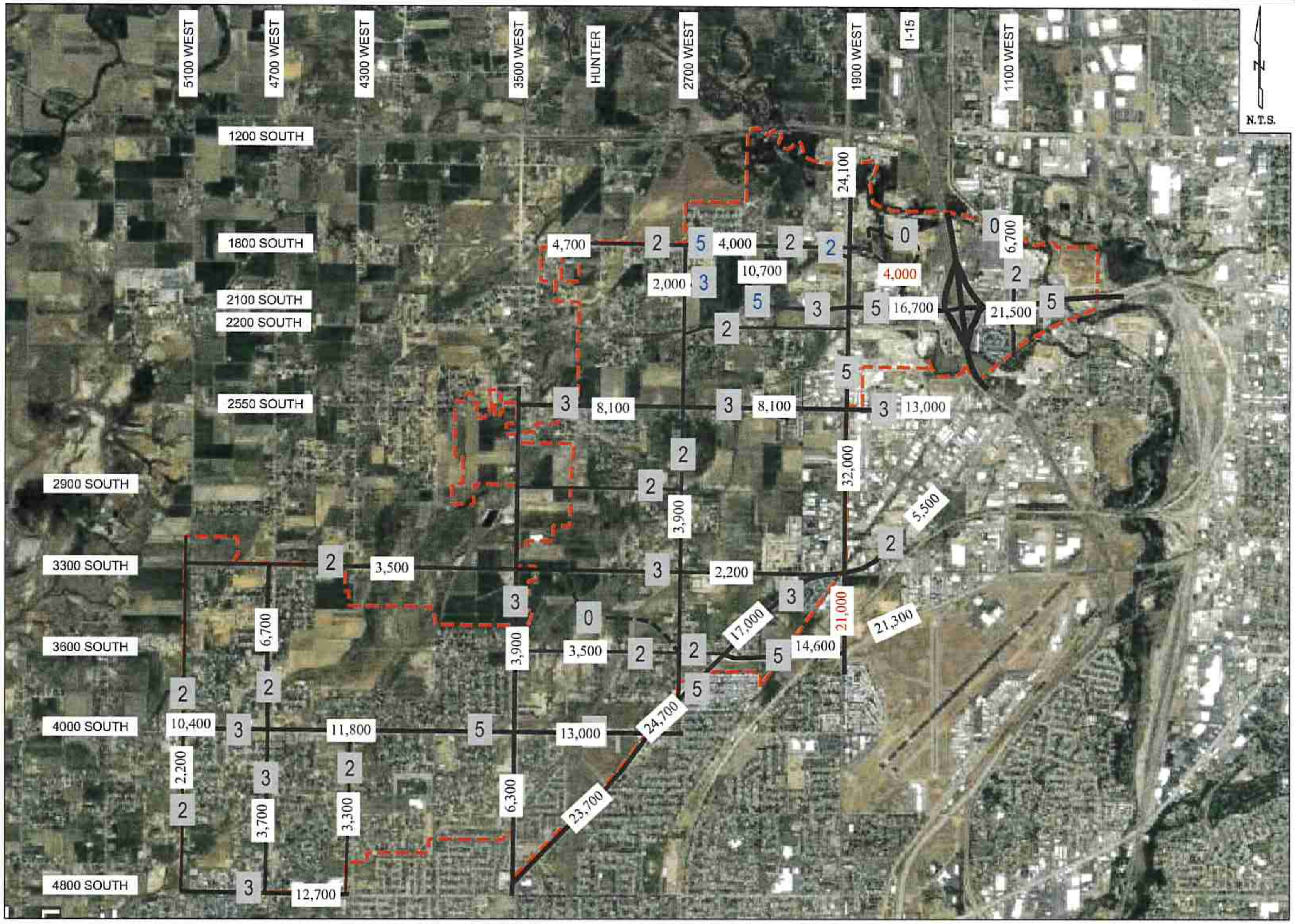


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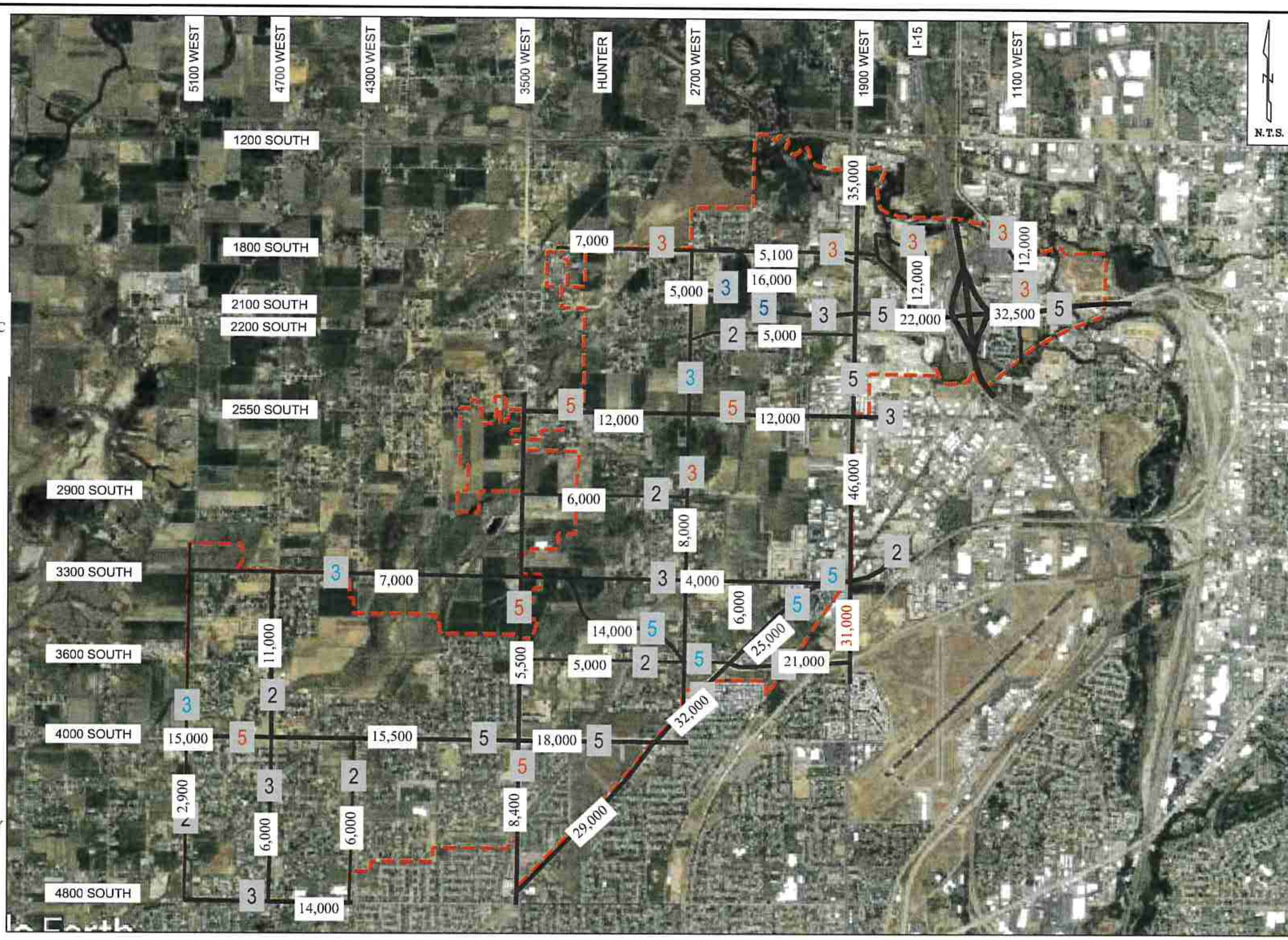
Figure 9

2028 AVERAGE ANNUAL DAILY TRAFFIC




# LEGEND

EXISTING NUMBER OF LANES

2028 IMPROVEMENT NUMBER OF LANES

2033 IMPROVEMENT NUMBER OF LANES

2050 IMPROVEMENT NUMBER OF LANES

2050 AADT (XXXX) - DAILY TRAFFIC

WEST HAVEN CITY BOUNDARY

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Figure 11

2050 AVERAGE ANNUAL DAILY TRAFFIC

## 10. 2028 and 2030 Analysis

### A. Future Capacity Needs

The recommended improvements are based on the need for additional capacity to maintain a minimum level of service of D for both roadways and intersections in the future. The following improvements are determined to be the necessary improvements in the 2028/2033 analysis in Table 8 and Table 9.

Table 7 shows the future capacity and excess capacity in AADT that is projected in 2028 and 2033. If a number in Table 7 is shown as a positive there is excess capacity, if a number is shown as negative then the roadway is deficient in capacity and does not meet the City's designated LOS D. It should be noted that for most of the City streets, there is excess capacity and therefore the streets may function at better than LOS D conditions through 2033.

Table 4 identifies that for 2 and 3 lane roadways to operate at a LOS C instead of LOS D, the difference is 1,500 less AADT. For 5-lane facilities, it is 4,000 less AADT to function below the LOS C threshold instead of LOS D threshold for arterial roads and 3,500 for collector roads. Table 7 indicates that with the projected excess capacity of the recommended road realignment and widening projects during 2028/2033 planning horizon, all but one City street and intersection will likely operate at LOS C conditions.

- **Table 7 shows the excess capacity AFTER the recommended improvements are made for the future projected AADT.**

**Table 7: 2028 / 2033 Build Capacity and Excess Capacity**

| Roadway | From | To | 2028 Number of Lanes | 2028 LOS D Capacity (In AADT) | 2028 Excess Capacity (In AADT) | 2033 Number of Lanes | 2033 LOS D Capacity (In AADT) | 2033 Excess Capacity (In AADT) |
|---|---|---|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | 3 | 11500 | -1,200 | 3 | 11500 | -1,500 |
| 4000 South | 5100 West | 4700 West | 3 | 13000 | 2,600 | 3 | 13000 | 1,400 |
| 4000 South | 4700 West | 3500 West | 5 | 30500 | 18,700 | 5 | 30500 | 17,700 |
| 4000 South | 3500 West | Midland Drive | 5 | 30500 | 17,500 | 5 | 30500 | 16,200 |
| 3600 South | 3500 West | 2700 West | 2 | 10500 | 7,000 | 2 | 10500 | 6,600 |
| 3600 South | 2700 West | Midland Drive | 2 | 10500 | 7,000 | 5 | 30500 | 26,600 |
| Hinckley Drive | Midland Drive | East Border | 5 | 30500 | 15,900 | 5 | 30500 | 14,300 |
| Connector | 3300 South | 3600 South | Unbuilt | | | 5 | 30500 | 20,000 |
| 3300 South | 5100 West | 3500 West | 2 | 10500 | 7,000 | 3 | 11500 | 7,100 |
| 3300 South | 3500 West | Connector | 3 | 11500 | 9,300 | 5 | 30500 | 12,500 |
| 3300 South | Connector | Midland Drive | 3 | 11500 | 9,300 | 3 | 11500 | 8,800 |
| 2900 South | West Border | 2700 West | 2 | 10500 | 10,500 | 2 | 10500 | 10,500 |
| 2550 South | West Border | 2700 West | 3 | 11500 | 3,400 | 3 | 11500 | 2,400 |
| 2550 South | 2700 West | 1900 West | 3 | 11500 | 3,400 | 3 | 11500 | 2,400 |
| 2200 South | 2700 West | 1900 West | 2 | 10500 | 10,500 | 2 | 10500 | 10,500 |
| Connector | 1800 South | 2100 South | 5 | 30500 | 19,800 | 5 | 30500 | 18,500 |
| 2100 South | 1900 West | I-15 | 5 | 30500 | 13,800 | 5 | 30500 | 12,500 |
| 2100 South | I-15 | East Border | 5 | 30500 | 9,000 | 5 | 30500 | 6,200 |
| Wilson Lane | 2700 West | 2400 West | 3 | 11500 | 11,500 | 3 | 11500 | 11,500 |
| 1800 South | West Border | 2700 West | 2 | 10500 | 5,800 | 2 | 10500 | 5,200 |
| 1800 South | 2700 West | Connector | 5 | 30500 | 21,100 | 5 | 30500 | 18,200 |
| 1800 South | Connector | 1900 West | 3[1] | 11500 | 7,500 | 3 | 11500 | 7,200 |
| 5100 West | 3300 South | 4800 South | 2 | 10500 | 8,300 | 3 | 11500 | 9,100 |
| 4700 West | 4000 South | 4800 South | 3 | 11500 | 7,800 | 3 | 11500 | 7,200 |
| 4700 West | 3300 South | 4000 South | 2 | 11500 | 4,800 | 2 | 11500 | 3,700 |
| 4300 West | 4000 South | 4800 South | 2 | 10500 | 7,200 | 2 | 10500 | 6,500 |
| 3500 West | 4000 South | 4800 South | 3 | 13000 | 6,700 | 3 | 13000 | 6,100 |
| 3500 West | 3300 South | 4000 South | 3 | 13000 | 9,100 | 3 | 13000 | 8,700 |
| 2700 West | North Border | Midland Drive | 2 | 10500 | 6,600 | 3[2] | 11500 | 6,500 |
| Canal Crossing | North Border | 1100 West | Unbuilt | | | Unbuilt | | |
| 1900 West | 2100 South | Midland Drive | 5 | 30500 | -1,500 | 5 | 30500 | -5,000 |
| 1900 West | North Border | 2100 South | 5 | 30500 | 6,400 | 5 | 30500 | 3,700 |
| Retail Loop | 1900 West | 1625 West | 2 | 10500 | 10,500 | 2 | 10500 | 10,500 |
| 1100 West | North Border | South Border | 2 | 10500 | 3,800 | 2 | 10500 | 2,400 |
| Midland Drive | 3500 West | 4000 South | 5 | 30500 | 6,800 | 5 | 30500 | 5,500 |
| Midland Drive | 4000 South | Hinckley | 5 | 30500 | 5,800 | 5 | 30500 | 4,000 |
| Midland Drive | Hinckley | 3300 South | 3 | 13000 | -4,000 | 5 | 30500 | 11,500 |
| Midland Drive | 3300 South | 1900 West | 3 | 13000 | 7,500 | 5 | 30500 | 22,800 |

1. Realignment and Widening Project
2. Only the segment from 2175 South to 2550 South is planned in 2033.

### B. Recommended Improvements

Recommended improvements are indicated for the city. These improvements include intersection control, intersection geometry and road completion or widening. Road completion and widening improvements are shown in Table 8. Roadway widening projects recommended within this section are contributed directly to LOS, safety and accessibility. These improvements are related to future development.

Where commercial is located along a route, it is recommended that a center turn lane be added to improve safety and accessibility to the area, therefore 2 and 4 lane roadways are rarely recommended even if the LOS is within the recommended ranges.

**Table 8: 2028 / 2033 Recommended Roadway Widening and Sizing Improvements**

| Project Number | Road | From | To | Improvement |
|---|---|---|---|---|
| #6 | 3600 South | 2700 West | Midland Drive | Widen Road from 2 to 5 lanes |
| #7 | Connector | 3300 South | 3600 South | New Road – 5 lanes |
| #4 | Connector | 1800 South | 2100 South | New Road – 5 lanes |
| TBA | Wilson Lane | 2700 West | 2400 West | Partial New Road – from 2 to 3 lanes |
| #5 | 1800 South | 2700 West | 1950 West | Widen Road from 2 to 5 lanes |
| UDOT | Midland Drive | Hinckley | 3300 South | Widen Road from 3 to 5 lanes – UDOT |
| UDOT | Midland Drive | 3300 South | 1900 West | Widen Road from 3 to 5 lanes – UDOT |
| #1 | 3300 South | 4700 West | 5100 West | Widen Road from 2 to 3 lanes |
| TBA | 3300 South | 3500 West | ~3200 West | Widen Road from 2 to 5 lanes |
| #2 | 5100 West | 3300 South | 4000 South | Widen Road from 2 to 3 lanes |
| #3 | 2700 West | 2050 South | 2550 South | Widen Road from 2 to 3 lanes |

- TBA – Indicates Master Planned Project not included in this project window for impact fee analysis
- UDOT - Indicates Master Planned Projects on UDOT owned routes

The intersection and access analysis evaluates the performance of the intersection and access using the measure of performance of delay and level of service (LOS). Table 9 indicates the intersections that are recommended to be improved by the 2033 analysis year. This recommendation assumes that growth will occur at the rate of population growth and will depend on actual development by area within the City. Intersection improvements will be based on meeting the MUTCD warrants.

**Table 9: 2033 Intersection Control and Geometric Improvements**

| Project Number | Intersection | | Improvement |
|---|---|---|---|
| 11 | 1800 South | 1900 West | Signal – UDOT |
| 8 / Part of Project #4 | 1800 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| TBA/UDOT | Midland Drive | 3300 South | Alternative Intersection (Roundabout)[1] - UDOT |
| 9 | 4000 South | 5100 West | Signal – UDOT |
| 10 | 4000 South | 4300 West | Signal – UDOT |
| UDOT | Midland Drive | Hunter | Signal – Development Driven – UDOT |
| UDOT | 4000 South | 3050 West (Hunter) | Signal – Development Driven - UDOT |
| 12 / Part of #7 | 3300 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| 13 | 2700 West | 3600 South | Alternative Intersection (Roundabout)[1] |

1 -For more information pertaining to why roundabouts are recommended please see Section 12. Unique Design Considerations.

The network improvements recommended for 2028 / 2033 is shown in Figure 12.

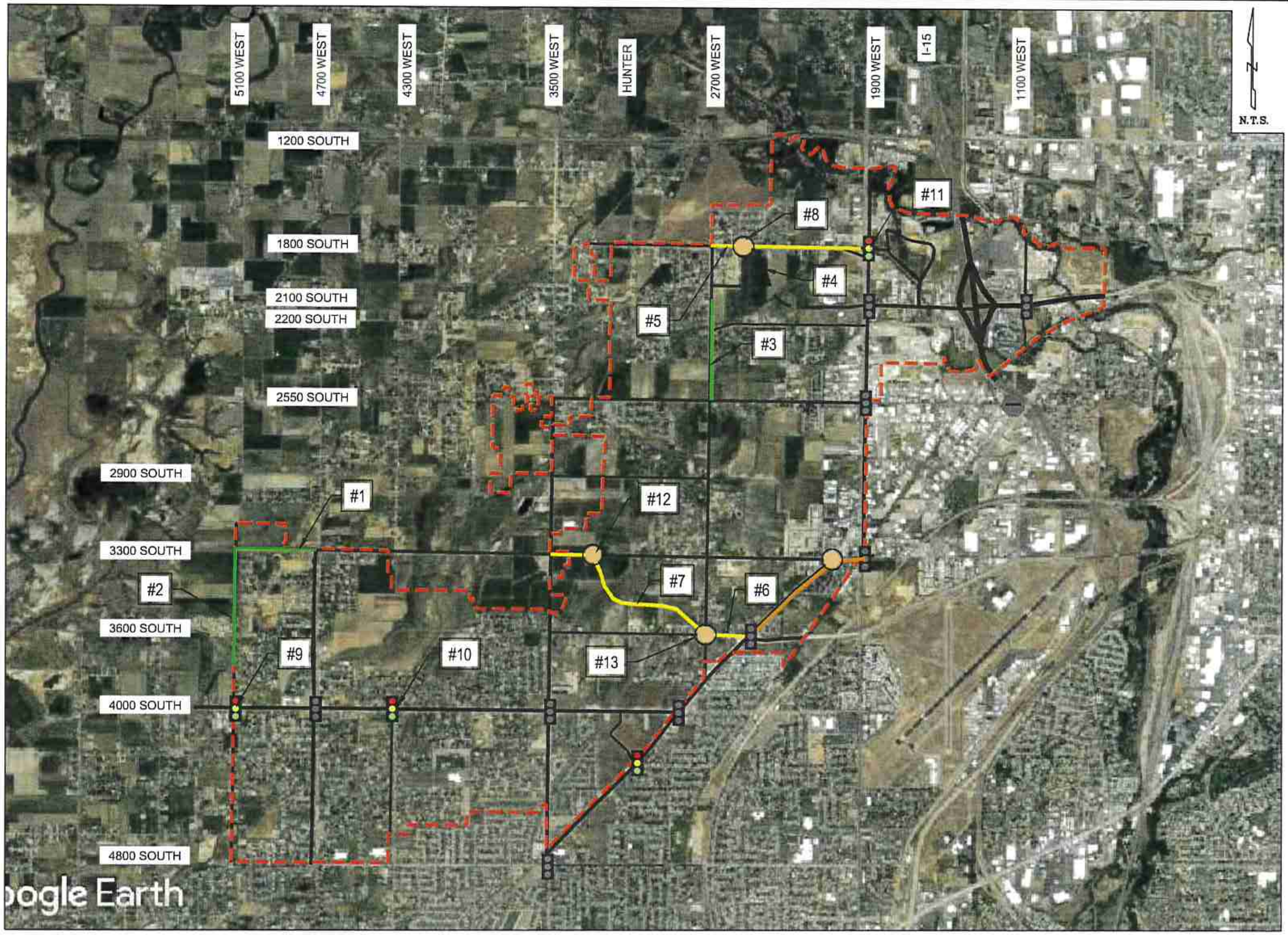





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Figure 12

2028 / 2033 NETWORK RECOMMENDATIONS

## 11. Future 2050 Analyses

### A. Future Capacity Needs

The recommended improvements are based on the need for additional capacity to maintain a level of service of D. The following are determined to be the necessary improvements in the 2050 analysis.

**2050 Improvements**

- 4000 South from 5100 West to 4700 West widen from 3 to 5 lanes (UDOT)
- 1800 South from west border to 1900 West – widen from 2 to 3 lanes (2700 West to 2400 West is a 5 lane segment improved in 2028/2033)
- 3500 West from 3300 South to 4800 South – widen from 3 to 5 lanes
- Canal Crossing constructed as a 3 lane road from 1100 West to termination at city boundary
- Retail loop completed as a 3 lane road. This includes both the north and south connections of the loop.
- 1100 West from north to south bounder widen from 2 to 3 lanes.

Table 10 identifies the 2050 AADT capacity. If a number in Table 10 is shown as a positive there is excess capacity, if a number is shown as negative then the roadway is deficient in capacity and does not meet the City's designated LOS D. A level of service analysis based on the existing capacity for each roadway segment was performed for the 2050 future analysis years. Table 11 shows the LOS in the buildout condition with and without the improvements.

There are several roadways within the network that have a level of service F even after improvements. These are all UDOT roadways and there are no additional improvement projects on the 2050 WFRC Regional Transportation Plan (RTP). Therefore no additional recommendations were made.

**Table 10: 2050 Build Capacity and Excess Capacity**

| Roadway | From | To | 2050 AADT | 2050 Number of Lanes | 2050 LOS D Capacity | 2050 Excess Capacity |
|---|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | 14,000 | 3 | 11500 | (2,500) |
| 4000 South | 5100 West | 4700 West | 15,000 | 5 | 30500 | 15,500 |
| 4000 South | 4700 West | 3500 West | 15,500 | 5 | 30500 | 15,000 |
| 4000 South | 3500 West | Midland Drive | 18,000 | 5 | 30500 | 12,500 |
| 3600 South | 3500 West | 2700 West | 5,000 | 2 | 10500 | 5,500 |
| 3600 South | 2700 West | Midland Drive | 5,000 | 5 | 30500 | 25,500 |
| Hinckley Drive | Midland Drive | East Border | 21,000 | 5 | 30500 | 9,500 |
| Connector | 3300 South | 3600 South | 14,000 | 5 | 30500 | 16,500 |
| 3300 South | 5100 West | 3500 West | 7,000 | 3 | 11500 | 4,500 |
| 3300 South | 3500 West | Connector | 18,000 | 5 | 30500 | 12,500 |
| 3300 South | Connector | Midland Drive | 4,000 | 3 | 11500 | 7,500 |
| 2900 South | West Border | 2700 West | 6,000 | 2 | 10500 | 4,500 |
| 2550 South | West Border | 2700 West | 12,000 | 5 | 30500 | 18,500 |
| 2550 South | 2700 West | 1900 West | 12,000 | 5 | 30500 | 18,500 |
| 2200 South | 2700 West | 1900 West | 5,000 | 2 | 10500 | 5,500 |
| Connector | 1800 South | 2100 South | 16,000 | 5 | 30500 | 14,500 |
| 2100 South | 1900 West | I-15 | 22,000 | 5 | 30500 | 8,500 |
| 2100 South | I-15 | East Border | 32,500 | 5 | 30500 | (2,000) |
| Wilson Lane | 2700 West | 2400 West | 5,000 | 3 | 11500 | 6,500 |
| 1800 South | West Border | 2700 West | 7,000 | 3 | 11500 | 4,500 |
| 1800 South | 2700 West | Connector | 21,100 | 5 | 30500 | 9,400 |
| 1800 South | Connector | 1900 West | 5,100 | 3[2] | 11500 | 6,400 |
| 5100 West | 3300 South | 4800 South | 2,900 | 3 | 11500 | 8,600 |
| 4700 West | 4000 South | 4800 South | 6,000 | 3 | 11500 | 5,500 |
| 4700 West | 3300 South | 4000 South | 11,000 | 2 | 11500 | 500 |
| 4300 West | 4000 South | 4800 South | 6,000 | 2 | 10500 | 4,500 |
| 3500 West | 4000 South | 4800 South | 8,400 | 5 | 30500 | 22,100 |
| 3500 West | 3300 South | 4000 South | 5,500 | 5 | 30500 | 25,000 |
| 2700 West | North Border | Midland Drive | 8,000 | 3[1] | 11500 | 3,500 |
| Canal Crossing | North Border | 1100 West | | 3 | | - |
| 1900 West | 2100 South | Midland Drive | 46,000 | 5 | 30500 | (15,500) |
| 1900 West | North Border | 2100 South | 35,000 | 5 | 30500 | (4,500) |
| Retail Loop | 1900 West | 1625 West | 12,000 | 3 | 11500 | (500) |
| 1100 West | North Border | South Border | 12,000 | 3 | 11500 | (500) |
| Midland Drive | 3500 West | 4000 South | 29,000 | 5 | 30500 | 1,500 |
| Midland Drive | 4000 South | Hinckley | 32,000 | 5 | 30500 | (1,500) |
| Midland Drive | Hinckley | 3300 South | 25,000 | 5 | 30500 | 5,500 |
| Midland Drive | 3300 South | 1900 West | 14,000 | 5 | 30500 | 16,500 |
| **2028 Improvement** | | **2033 Improvement** | | **2050 Improvement** | | |

1. A portion of this segment from 2050 South to 2550 South was planned in 2033
2. A portion of this segment from 1900 West to realignment tie in was planned in 2033

**Table 11: Projected Roadway LOS with and without Recommended Improvements**

| Roadway | From | To | 2050 AADT | LOS without Improvement | LOS With Improvement |
|---|---|---|---|---|---|
| 4800 South | 5100 West | 4300 West | 14,000 | F | F |
| 4000 South | 5100 West | 4700 West | 15,000 | F | D |
| 4000 South | 4700 West | 3500 West | 15,500 | D | D |
| 4000 South | 3500 West | Midland Drive | 18,000 | D | D |
| 3600 South | 3500 West | 2700 West | 5,000 | D | D |
| 3600 South | 2700 West | Midland Drive | 5,000 | D | D |
| Hinckley Drive | Midland Drive | East Border | 21,000 | D | D |
| Connector | 3300 South | 3600 South | 14,000 | N/A | D |
| 3300 South | 5100 West | 3500 West | 7,000 | D | D |
| 3300 South | 3500 West | Connector | 18,000 | F | D |
| 3300 South | Connector | Midland Drive | 4,000 | D | D |
| 2900 South | West Border | 2700 West | 6,000 | D | D |
| 2550 South | West Border | 2700 West | 12,000 | F | D |
| 2550 South | 2700 West | 1900 West | 12,000 | F | D |
| 2200 South | 2700 West | 1900 West | 5,000 | D | D |
| Connector | 1800 South | 2100 South | 16,000 | N/A | D |
| 2100 South | 1900 West | I-15 | 22,000 | D | D |
| 2100 South | I-15 | East Border | 32,500 | F | F |
| Wilson Lane | 2700 West | 2400 West | 5,000 | D | D |
| 1800 South | West Border | 2700 West | 7,000 | D | D |
| 1800 South | 2700 West | Connector | 21,100 | F | D |
| 1800 South[2] | Connector | 1900 West | 5,100 | D | D |
| 5100 West | 3300 South | 4800 South | 2,900 | D | D |
| 4700 West | 4000 South | 4800 South | 6,000 | D | D |
| 4700 West | 3300 South | 4000 South | 11,000 | D | D |
| 4300 West | 4000 South | 4800 South | 6,000 | D | D |
| 3500 West | 4000 South | 4800 South | 8,400 | D | D |
| 3500 West | 3300 South | 4000 South | 5,500 | D | D |
| 2700 West[1] | North Border | Midland Drive | 8,000 | D | D |
| Canal Crossing | North Border | 1100 West | | D | D |
| 1900 West | 2100 South | Midland Drive | 46,000 | F | F |
| 1900 West | North Border | 2100 South | 35,000 | F | F |
| Retail Loop | 1900 West | 1625 West | 12,000 | F | E |
| 1100 West | North Border | South Border | 12,000 | F | E |
| Midland Drive | 3500 West | 4000 South | 29,000 | D | D |
| Midland Drive | 4000 South | Hinckley | 32,000 | F | F |
| Midland Drive | Hinckley | 3300 South | 25,000 | F | D |
| Midland Drive | 3300 South | 1900 West | 14,000 | F | D |
| **2028 Improvement** | | **2033 Improvement** | | **2050 Improvement** | |

1. A portion of this segment from 2175 South to 2550 South was planned in 2033
2. A portion of this segment from 1900 West to realignment tie in was planned in 2033

### B. 2050 Recommended Improvements

The recommendations are made by road segment for 2050. These recommendations are shown in Table 12 and 13 and graphically shown in Figure 13. There are no project numbers assigned as this project horizon is beyond the project assignment horizon.

**Table 12: 2050 Recommendations**

| Roadway | From | To | 2050 Recommended Improvement |
|---|---|---|---|
| 4000 South | 5100 West | 4700 West | Widen Road from 3 to 5 Lanes – UDOT |
| 2550 South | West Border | 1900 West | Widen Road from 3 to 5 Lanes |
| 1800 South | West Border | 2700 West | Widen Road from 2 to 3 Lanes |
| 1800 South | 1900 West | 1700 West | New 3 lanes road connecting 1900 West to Retail Loop |
| 3500 West | 3300 South | 4000 South | Widen Road from 3 to 5 Lanes |
| 3500 West | 4000 South | 4800 South | Widen Road from 3 to 5 Lanes |
| 2700 West | North Border | 2175 South | Widen Road from 2 to 3 lanes |
| 2700 West | 2550 South | Midland Drive | Widen Road from 2 to 3 Lanes |
| Canal Crossing | North Border | 1100 West | New Road - 3 Lane |
| Retail Loop | 1750 West | 1625 West | Complete and Widen the Retail Loop to 3 Lanes (This includes the northern portion of the Loop Road) |
| 1100 West | North Border | South Border | Widen Road from 2 to 3 Lanes |

The following intersections should be considered for improvement:

**Table 13: 2050 Intersection Control Improvements**

| Intersection | | Improvement |
|---|---|---|
| 1625 West | 2100 South | Signal – UDOT |
| 2700 West | 1800 South | Signal |
| 2700 West | 2550 South | Signal |
| 2700 West | 2900 South | Signal |
| 2700 West | 3300 South | Signal |
| 3500 West | 2550 South | Signal |
| 3500 West | 3300 South | Signal |

These are the intersections that will logically have the greatest impact in each analysis year. Detailed analysis is not provided for these intersections and will need to be evaluated as development occurs in the future but there should be a default assumption that separate left and right turn auxiliary lanes should be planned at each intersection.

Roundabouts were also considered as an intersection option. The ratio of volume to capacity (v/c) provides a quantitative rating of how the roundabout will perform. The lower the v/c, the better the performance. As the v/c nears 1.0, delays and queuing can be expected. When considering a roundabout, items such as topography and right-of-way acquisition should be considered. Only location with acceptable v/c ratios are recommended for roundabout consideration or were unique geometry and skewed approaches may make a traffic signal difficult to provide the same LOS. As each of these intersections approach the need for additional control, then the individual intersection analysis using the FHWA recommended Intersection Control Evaluation (ICE) method should be applied for the final decision.

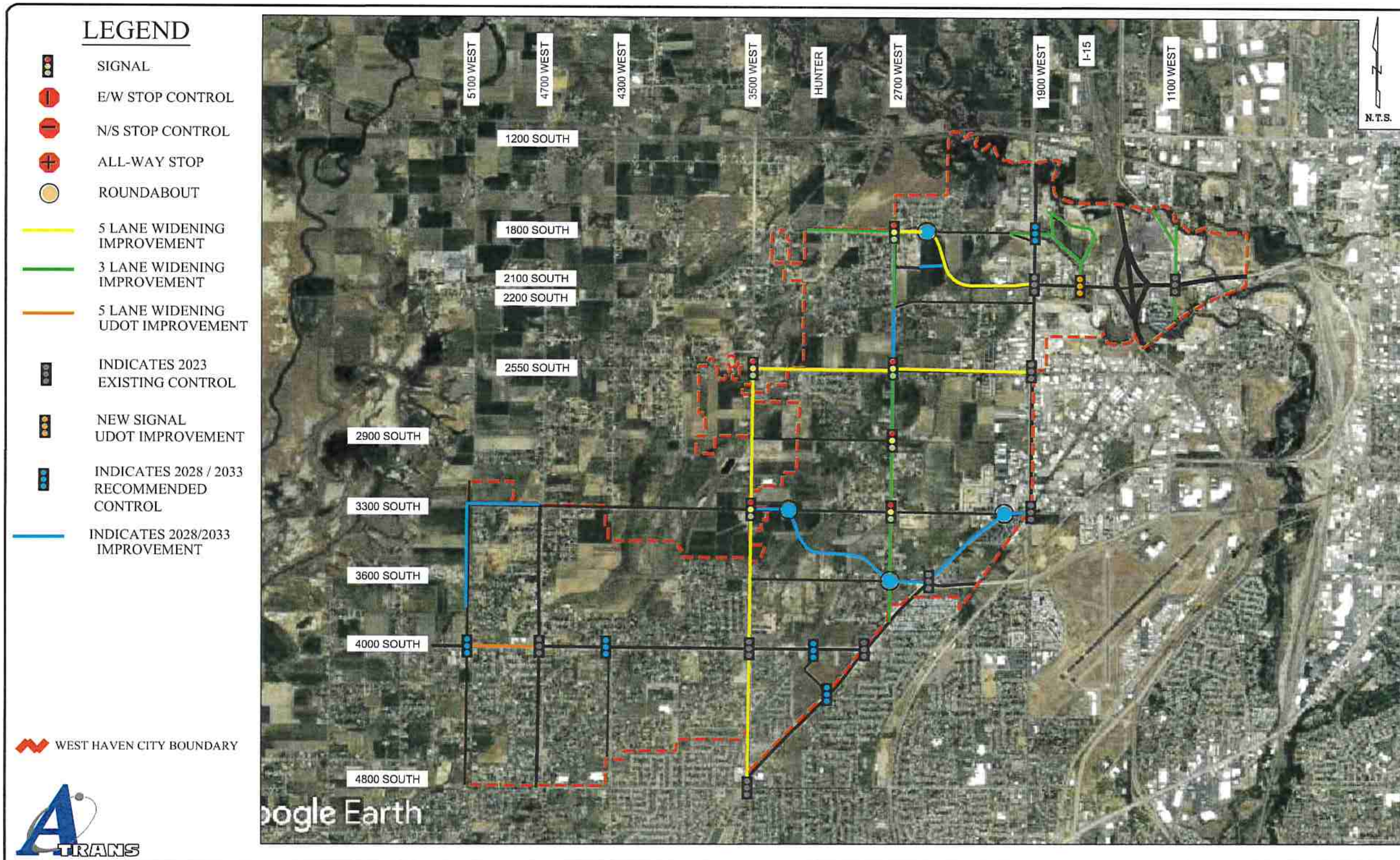


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Figure 13

2050 BUILDOUT RECOMMENDATIONS

## 12. Unique Design Considerations

There are several locations within West Haven City where unique situations occur in which alternative design methods should be implemented to optimize right of way, operations, and accessibility. The following summary of these locations and unique situations are provided:

- Connector 1800 South to 2100 South. This road is planned as an S-curve connecting 1800 South to 2100 South from east of 2700 West to 1900 West. The exact location of the road is currently unknown however it is expected to tie in with the completed extension of 2100 South west of 1900 West on the south.
    - In conjunction with the Connector from 1800 South to 2100 South a skewed intersection along 1800 South is anticipated. The exact location of this intersection is currently unknown however it is anticipated that it will not come in at a 90 degree angle and therefore an alternative intersection design is likely to be necessary. Additionally, its proximity to 1800 South / 2700 West makes it an undesirable location for a signal. A roundabout is the most likely solution, roundabouts typically have a lower cost to construct and maintain than signals but have higher costs with the acquisition as property as roundabouts have a larger footprint then a traditional intersection. Depending on the acquisition costs, a roundabout may become financially infeasible. This should be taken into consideration during the planning phase for this intersection.
- Proposed signal at 1800 South / 1900 West. 1800 South currently skews to the south to the west of 1900 West and ties in at an angle. It is proposed that 1800 South be realigned to access 1900 West at a 90 degree angle. Additionally, it is proposed that the access to the retail developments to the east of 1900 West tie into 1900 West as the fourth leg to this intersection.
- 3300 South / Midland Drive Realignment. The 3300 South /Midland Drive is a T-intersection where the 3300 South intersects Midland Drive. There is a WB bypass lane from the Midland Drive / 3300 South intersection. Due to the proximity to the signal at 1900 West / Midland Drive, an innovative design is necessary for the 3300 South / Midland Drive for traffic control at this location. Potential design could include a roundabout or partial signal. The city should investigate different strategies to accommodate the future traffic demand at this location.
- Connector 3300 South to 3600 South. This road is planned as an S-curve connecting 3300 South to 3600 South from east of 3500 West to 2700 West. The exact alignment is unknown but a possible alignment is shown in Appendix C.
    - 3300 South Skewed Intersection. In conjunction with the Connector from 3300 South to 3600 South. A skewed intersection along 3300 South is anticipated. The exact location of this intersection is currently unknown however it is anticipated that it will not come in at a 90 degree angle and therefore an alternative intersection design is likely to be necessary. Additionally, its proximity to 3300 South / 3500 West makes it an undesirable location for a signal. A roundabout is the most likely solution, roundabouts typically have a lower cost to construct and maintain than signals but have higher costs with the acquisition as property as roundabouts have a larger footprint then a traditional

intersection. This should be taken into consideration during the planning phase for this intersection.

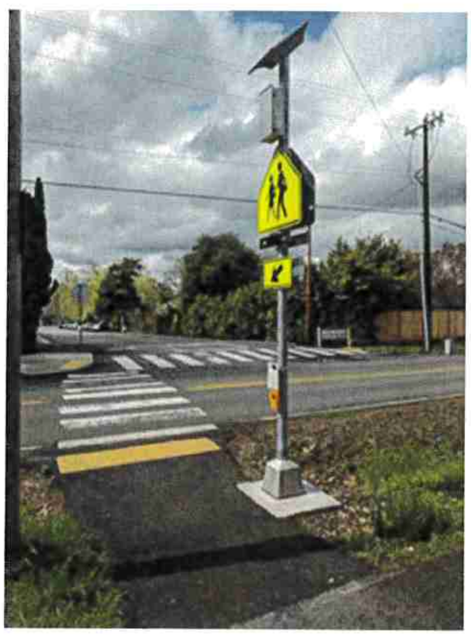
- 3600 South 5-legged Intersection. In conjunction with the Connector from 3300 South to 3600 South the connector, depending on the design, may connect in as a 5$^{th}$ leg to the 2700 West / 3600 South intersection. A five leg intersection requires a unique approach to allow for all movements between two arterials and a collector to be accommodated with acceptable LOS. A roundabout is the most likely solution, roundabouts typically have a lower cost to construct and maintain than signals but have higher costs with the acquisition as property as roundabouts have a larger footprint then a traditional intersection. Depending on the acquisition costs, a roundabout may become financially infeasible. This should be taken into consideration during the planning phase for this intersection.

## 13. Trails Plan

The projected trails map (Figure 14) identifies the type of trails and the crossing locations. The crossing locations are recommended as grade separated or an enhanced crosswalk based on the projected roadway AADTs. Enhanced crosswalks typically include some warning flashers or protected signal indicators. These will likely include but are not limited to:

- Two stage crossing with a pedestrian refuge island
- At a signalized intersection
- An enhanced crossing which may include a RRFB or HAWK

**Any proposed trail improvements should include coordination with surrounding municipalities, Weber County, and Wasatch Front Regional Council since these improvements will be part of the entire regional trail network.**



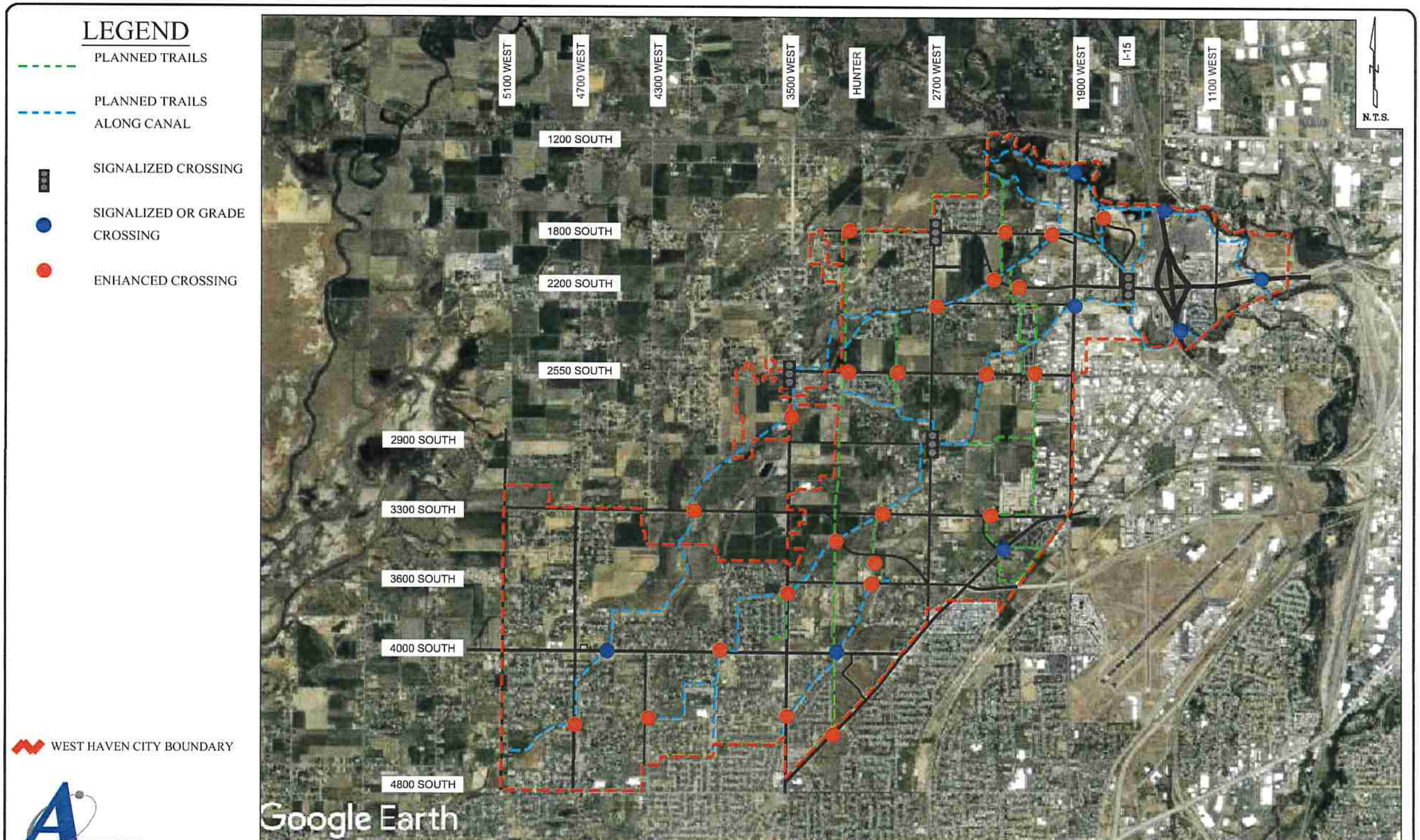




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Figure 14

TRAILS MAP

## 14. Access Category

Effective access management is the proactive management of access points to the primary routes within the City. By providing proper access management, the roadways are managed for a more efficient and safer roadway network. The primary goal of an access management plan is to provide recommended Access Spacing requirements along major and minor arterials and collectors to reduce the number of accesses permitted onto City Roadways and ensure safety requirements are met. Secondly, it is to provide requirements for auxiliary lanes including left and right acceleration/deceleration lanes and median treatments in order to reduce the number of conflict points and reduce impact to roadway capacity.

There are several resources both nationally and locally which can be utilized to determine the appropriate access classification for the roadways within the city. These include AASHTO, UDOT, FWHA and other professional publications, all of these resources will be considered in the final classification recommendations for the City. These resources provide insight into a reasonable classification requirement for various roadway types. Within West Haven City, there are State and City roadways. UDOT roadways are classified in a 1 through 10 classifications as defined in UDOT Administrative Rule R930-6 and the UDOT Access Category Manual. For the purposes of providing a unique classification labeling for the City, the City access categories will be designated Category A-D.

Access spacing is typically a function of:

1. the expected land use,
2. the speed of the roadway
3. volume of the roadway (both existing and projected future)
4. the purpose of the road.

A preliminary consideration of existing access spacing within the city as well as UDOT practices allows us to make initial recommendations which include:

**Table 14: Recommended West Haven Spacing Categories**

| Access Category | Minimum Signal Spacing (feet) | Minimum Street Spacing (feet) | Minimum Driveway Spacing (feet) |
|---|---|---|---|
| A | 2,640’ | 660’ | 550’ |
| B | 2,640’ | 660’ | 500’ |
| C | 1,320’ | 440’ | 350’ |
| D | 1,320’ | 330’ | 250’ |

The following is the UDOT Access Categories and associated access spacing from the UDOT Admin Rule R930-6.

**TABLE 1 - State Highway Access Management Spacing Standards**

| Category | | Minimum Signal Spacing (feet) | Minimum Street Spacing (feet) | Minimum Driveway Spacing (feet) | Minimum Interchange to Crossroad Access Spacing | | |
|---|---|---|---|---|---|---|---|
| | | | | | to 1st Right-in Right-out Driveway (feet) | to 1st Intersection (feet) | from Last Right-in Right-out Driveway (feet) |
| 1 | (I) | N/A | N/A | N/A | n-a | n-a | n-a |
| 2 | (S-R) | 5,280 | 1,000 | 1,000 | 1,320 | 1,320 | 1,320 |
| 3 | (S-U) | 2,640 | N/A | N/A | 1,320 | 1,320 | 1,320 |
| 4 | (R-S) | 2,640 | 660 | 500 | 660 | 1,320 | 500 |
| 5 | (R-PU) | 2,640 | 660 | 350 | 660 | 1,320 | 500 |
| 6 | (R-U) | 1,320 | 350 | 200 | 500 | 1,320 | 500 |
| 7 | (C-R) | 1,320 | 300 | 150 | n-a | n-a | n-a |
| 8 | (C-U) | 1,320 | 300 | 150 | n-a | n-a | n-a |
| 9 | (O) | 1,320 | 300 | 150 | n-a | n-a | n-a |
| 10 | (F-FR) | 1,320 | 660 | N/A | n-a | n-a | n-a |

"N/A" means not allowed.
"n-a" means not applicable.

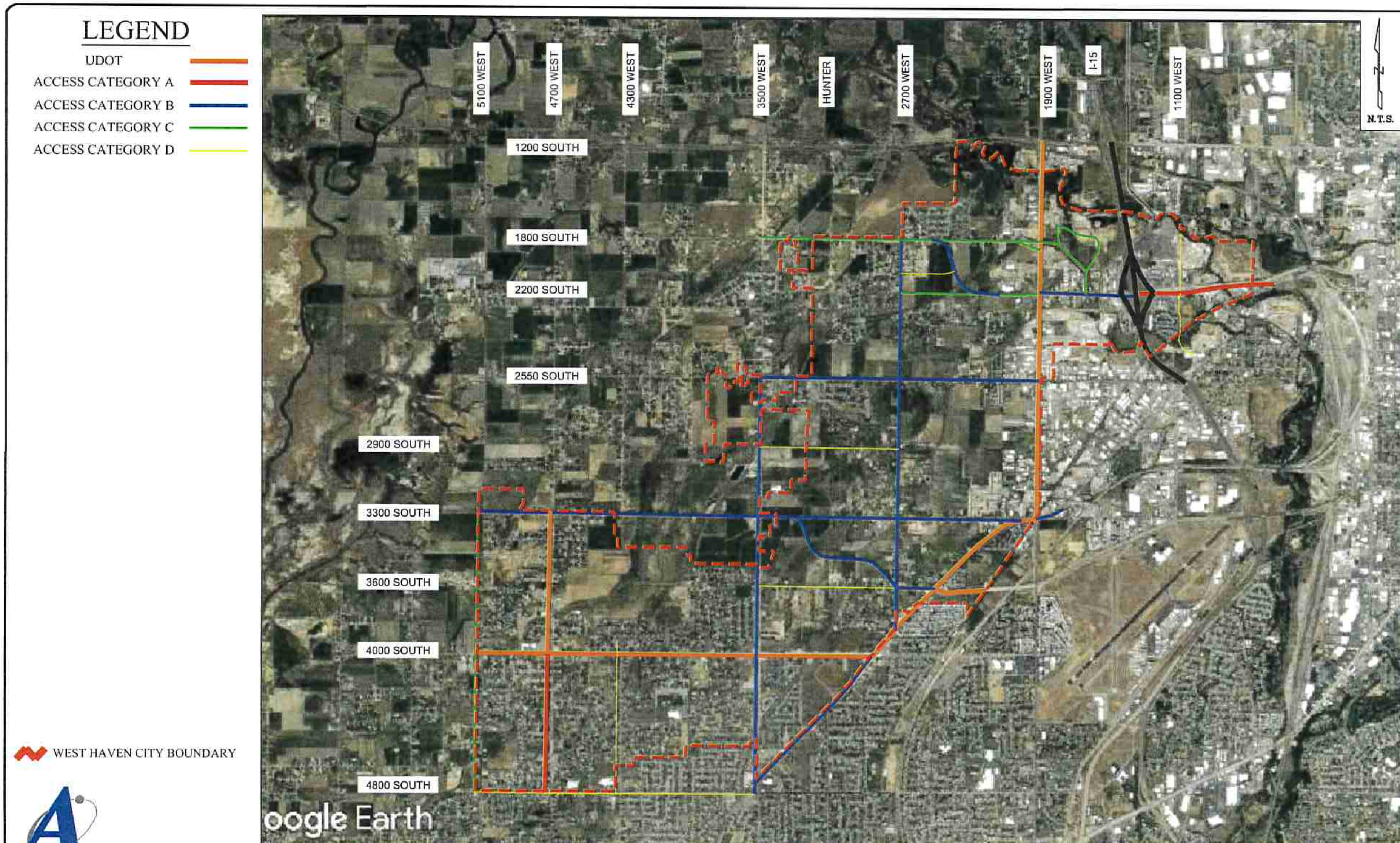


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Figure 15

WEST HAVEN ACCESS CATEGORIES

## LEGEND

UDOT CATEGORY 1
UDOT CATEGORY 3
UDOT CATEGORY 5

WEST HAVEN CITY BOUNDARY

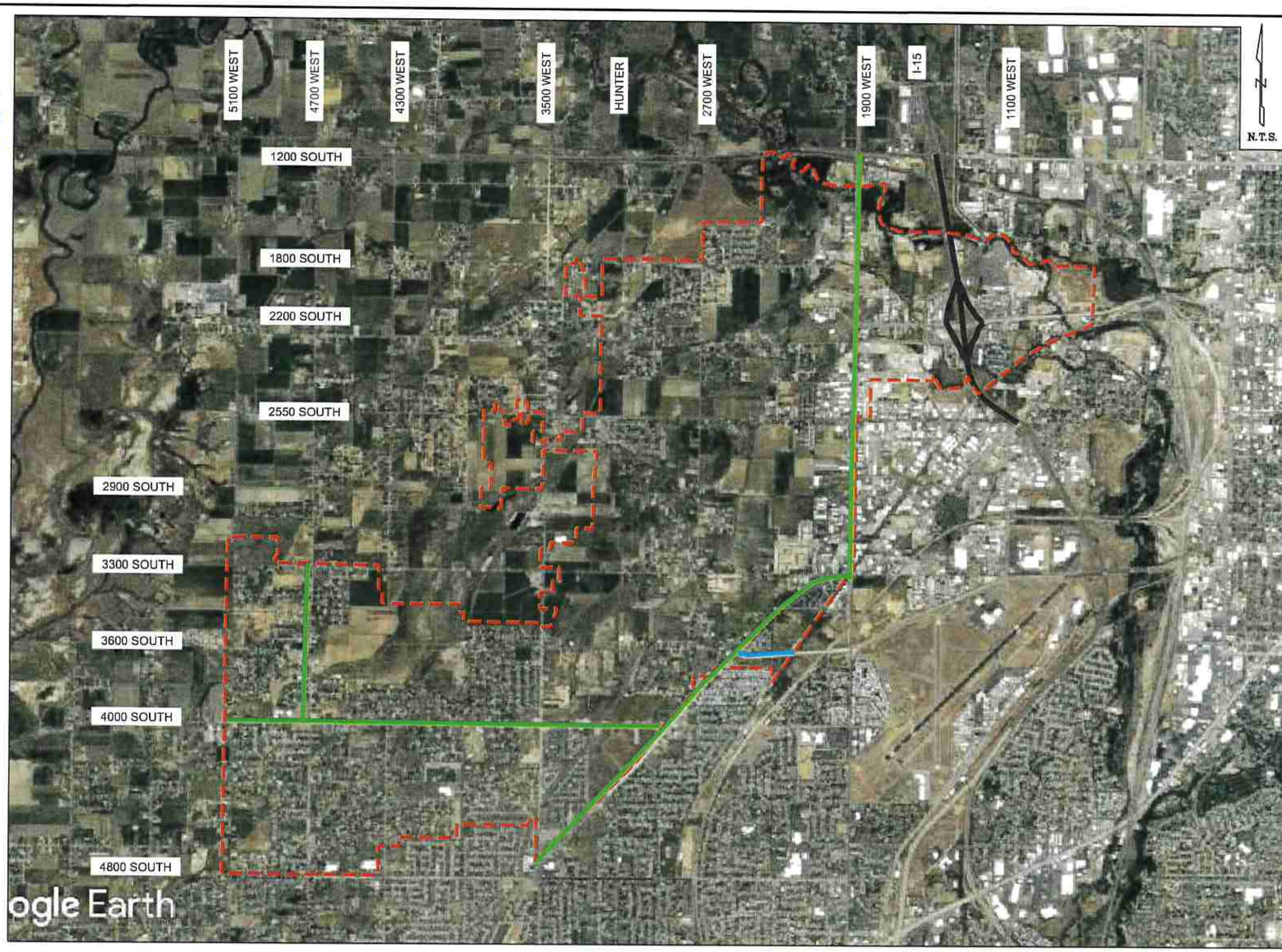


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Figure 16

UDOT ACCESS CATEGORIES

## 15. Conclusions

A Capital Facilities Plan (CFP) provides both the short- and long-term traffic analyses with planning-level recommendations. The Impact Fee Facilities Plan (IFFP) concentrates on a 6-10 year outlook but there is also a 2050 analysis to allow for long range infrastructure planning.

The transportation modeling provides recommendations for:

- Roadway capacity needs
- Intersection improvements
- Trails and trail crossing needed.

Traffic on the City roadways is derived from three contributors.

- Traffic already on the roadway from existing development within and without the city,
- Traffic that will be generated from future development within the city and
- Background traffic which is trips that are generated from outside the city.

The following resources were utilized in the analysis:

- West Haven Roadway Classification Map
- West Haven Trails Map
- Long Range Transportation Plan for Weber County
- West Haven General Zoning Map
- UDOT's Traffic on Utah Highways

To offset the impact of the increased traffic from within and outside of West Haven City, the following roadway and signal improvement recommendations are made. The actual need for these improvements will depend on where development occurs and how quickly development happens. The projects are organized into priority groups represented by time frames: current to 2028/2033, 2050.

**Table 15: 2028 / 2033 Recommended Roadway Widening and Sizing Improvements**

| Project # | Road | From | To | Improvement |
|---|---|---|---|---|
| 6 | 3600 South | 2700 West | Midland Drive | Widen Road from 2 to 5 lanes |
| 7 | Connector | 3300 South | 3600 South | New Road – 5 lanes |
| 4 | Connector | 1800 South | 2100 South | New Road – 5 lanes |
| TBA | Wilson Lane | 2700 West | 2400 West | Partial New Road – from 2 to 3 lanes |
| 5 | 1800 South | 2700 West | 1950 West | Widen Road from 2 to 5 lanes |
| UDOT | Midland Drive | Hinckley | 3300 South | Widen Road from 3 to 5 lanes – UDOT |
| UDOT | Midland Drive | 3300 South | 1900 West | Widen Road from 3 to 5 lanes – UDOT |
| 1 | 3300 South | 4700 West | 5100 West | Widen Road from 2 to 3 lanes |
| TBA | 3300 South | 3500 West | ~3200 West | Widen Road from 2 to 5 lanes |
| 2 | 5100 West | 3300 South | 4000 South | Widen Road from 2 to 3 lanes |
| 3 | 2700 West | 2150 South | 2550 South | Widen Road from 2 to 3 lanes |

**Table 16: 2033 Intersection Control and Geometric Improvements**

| Project # | Intersection | | Improvement |
|---|---|---|---|
| 11 | 1800 South | 1900 West | Signal - UDOT |
| 8 / Part of #4 | 1800 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| TBA / UDOT | Midland Drive | 3300 South | Alternative Intersection (Roundabout)[1]- UDOT |
| 9 | 4000 South | 5100 West | Signal – UDOT |
| 10 | 4000 South | 4300 West | Signal – UDOT |
| UDOT | Midland Drive | Hunter | Signal – Development Driven – UDOT |
| UDOT | 4000 South | Hunter (3050 West) | Signal – Development Driven - UDOT |
| 12 / Part of #7 | 3300 South | Connector Road | Alternative Intersection (Roundabout)[1] |
| 13 | 2700 West | 3600 South | Alternative Intersection (Roundabout)[1] |

1 -For more information pertaining to why roundabouts are recommended please see Section 12. Unique Design Considerations.

**Table 17: 2050 Recommendations**

| Roadway | From | To | 2050 Recommended Improvement |
|---|---|---|---|
| 4000 South | 5100 West | 4700 West | Widen Road from 3 to 5 Lanes – UDOT |
| 2550 South | West Border | 1900 West | Widen Road from 3 to 5 Lanes |
| 1800 South | 2050 West | 1900 West | Realignment and widening from 2 to 3 lanes |
| 1800 South | 1900 West | 1700 West | New 3 lanes road connecting 1900 West to Retail Loop |
| 1800 South | West Border | 2700 West | Widen Road from 2 to 3 Lanes |
| 3500 West | 3300 South | 4000 South | Widen Road from 3 to 5 Lanes |
| 3500 West | 4000 South | 4800 South | Widen Road from 3 to 5 Lanes |
| 2700 West | North Border | 2175 South | Widen Road from 2 to 3 lanes |
| 2700 West | 2550 South | Midland Drive | Widen Road from 2 to 3 Lanes |
| Canal Crossing | North Border | 1100 West | New Road - 3 Lane |
| Retail Loop | 1750 West | 1625 West | Complete and Widen the Retail Loop to 3 Lanes (This includes the northern portion of the Loop Road) |
| 1100 West | North Border | South Border | Widen Road from 2 to 3 Lanes |

**Table 18 : 2050 Intersection Control Improvements**

| Intersection | | Improvement |
|---|---|---|
| 1625 West | 2100 South | Signal – UDOT |
| 2700 West | 1800 South | Signal |
| 2700 West | 2550 South | Signal |
| 2700 West | 2900 South | Signal |
| 2700 West | 3300 South | Signal |
| 3500 West | 2550 South | Signal |
| 3500 West | 3300 South | Signal |

## 16. Funding Improvements

Entities have various options when it comes to funding roadway improvements. These include but are not limited to: taxes, transportation or road utility fees, impact fees, bonds, and grants and loans from funding agencies and private entities. Rules, regulations, and stipulations generally come with each type of funding source. For example, impact fees may only be applied toward roadway improvement costs directly associated with the impact development has on the roadway system. Further explanation follows.

### A. Impact Fees

The Impact Fees Act, Utah Code Section 11-36a, allows a City to impose an impact fee on new development provided that the fee is calculated to reasonably offset the burden of infrastructure costs created by the development. A few simple rules of impact fees are:

1. The fees must be applied toward **system improvements** that benefit the community at large.
    a. The system improvements may have been previously constructed, or
    b. The system improvements may be new improvements intended to mitigate the impact new development will impose on an existing system.
2. Impact fees cannot be used to cure system deficiencies.
3. The fees cannot be used to raise the established level of service of a public facility.
4. Impact fees may not be used to pay for **project improvements**, which benefit only a specific development.

Impact fees also need to be applied toward system improvements in a timely manner as specified in Section 11-36a-602 of the Utah Code. Collecting and reserving fees for an extended period of time is not allowed. Consequently, careful planning is required in order to balance revenues with expenditures. As a result, the City may need to consider the likelihood of bonding to pay for system improvement costs, and use impact fees received in the future to help service the debt.

Some expensive projects may be needed well in advance of development and the collection of impact fees. Therefore, the City may be forced to consider the need to pay for these improvements using bonds rather than savings accounts which are established using fees and taxes. These bonds and associated interest payments may then be paid off as fees and taxes are collected. The limitations found in the impact fees act may force cities to accept bonding rather than using a conservative pay-as-you-go approach.

This study has assumed that city revenue sources and grants will be available and sufficient to pay for improvement costs. System improvement costs may need to be raised to account for interest payments and fees if bonding is used. This in turn, would raise the expected impact fee.

When impact fees are applied toward previously constructed projects, they must be based on the cost actually incurred (historical cost) rather than the current value of the public facility itself. For example, the value of right-of-way acquisition cannot be recovered using impact fees if the land was donated. Only actual expenses can be recovered by impact fees (see Utah Code Section 11-36a-202-1). Moreover, only the portion of those expenses that can be shown to serve future growth can be recovered, not the entire expense (see Utah Code Section 11-36a-304-1).

### B. Other Funding Sources

The cost to pay for infrastructure that will serve new growth does not need to come from impact fees alone, or even at all. Other revenue sources, such as utility fees and property taxes, may be used to pay for needed enhancements. Some system improvements may also qualify for low interest rate loans or grants. Occasionally, development may even donate system improvements, and in other cases developers may construct and dedicate system improvements to the City and then be reimbursed by impact fees.

West Haven City falls within the metropolitan planning organizational limits of the Wasatch Front Regional Council (WFRC). WRFC is the regional transportation entity responsible for allocating federal funds for important transportation projects. The WFRC has developed an overall plan called the Regional Transportation Plan (RTP). It identifies short and long range transportation projects needed for the transportation network. In order for projects to receive funds distributed by WFRC, projects need to be identified as a short range (Phase 1) improvement in the RTP. These projects are broken into phases:

- Phase 1 – 2025 to 2035 (short range)
- Phase 2 – 2035 to 2045 (mid range)
- Phase 3 – 2045 to 2055 (long range)
- Unfunded Beyond 2055 (Projects lacking a confirmed funding source) (long range)

Cities may elect to impose a road or transportation utility fee. These fees help fund road maintenance and capital improvement projects.

Possible funding sources from which the City can apply for funding for needed improvements are shown in Appendix C Table 2. Some of these funding options are grants that only require a small local match. Residents, both current and future, will save on fees and taxes if grant money is used to construct these improvements. We recommend that the City utilize grants as much as reasonably possible to fund the major roadway network improvements. Individual project cost estimates are found in Appendix C.

### C. Recovering the Cost of Excess Capacity in System Improvements

In many instances, the city has participated in the construction of roadway projects that will benefit expected growth. Impact fees can be used to pay back the city the proportionate share of these system improvements that will serve new growth. The portion of city expenses recovered by impact fees is often directly correlated to the unused capacity of the roadway up to the traffic volume expected to be imposed by new development. It is important to remember that the impact fee analysis only considers actual expenses (historical costs) and not the current value of facilities with excess capacity. This part of the impact fee analysis is often referred to as "buy-in." Excess traffic capacity has been identified in Tables

5, 7 and 10. The impact fee analysis may consider the historical cost of these facilities and recover the proportionate share of these costs that serve new growth.

### 17. The Impact Fee Facilities Plan

The purpose of this section of the report is to justify the need to impose an impact fee on new development to pay for needed system improvements. Based on the data presented in this report, it is clear that growth will increase traffic on the city's roadway system. The traffic modeling data indicates that some of the existing system improvements will exceed their design capacity and need to be enhanced in order to maintain the City's existing LOS "D." The City proposes to perpetuate the existing LOS "D" into the future.

As a result, we recommend that a transportation impact fee be implemented, and the City in accordance with 11-36a-302(3) has determined that the City's plan for financing system improvement establishes that impact fees are necessary to maintain the level of service D.

During this impact fee facilities plan (IFFP) planning horizon (6 to 10-year period) the projects listed in Appendix C Table 1 and Appendix C Table 2 are the recommended system improvements for the IFFP, except any UDOT listed projects within these same tables. The costs for impact fee eligible system improvements are shown in the right column.

### 18. Impact Fee Facilities Plan Certification

The system improvements identified in this report are considered qualified projects meeting the requirements of the impact fees act. They are major roadway improvements that justify the collection of an impact fee on new development in order to mitigate impacts to the roadway system.

"I certify that the attached impact fee facilities plan:

1. Includes only the costs of public facilities that are:
    a. allowed under the Impact Fees Act; and
    b. actually incurred; or
    c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. Does not include:
    a. costs of operation and maintenance of public facilities;
    b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents; or
    c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Complies in each and every relevant respect with the Impact Fees Act."

**Appendix**

| | |
|---|---|
| Appendix A | Traffic Counts and Projections |
| Appendix B | Intersection Analyses |
| Appendix C | Project Cost Estimates |

## Appendix A Traffic Counts and Projections

Data from UDOT's Signal Performance Metrics

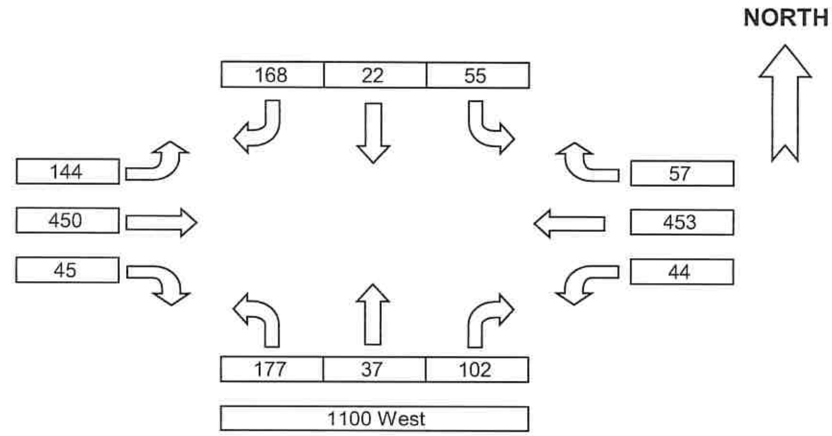
N-S STREET: **1100 West**
E-W STREET: **2100 South**

Date **11-Apr-23**

intersection
5033

| | |
|---|---|
| PK HR VOLUME: | 1,754 |
| PHF: | 0.79 |

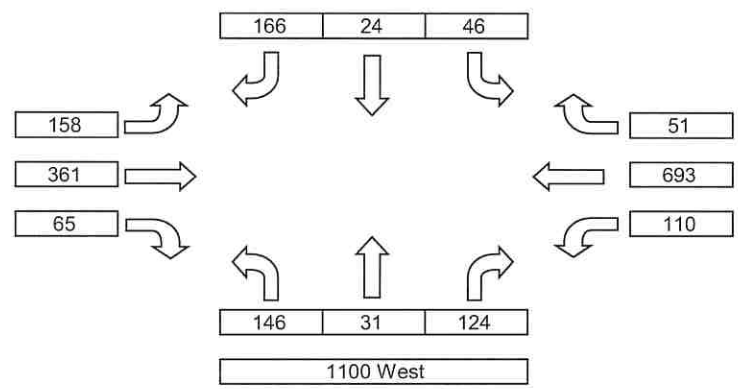
2100 South




| AM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 144 | 450 | 45 | 44 | 453 | 57 | 177 | 37 | 102 | 55 | 22 | 168 |
| PHF | 0.82 | 0.86 | 0.8 | 0.79 | 0.83 | 0.75 | 0.92 | 0.77 | 0.85 | 0.65 | 0.69 | 0.78 |

| | |
|---|---|
| PK HR VOLUME: | 1,975 |
| PHF: | 0.84 |

2100 South




| PM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 158 | 361 | 65 | 110 | 693 | 51 | 146 | 31 | 124 | 46 | 24 | 166 |
| PHF | 0.88 | 0.83 | 0.77 | 0.95 | 0.9 | 0.71 | 0.79 | 0.86 | 0.86 | 0.82 | 0.86 | 0.92 |

Data from UDOT's Signal Performance Metrics

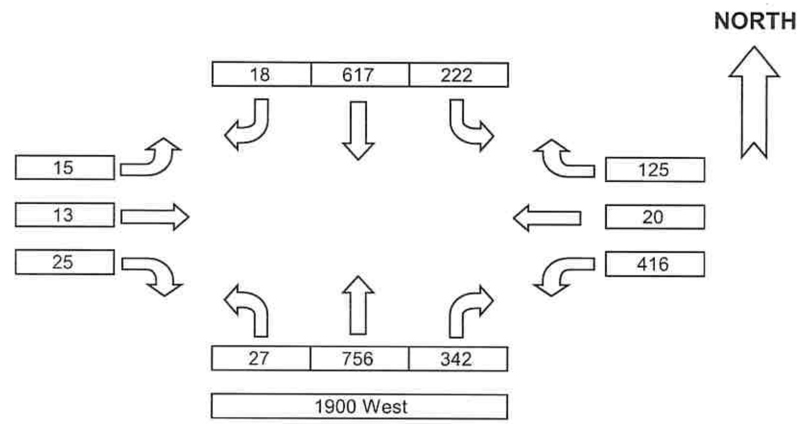
N-S STREET: **1900 West**
E-W STREET: **2100 South**

Date **11-Apr-23**

Intersection
5130

| | |
|---|---|
| PK HR VOLUME: | 2,596 |
| PHF: | 0.78 |

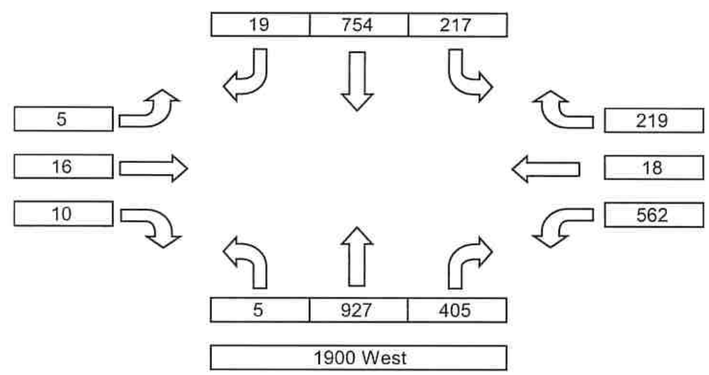
2100 South




| AM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 15 | 13 | 25 | 416 | 20 | 125 | 27 | 756 | 342 | 222 | 617 | 18 |
| PHF | 0.75 | 0.41 | 0.52 | 0.95 | 0.71 | 0.89 | 0.84 | 0.86 | 0.81 | 0.91 | 0.92 | 0.75 |

| | |
|---|---|
| PK HR VOLUME: | 3,157 |
| PHF: | 0.72 |

2100 South




| PM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 5 | 16 | 10 | 562 | 18 | 219 | 5 | 927 | 405 | 217 | 754 | 19 |
| PHF | 0.62 | 0.57 | 0.62 | 0.83 | 0.5 | 0.91 | 0.25 | 0.93 | 0.84 | 0.92 | 0.89 | 0.59 |

Data from UDOT's Signal Performance Metrics

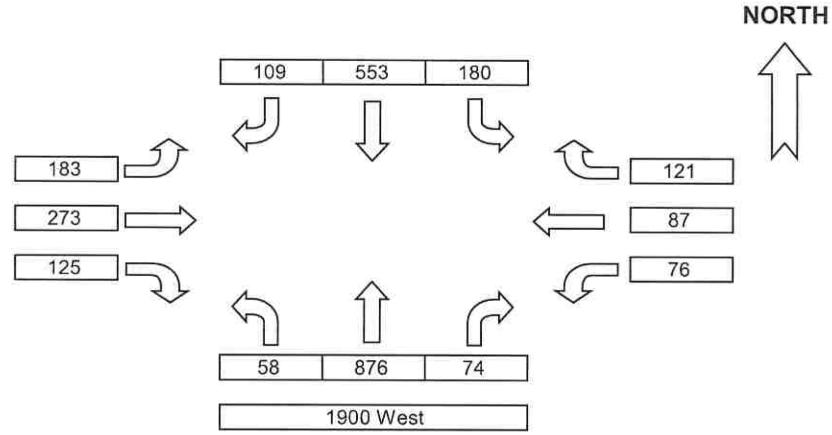
N-S STREET: **1900 West**
E-W STREET: **2550 South**

Date **11-Apr-23**

Intersection
5098

| | |
|---|---|
| PK HR VOLUME: | 2,715 |
| PHF: | 0.84 |

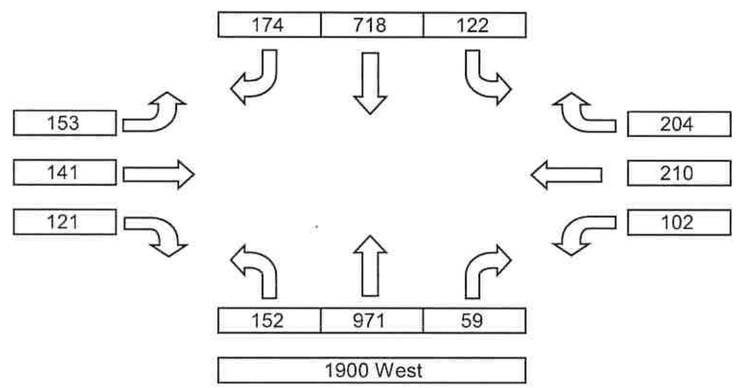
2550 South




| AM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 183 | 273 | 125 | 76 | 87 | 121 | 58 | 876 | 74 | 180 | 553 | 109 |
| PHF | 0.78 | 0.75 | 0.89 | 0.73 | 0.91 | 0.86 | 0.85 | 0.88 | 0.77 | 0.76 | 0.93 | 0.91 |

| | |
|---|---|
| PK HR VOLUME: | 3,127 |
| PHF: | 0.81 |

2550 South




| PM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 153 | 141 | 121 | 102 | 210 | 204 | 152 | 971 | 59 | 122 | 718 | 174 |
| PHF | 0.83 | 0.86 | 0.72 | 0.73 | 0.74 | 0.91 | 0.97 | 0.88 | 0.67 | 0.73 | 0.88 | 0.95 |

Data from UDOT's Signal Performance Metrics

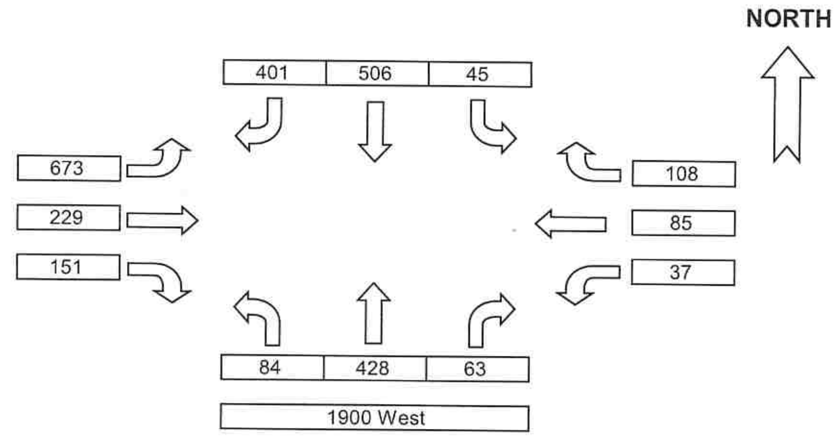
N-S STREET: **1900 West**
E-W STREET: **Midland**

Date **11-Apr-23**

Intersection
5097

| | |
|---|---|
| PK HR VOLUME: | 2,810 |
| PHF: | 0.83 |

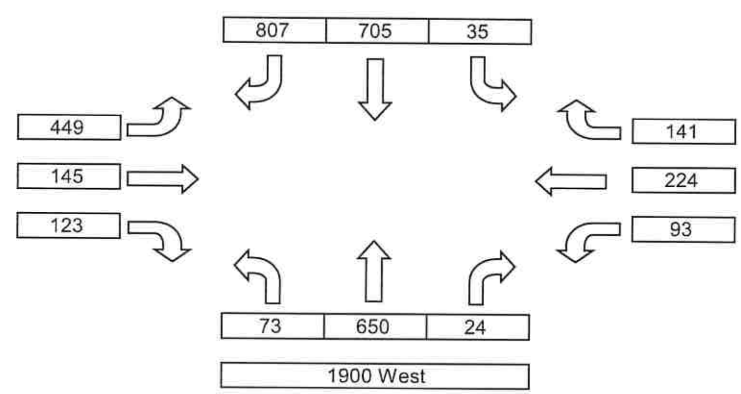
Midland




| AM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 673 | 229 | 151 | 37 | 85 | 108 | 84 | 428 | 63 | 45 | 506 | 401 |
| PHF | 0.91 | 0.78 | 0.92 | 0.58 | 0.66 | 0.66 | 0.91 | 0.86 | 0.83 | 0.94 | 0.94 | 0.91 |

| | |
|---|---|
| PK HR VOLUME: | 3,469 |
| PHF: | 0.80 |

Midland




| PM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 449 | 145 | 123 | 93 | 224 | 141 | 73 | 650 | 24 | 35 | 705 | 807 |
| PHF | 0.88 | 0.88 | 0.88 | 0.8 | 0.89 | 0.73 | 0.76 | 0.89 | 0.6 | 0.67 | 0.87 | 0.97 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **2300 West** **and** **2550 South**

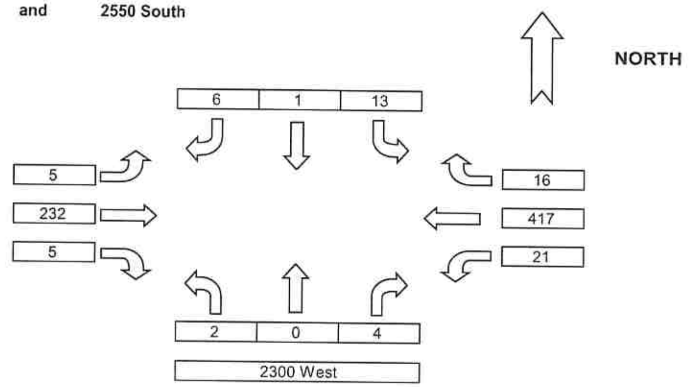
Ped = 0

N-S STREET: **2300 West**
E-W STREET: **2550 South**

COUNT DATE: **April 18, 2023**
Day of the Week: **Tuesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 722 |
| PHF: | 0.91 |
| PEAK HOUR: | |
| FROM: 4:40 PM | TO: 5:40 PM |




2550 South

## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND (Name: Leisel) | | | EASTBOUND (Name: Leisel) | | | SOUTHBOUND (Name: Leisel) | | | WESTBOUND (Name: Leisel) | | | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | | | E/W | N/S |
| 4:00 PM | 4:05 PM | 0 | 0 | 2 | 0 | 21 | 0 | 3 | 0 | 0 | 1 | 22 | 2 | 51 | 159 | 0 | 0 |
| 4:05 PM | 4:10 PM | 0 | 0 | 1 | 1 | 16 | 0 | 2 | 0 | 0 | 1 | 23 | 2 | 46 | 166 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 0 | 1 | 2 | 21 | 0 | 2 | 0 | 0 | 0 | 34 | 2 | 62 | 169 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 0 | 0 | 2 | 22 | 0 | 1 | 0 | 2 | 1 | 28 | 2 | 58 | 170 | 0 | 0 |
| 4:20 PM | 4:25 PM | 1 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 2 | 23 | 0 | 49 | 161 | 0 | 0 |
| 4:25 PM | 4:30 PM | 1 | 1 | 0 | 0 | 21 | 0 | 1 | 0 | 0 | 2 | 35 | 2 | 63 | 177 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 0 | 1 | 1 | 22 | 0 | 1 | 0 | 0 | 0 | 22 | 2 | 49 | 175 | 0 | 0 |
| 4:35 PM | 4:40 PM | 0 | 0 | 1 | 1 | 28 | 1 | 2 | 0 | 1 | 2 | 27 | 2 | 65 | 205 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 0 | 0 | 0 | 20 | 0 | 1 | 0 | 0 | 1 | 37 | 2 | 61 | 198 | 0 | 0 |
| 4:45 PM | 4:50 PM | 0 | 0 | 0 | 2 | 25 | 0 | 3 | 0 | 2 | 1 | 45 | 1 | 79 | 181 | 0 | 0 |
| 4:50 PM | 4:55 PM | 0 | 0 | 0 | 0 | 15 | 0 | 1 | 0 | 0 | 2 | 39 | 1 | 58 | 158 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 0 | 0 | 1 | 13 | 1 | 0 | 0 | 0 | 2 | 25 | 2 | 44 | 152 | 0 | 0 |
| 5:00 PM | 5:05 PM | 0 | 0 | 1 | 0 | 19 | 0 | 3 | 0 | 2 | 1 | 28 | 2 | 56 | 173 | 0 | 0 |
| 5:05 PM | 5:10 PM | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 2 | 1 | 25 | 1 | 52 | 174 | 0 | 0 |
| 5:10 PM | 5:15 PM | 1 | 0 | 1 | 0 | 19 | 1 | 0 | 0 | 0 | 1 | 39 | 3 | 65 | 180 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 0 | 0 | 1 | 12 | 0 | 3 | 0 | 0 | 2 | 39 | 0 | 57 | 165 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 0 | 0 | 0 | 16 | 1 | 0 | 0 | 0 | 2 | 38 | 1 | 58 | 179 | 0 | 0 |
| 5:25 PM | 5:30 PM | 1 | 0 | 0 | 0 | 21 | 1 | 0 | 0 | 0 | 2 | 25 | 0 | 50 | 192 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 0 | 1 | 1 | 24 | 1 | 0 | 1 | 0 | 3 | 38 | 2 | 71 | 186 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 0 | 1 | 0 | 25 | 0 | 2 | 0 | 0 | 3 | 39 | 1 | 71 | 165 | 0 | 0 |
| 5:40 PM | 5:45 PM | 0 | 0 | 0 | 0 | 11 | 0 | 1 | 1 | 0 | 1 | 29 | 1 | 44 | 136 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 0 | 2 | 1 | 18 | 0 | 2 | 0 | 0 | 3 | 22 | 2 | 50 | 133 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 0 | 1 | 1 | 13 | 0 | 0 | 0 | 0 | 2 | 24 | 1 | 42 | 83 | 0 | 1 |
| 5:55 PM | 6:00 PM | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 2 | 24 | 2 | 41 | 41 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **2700 West** **and** **2550 South**

Ped = 3

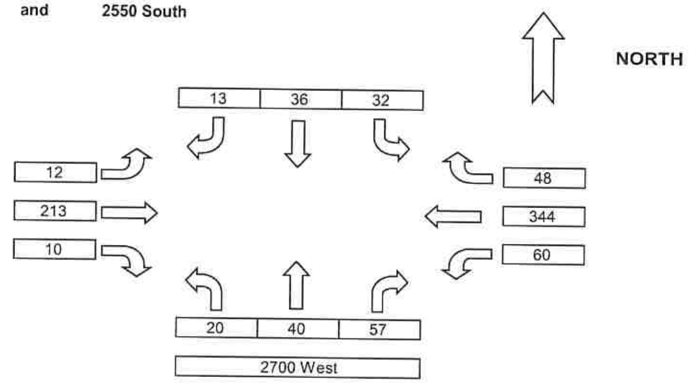
N-S STREET: **2700 West**
E-W STREET: **2550 South**

COUNT DATE: **April 19, 2023**
Day of the Week: **Wednesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

PK HR VOLUME: 885
PHF: 0.95
PEAK HOUR:
FROM: 4:35 PM TO: 5:35 PM

2550 South




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND (Name: Heather) | | | EASTBOUND (Name: Heather) | | | SOUTHBOUND (Name: Heather) | | | WESTBOUND (Name: Heather) | | | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | | | E/W | N/S |
| 4:00 PM | 4:05 PM | 2 | 15 | 1 | 3 | 1 | 0 | 5 | 25 | 6 | 3 | 0 | 7 | 68 | 198 | 0 | 0 |
| 4:05 PM | 4:10 PM | 0 | 14 | 1 | 3 | 4 | 2 | 3 | 11 | 3 | 0 | 4 | 11 | 56 | 197 | 0 | 0 |
| 4:10 PM | 4:15 PM | 2 | 1 | 3 | 2 | 18 | 0 | 4 | 3 | 2 | 3 | 30 | 6 | 74 | 207 | 0 | 0 |
| 4:15 PM | 4:20 PM | 2 | 5 | 5 | 2 | 20 | 0 | 1 | 1 | 0 | 4 | 25 | 2 | 67 | 191 | 0 | 0 |
| 4:20 PM | 4:25 PM | 0 | 2 | 3 | 1 | 16 | 2 | 1 | 2 | 2 | 6 | 27 | 4 | 66 | 186 | 0 | 0 |
| 4:25 PM | 4:30 PM | 0 | 3 | 4 | 1 | 18 | 0 | 1 | 1 | 1 | 0 | 24 | 5 | 58 | 201 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 2 | 9 | 1 | 13 | 0 | 1 | 0 | 0 | 5 | 28 | 3 | 62 | 212 | 0 | 0 |
| 4:35 PM | 4:40 PM | 5 | 1 | 6 | 2 | 31 | 0 | 4 | 2 | 1 | 8 | 17 | 4 | 81 | 229 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 2 | 7 | 0 | 19 | 1 | 2 | 2 | 1 | 5 | 24 | 6 | 69 | 216 | 0 | 0 |
| 4:45 PM | 4:50 PM | 3 | 4 | 6 | 0 | 16 | 0 | 3 | 2 | 0 | 2 | 40 | 3 | 79 | 213 | 0 | 0 |
| 4:50 PM | 4:55 PM | 1 | 5 | 2 | 1 | 15 | 2 | 0 | 1 | 3 | 5 | 27 | 6 | 68 | 222 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 6 | 3 | 2 | 19 | 1 | 1 | 2 | 0 | 3 | 28 | 1 | 66 | 232 | 0 | 0 |
| 5:00 PM | 5:05 PM | 2 | 3 | 9 | 3 | 23 | 0 | 5 | 4 | 1 | 8 | 27 | 3 | 88 | 231 | 2 | 0 |
| 5:05 PM | 5:10 PM | 2 | 2 | 5 | 0 | 18 | 1 | 1 | 3 | 1 | 8 | 33 | 4 | 78 | 221 | 0 | 0 |
| 5:10 PM | 5:15 PM | 1 | 6 | 5 | 2 | 7 | 1 | 1 | 7 | 0 | 2 | 25 | 8 | 65 | 220 | 0 | 0 |
| 5:15 PM | 5:20 PM | 2 | 3 | 3 | 0 | 22 | 1 | 4 | 4 | 1 | 5 | 31 | 2 | 78 | 221 | 0 | 0 |
| 5:20 PM | 5:25 PM | 2 | 3 | 3 | 2 | 19 | 1 | 2 | 2 | 2 | 7 | 30 | 4 | 77 | 213 | 0 | 0 |
| 5:25 PM | 5:30 PM | 1 | 1 | 5 | 0 | 11 | 0 | 2 | 4 | 2 | 1 | 33 | 6 | 66 | 195 | 0 | 0 |
| 5:30 PM | 5:35 PM | 1 | 4 | 3 | 0 | 13 | 2 | 7 | 3 | 1 | 6 | 29 | 1 | 70 | 179 | 1 | 0 |
| 5:35 PM | 5:40 PM | 1 | 4 | 7 | 0 | 16 | 0 | 5 | 1 | 1 | 2 | 19 | 3 | 59 | 175 | 0 | 0 |
| 5:40 PM | 5:45 PM | 1 | 8 | 7 | 0 | 17 | 0 | 3 | 1 | 0 | 3 | 9 | 1 | 50 | 171 | 0 | 0 |
| 5:45 PM | 5:50 PM | 1 | 2 | 6 | 0 | 21 | 0 | 4 | 2 | 1 | 6 | 21 | 2 | 66 | 179 | 0 | 0 |
| 5:50 PM | 5:55 PM | 2 | 5 | 7 | 0 | 18 | 0 | 1 | 2 | 1 | 2 | 16 | 1 | 55 | 113 | 0 | 0 |
| 5:55 PM | 6:00 PM | 3 | 4 | 8 | 4 | 9 | 2 | 3 | 3 | 0 | 5 | 16 | 1 | 58 | 58 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **3500 West** **and** **3300 South**

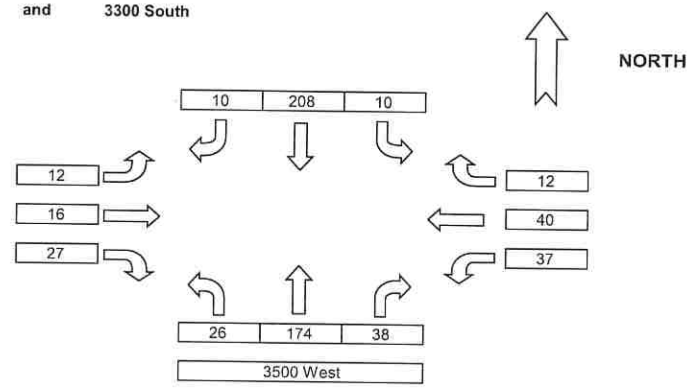
Ped = 0

N-S STREET: **3500 West**
E-W STREET: **3300 South**

COUNT DATE: **April 20, 2023**
Day of the Week: **Thursday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 610 |
| PHF: | 0.87 |
| PEAK HOUR: | |
| FROM: 4:10 PM | TO: 5:10 PM |




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND (Name: Heather) | | | EASTBOUND (Name: Heather) | | | SOUTHBOUND (Name: Heather) | | | WESTBOUND (Name: Heather) | | | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | | | E/W | N/S |
| 4:00 PM | 4:05 PM | 6 | 12 | 5 | 0 | 2 | 0 | 1 | 10 | 0 | 3 | 2 | 0 | 41 | 155 | 0 | 0 |
| 4:05 PM | 4:10 PM | 1 | 12 | 1 | 2 | 0 | 3 | 1 | 18 | 1 | 6 | 1 | 0 | 46 | 167 | 0 | 0 |
| 4:10 PM | 4:15 PM | 4 | 18 | 2 | 4 | 1 | 2 | 1 | 24 | 2 | 4 | 5 | 1 | 68 | 175 | 0 | 0 |
| 4:15 PM | 4:20 PM | 1 | 15 | 4 | 0 | 1 | 1 | 2 | 20 | 0 | 3 | 5 | 1 | 53 | 151 | 0 | 0 |
| 4:20 PM | 4:25 PM | 3 | 13 | 6 | 2 | 2 | 2 | 1 | 20 | 0 | 1 | 4 | 0 | 54 | 150 | 0 | 0 |
| 4:25 PM | 4:30 PM | 4 | 11 | 1 | 0 | 0 | 0 | 0 | 19 | 0 | 6 | 2 | 1 | 44 | 148 | 0 | 0 |
| 4:30 PM | 4:35 PM | 3 | 21 | 3 | 1 | 1 | 0 | 1 | 14 | 0 | 5 | 2 | 1 | 52 | 140 | 0 | 0 |
| 4:35 PM | 4:40 PM | 2 | 17 | 5 | 0 | 1 | 2 | 1 | 16 | 4 | 2 | 1 | 1 | 52 | 138 | 0 | 0 |
| 4:40 PM | 4:45 PM | 1 | 9 | 1 | 1 | 0 | 2 | 0 | 15 | 2 | 2 | 2 | 1 | 36 | 134 | 0 | 0 |
| 4:45 PM | 4:50 PM | 0 | 12 | 2 | 0 | 3 | 6 | 2 | 16 | 0 | 3 | 5 | 1 | 50 | 143 | 0 | 0 |
| 4:50 PM | 4:55 PM | 4 | 13 | 5 | 0 | 1 | 2 | 1 | 16 | 1 | 1 | 2 | 2 | 48 | 137 | 0 | 0 |
| 4:55 PM | 5:00 PM | 2 | 14 | 4 | 1 | 2 | 1 | 1 | 13 | 1 | 5 | 1 | 0 | 45 | 153 | 0 | 0 |
| 5:00 PM | 5:05 PM | 0 | 11 | 2 | 1 | 2 | 5 | 0 | 17 | 0 | 3 | 1 | 2 | 44 | 169 | 0 | 0 |
| 5:05 PM | 5:10 PM | 2 | 20 | 3 | 2 | 2 | 4 | 0 | 18 | 0 | 2 | 10 | 1 | 64 | 176 | 0 | 0 |
| 5:10 PM | 5:15 PM | 5 | 20 | 1 | 2 | 2 | 2 | 2 | 20 | 1 | 5 | 1 | 0 | 61 | 158 | 0 | 0 |
| 5:15 PM | 5:20 PM | 5 | 10 | 8 | 2 | 1 | 1 | 1 | 17 | 2 | 1 | 3 | 0 | 51 | 147 | 0 | 0 |
| 5:20 PM | 5:25 PM | 1 | 13 | 6 | 0 | 0 | 2 | 0 | 19 | 3 | 1 | 0 | 1 | 46 | 126 | 0 | 0 |
| 5:25 PM | 5:30 PM | 3 | 18 | 5 | 1 | 3 | 2 | 1 | 12 | 1 | 1 | 3 | 0 | 50 | 123 | 0 | 0 |
| 5:30 PM | 5:35 PM | 2 | 7 | 0 | 1 | 0 | 4 | 1 | 8 | 0 | 1 | 4 | 2 | 30 | 126 | 0 | 0 |
| 5:35 PM | 5:40 PM | 3 | 13 | 1 | 1 | 3 | 3 | 1 | 11 | 0 | 3 | 4 | 0 | 43 | 132 | 0 | 0 |
| 5:40 PM | 5:45 PM | 4 | 15 | 2 | 1 | 0 | 2 | 1 | 21 | 1 | 2 | 3 | 1 | 53 | 136 | 0 | 0 |
| 5:45 PM | 5:50 PM | 2 | 13 | 2 | 0 | 2 | 1 | 3 | 8 | 0 | 1 | 4 | 0 | 36 | 111 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 21 | 4 | 0 | 1 | 0 | 0 | 17 | 0 | 1 | 0 | 3 | 47 | 75 | 0 | 1 |
| 5:55 PM | 6:00 PM | 4 | 5 | 0 | 1 | 2 | 1 | 0 | 9 | 2 | 2 | 1 | 1 | 28 | 28 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **3500 West** **and** **4000 South**

Ped =2

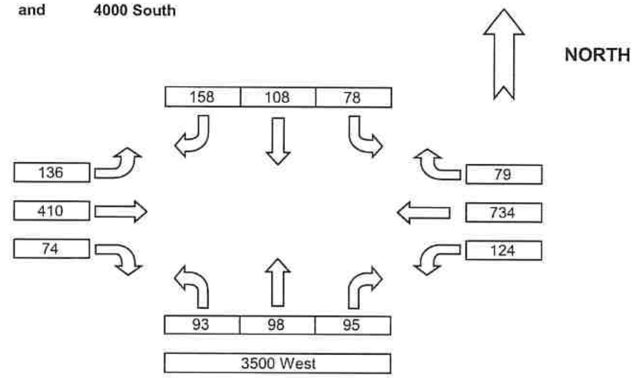
N-S STREET: **3500 West**
E-W STREET: **4000 South**

COUNT DATE: **April 26, 2023**
Day of the Week: **Wednesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 2,187 |
| PHF: | 0.92 |
| PEAK HOUR: FROM: 4:45 PM | TO: 5:45 PM |

4000 South




## PM Traffic

COUNT DATA INPUT: Name: Julie Name: Will Name: Willl Name: Julie

| TIME PERIOD | | NORTHBOUND | | | EASTBOUND | | | SOUTHBOUND | | | WESTBOUND | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 5 | 12 | 6 | 6 | 27 | 2 | 6 | 5 | 10 | 12 | 55 | 6 | 152 | 471 | 0 | 0 |
| 4:05 PM | 4:10 PM | 4 | 9 | 7 | 5 | 28 | 2 | 5 | 6 | 14 | 6 | 66 | 4 | 156 | 473 | 0 | 0 |
| 4:10 PM | 4:15 PM | 8 | 16 | 5 | 15 | 29 | 7 | 6 | 6 | 3 | 12 | 51 | 5 | 163 | 470 | 0 | 0 |
| 4:15 PM | 4:20 PM | 6 | 2 | 13 | 12 | 40 | 2 | 7 | 5 | 10 | 5 | 47 | 5 | 154 | 477 | 0 | 0 |
| 4:20 PM | 4:25 PM | 4 | 10 | 7 | 10 | 30 | 6 | 7 | 8 | 9 | 7 | 51 | 4 | 153 | 514 | 0 | 0 |
| 4:25 PM | 4:30 PM | 10 | 6 | 8 | 9 | 40 | 4 | 5 | 7 | 11 | 12 | 51 | 7 | 170 | 538 | 2 | 2 |
| 4:30 PM | 4:35 PM | 4 | 8 | 6 | 14 | 38 | 5 | 7 | 9 | 17 | 11 | 68 | 4 | 191 | 533 | 0 | 0 |
| 4:35 PM | 4:40 PM | 9 | 15 | 13 | 4 | 37 | 2 | 6 | 13 | 7 | 4 | 59 | 8 | 177 | 511 | 0 | 0 |
| 4:40 PM | 4:45 PM | 8 | 4 | 8 | 5 | 50 | 4 | 3 | 16 | 9 | 3 | 53 | 2 | 165 | 518 | 0 | 0 |
| 4:45 PM | 4:50 PM | 7 | 5 | 12 | 10 | 39 | 8 | 2 | 5 | 8 | 8 | 58 | 7 | 169 | 507 | 0 | 0 |
| 4:50 PM | 4:55 PM | 6 | 6 | 10 | 12 | 36 | 6 | 6 | 4 | 11 | 13 | 67 | 7 | 184 | 506 | 0 | 0 |
| 4:55 PM | 5:00 PM | 8 | 6 | 9 | 8 | 34 | 5 | 3 | 9 | 7 | 7 | 52 | 6 | 154 | 518 | 0 | 0 |
| 5:00 PM | 5:05 PM | 4 | 10 | 7 | 13 | 30 | 6 | 3 | 8 | 13 | 7 | 58 | 9 | 168 | 546 | 0 | 0 |
| 5:05 PM | 5:10 PM | 9 | 10 | 8 | 14 | 38 | 3 | 14 | 13 | 17 | 12 | 54 | 4 | 196 | 549 | 0 | 0 |
| 5:10 PM | 5:15 PM | 10 | 12 | 9 | 17 | 37 | 5 | 8 | 7 | 9 | 6 | 56 | 6 | 182 | 544 | 0 | 1 |
| 5:15 PM | 5:20 PM | 6 | 4 | 4 | 10 | 30 | 7 | 7 | 10 | 11 | 15 | 64 | 3 | 171 | 565 | 0 | 0 |
| 5:20 PM | 5:25 PM | 7 | 5 | 7 | 14 | 35 | 11 | 7 | 6 | 28 | 15 | 47 | 9 | 191 | 595 | 0 | 0 |
| 5:25 PM | 5:30 PM | 12 | 14 | 5 | 7 | 37 | 8 | 13 | 10 | 13 | 6 | 68 | 10 | 203 | 581 | 0 | 0 |
| 5:30 PM | 5:35 PM | 6 | 8 | 7 | 13 | 34 | 4 | 1 | 12 | 20 | 14 | 73 | 9 | 201 | 569 | 0 | 0 |
| 5:35 PM | 5:40 PM | 10 | 7 | 9 | 10 | 26 | 7 | 8 | 9 | 11 | 12 | 65 | 3 | 177 | 526 | 0 | 1 |
| 5:40 PM | 5:45 PM | 8 | 11 | 8 | 8 | 34 | 4 | 6 | 15 | 10 | 9 | 72 | 6 | 191 | 508 | 0 | 0 |
| 5:45 PM | 5:50 PM | 5 | 3 | 5 | 5 | 40 | 3 | 1 | 11 | 12 | 14 | 50 | 9 | 158 | 458 | 0 | 0 |
| 5:50 PM | 5:55 PM | 11 | 7 | 6 | 4 | 35 | 1 | 5 | 5 | 7 | 13 | 59 | 6 | 159 | 300 | 0 | 0 |
| 5:55 PM | 6:00 PM | 10 | 17 | 6 | 2 | 22 | 3 | 4 | 10 | 7 | 11 | 45 | 4 | 141 | 141 | 0 | 1 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **4700 West** **and** **3300 South**

Ped = 0

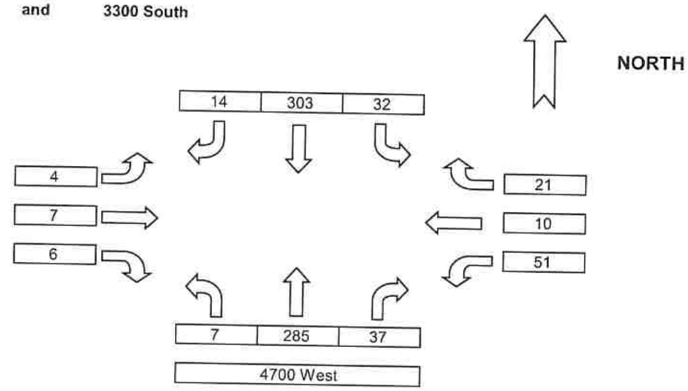
N-S STREET: **4700 West**
E-W STREET: **3300 South**

COUNT DATE: **April 25, 2023**
Day of the Week: **Tuesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 777 |
| PHF: | 0.82 |
| PEAK HOUR: | |
| FROM: 4:10 PM | TO: 5:10 PM |

3300 South




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | Name: Heather NORTHBOUND | | | Name: Heather EASTBOUND | | | Name: Heather SOUTHBOUND | | | Name: Heather WESTBOUND | | | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | | | E/W | N/S |
| 4:00 PM | 4:05 PM | 1 | 23 | 0 | 1 | 0 | 3 | 2 | 21 | 0 | 2 | 0 | 3 | 56 | 184 | 0 | 0 |
| 4:05 PM | 4:10 PM | 1 | 28 | 5 | 0 | 0 | 0 | 1 | 22 | 0 | 2 | 2 | 3 | 64 | 176 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 23 | 3 | 0 | 0 | 2 | 1 | 28 | 1 | 2 | 0 | 4 | 64 | 180 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 26 | 0 | 0 | 1 | 0 | 0 | 18 | 2 | 1 | 0 | 0 | 48 | 166 | 0 | 0 |
| 4:20 PM | 4:25 PM | 1 | 27 | 2 | 0 | 0 | 1 | 1 | 30 | 1 | 3 | 1 | 1 | 68 | 167 | 0 | 0 |
| 4:25 PM | 4:30 PM | 0 | 25 | 1 | 0 | 0 | 0 | 0 | 23 | 0 | 1 | 0 | 0 | 50 | 180 | 0 | 0 |
| 4:30 PM | 4:35 PM | 1 | 17 | 1 | 0 | 1 | 0 | 2 | 21 | 1 | 1 | 2 | 2 | 49 | 203 | 0 | 0 |
| 4:35 PM | 4:40 PM | 1 | 22 | 3 | 1 | 0 | 0 | 6 | 35 | 3 | 4 | 2 | 4 | 81 | 238 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 32 | 3 | 1 | 1 | 0 | 3 | 26 | 1 | 5 | 1 | 0 | 73 | 238 | 0 | 0 |
| 4:45 PM | 4:50 PM | 1 | 30 | 4 | 1 | 0 | 0 | 4 | 37 | 1 | 3 | 1 | 2 | 84 | 210 | 0 | 0 |
| 4:50 PM | 4:55 PM | 1 | 28 | 5 | 0 | 0 | 0 | 2 | 35 | 1 | 5 | 1 | 3 | 81 | 172 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 23 | 4 | 0 | 1 | 0 | 4 | 7 | 2 | 1 | 2 | 1 | 45 | 179 | 0 | 0 |
| 5:00 PM | 5:05 PM | 1 | 15 | 9 | 0 | 3 | 1 | 7 | 6 | 1 | 2 | 0 | 1 | 46 | 197 | 0 | 0 |
| 5:05 PM | 5:10 PM | 1 | 17 | 2 | 1 | 0 | 2 | 2 | 37 | 0 | 23 | 0 | 3 | 88 | 151 | 0 | 0 |
| 5:10 PM | 5:15 PM | 1 | 26 | 1 | 0 | 0 | 0 | 0 | 31 | 0 | 4 | 0 | 0 | 63 | 63 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 139 | 0 | 0 |
| 5:25 PM | 5:30 PM | 0 | 25 | 3 | 1 | 1 | 0 | 2 | 45 | 2 | 3 | 2 | 2 | 86 | 186 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 25 | 0 | 0 | 3 | 1 | 1 | 19 | 1 | 3 | 0 | 0 | 53 | 149 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 15 | 0 | 0 | 2 | 0 | 2 | 24 | 0 | 1 | 0 | 3 | 47 | 135 | 0 | 0 |
| 5:40 PM | 5:45 PM | 1 | 17 | 4 | 0 | 0 | 1 | 0 | 20 | 0 | 5 | 0 | 1 | 49 | 149 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 14 | 1 | 0 | 0 | 0 | 0 | 19 | 0 | 1 | 1 | 3 | 39 | 143 | 0 | 0 |
| 5:50 PM | 5:55 PM | 1 | 13 | 2 | 1 | 1 | 0 | 0 | 35 | 0 | 3 | 5 | 0 | 61 | 104 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 12 | 0 | 1 | 0 | 0 | 2 | 22 | 0 | 3 | 2 | 1 | 43 | 43 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **4700 West** **and** **4000 South**

Ped = 0

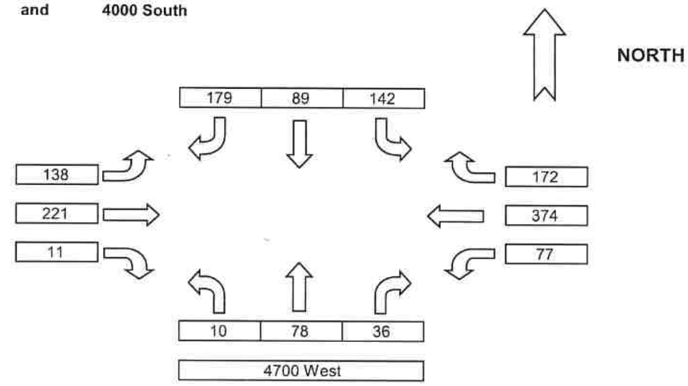
N-S STREET: **4700 West**
E-W STREET: **4000 South**

COUNT DATE: **April 24, 2023**
Day of the Week: **Monday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 1,527 |
| PHF: | 0.92 |
| PEAK HOUR: | |
| FROM: 4:40 PM | TO: 5:40 PM |

4000 South




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND (Name: Leisel) | | | EASTBOUND (Name: Leisel) | | | SOUTHBOUND (Name: Leisel) | | | WESTBOUND (Name: Leisel) | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 3 | 10 | 1 | 12 | 35 | 3 | 5 | 7 | 10 | 6 | 29 | 11 | 132 | 390 | 0 | 0 |
| 4:05 PM | 4:10 PM | 1 | 10 | 2 | 11 | 31 | 1 | 8 | 9 | 16 | 8 | 24 | 12 | 133 | 391 | 0 | 0 |
| 4:10 PM | 4:15 PM | 2 | 10 | 2 | 13 | 17 | 1 | 9 | 9 | 14 | 2 | 32 | 14 | 125 | 368 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 8 | 3 | 9 | 26 | 2 | 15 | 11 | 14 | 3 | 25 | 17 | 133 | 365 | 0 | 0 |
| 4:20 PM | 4:25 PM | 1 | 5 | 6 | 15 | 19 | 0 | 9 | 3 | 11 | 6 | 17 | 18 | 110 | 335 | 0 | 0 |
| 4:25 PM | 4:30 PM | 1 | 6 | 1 | 7 | 21 | 1 | 15 | 5 | 10 | 4 | 32 | 19 | 122 | 323 | 0 | 0 |
| 4:30 PM | 4:35 PM | 1 | 4 | 2 | 12 | 16 | 0 | 5 | 4 | 12 | 7 | 25 | 15 | 103 | 331 | 1 | 1 |
| 4:35 PM | 4:40 PM | 1 | 4 | 2 | 19 | 17 | 0 | 9 | 5 | 13 | 4 | 18 | 6 | 98 | 358 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 6 | 7 | 13 | 21 | 0 | 11 | 12 | 12 | 2 | 28 | 18 | 130 | 395 | 0 | 0 |
| 4:45 PM | 4:50 PM | 1 | 4 | 3 | 15 | 19 | 1 | 14 | 5 | 19 | 7 | 29 | 13 | 130 | 363 | 0 | 0 |
| 4:50 PM | 4:55 PM | 2 | 7 | 0 | 18 | 17 | 1 | 10 | 9 | 17 | 6 | 39 | 9 | 135 | 377 | 0 | 0 |
| 4:55 PM | 5:00 PM | 4 | 4 | 3 | 8 | 15 | 0 | 7 | 5 | 11 | 3 | 28 | 10 | 98 | 371 | 0 | 0 |
| 5:00 PM | 5:05 PM | 1 | 9 | 5 | 15 | 20 | 0 | 19 | 5 | 10 | 11 | 24 | 25 | 144 | 410 | 0 | 0 |
| 5:05 PM | 5:10 PM | 0 | 10 | 2 | 8 | 19 | 1 | 15 | 9 | 16 | 4 | 31 | 14 | 129 | 396 | 0 | 0 |
| 5:10 PM | 5:15 PM | 2 | 4 | 4 | 9 | 12 | 0 | 11 | 6 | 20 | 9 | 38 | 22 | 137 | 414 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 10 | 2 | 11 | 14 | 3 | 13 | 13 | 11 | 7 | 29 | 17 | 130 | 380 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 7 | 3 | 10 | 30 | 3 | 15 | 6 | 17 | 9 | 38 | 9 | 147 | 389 | 0 | 0 |
| 5:25 PM | 5:30 PM | 0 | 4 | 3 | 10 | 13 | 1 | 14 | 9 | 17 | 6 | 22 | 4 | 103 | 347 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 9 | 2 | 14 | 23 | 0 | 8 | 6 | 12 | 6 | 38 | 21 | 139 | 373 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 4 | 2 | 7 | 18 | 1 | 5 | 4 | 17 | 7 | 30 | 10 | 105 | 347 | 0 | 0 |
| 5:40 PM | 5:45 PM | 0 | 3 | 2 | 11 | 23 | 0 | 13 | 7 | 11 | 8 | 33 | 18 | 129 | 355 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 6 | 2 | 8 | 20 | 1 | 4 | 8 | 12 | 7 | 31 | 14 | 113 | 326 | 0 | 0 |
| 5:50 PM | 5:55 PM | 1 | 1 | 4 | 3 | 10 | 0 | 11 | 14 | 20 | 3 | 31 | 15 | 113 | 213 | 0 | 0 |
| 5:55 PM | 6:00 PM | 1 | 6 | 1 | 8 | 15 | 0 | 10 | 8 | 14 | 5 | 19 | 13 | 100 | 100 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **Midland Drive** **and** **2900 West**

Ped = 2

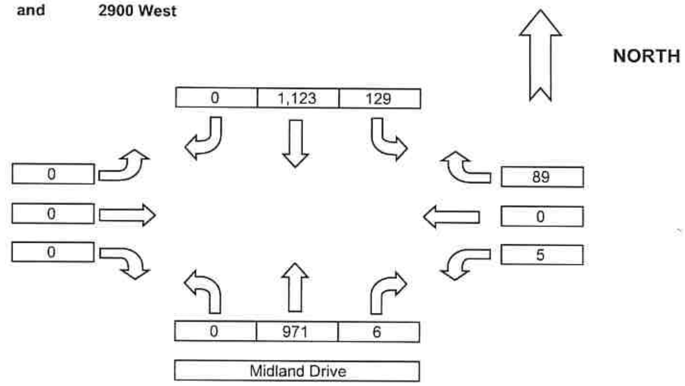
N-S STREET: **Midland Drive**
E-W STREET: **2900 West**

COUNT DATE: **April 26, 2023**
Day of the Week: **Wednesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 2,323 |
| PHF: | 0.91 |
| PEAK HOUR: | |
| FROM: 4:45 PM | TO: 5:45 PM |

2900 West




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN E/W | PEDESTRIAN N/S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name: Heather (NORTHBOUND) | | | Name: Heather (EASTBOUND) | | | Name: Heather (SOUTHBOUND) | | | Name: Heather (WESTBOUND) | | | | | | |
| 4:00 PM | 4:05 PM | 1 | 66 | 2 | 0 | 0 | 0 | 4 | 60 | 0 | 0 | 0 | 6 | 139 | 540 | 0 | 0 |
| 4:05 PM | 4:10 PM | 0 | 84 | 0 | 0 | 0 | 0 | 3 | 102 | 0 | 0 | 0 | 6 | 195 | 584 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 99 | 1 | 0 | 0 | 0 | 11 | 82 | 0 | 0 | 0 | 13 | 206 | 560 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 60 | 2 | 0 | 0 | 0 | 11 | 101 | 0 | 0 | 0 | 9 | 183 | 576 | 0 | 0 |
| 4:20 PM | 4:25 PM | 0 | 64 | 0 | 0 | 0 | 0 | 12 | 85 | 0 | 3 | 0 | 7 | 171 | 581 | 0 | 0 |
| 4:25 PM | 4:30 PM | 0 | 78 | 2 | 0 | 0 | 0 | 14 | 120 | 0 | 1 | 0 | 7 | 222 | 600 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 82 | 2 | 0 | 0 | 0 | 7 | 89 | 0 | 0 | 0 | 8 | 188 | 559 | 0 | 1 |
| 4:35 PM | 4:40 PM | 0 | 82 | 4 | 0 | 0 | 0 | 9 | 90 | 0 | 0 | 0 | 5 | 190 | 580 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 61 | 1 | 0 | 0 | 0 | 9 | 103 | 0 | 0 | 0 | 7 | 181 | 559 | 0 | 0 |
| 4:45 PM | 4:50 PM | 0 | 90 | 1 | 0 | 0 | 0 | 11 | 88 | 0 | 0 | 0 | 19 | 209 | 568 | 0 | 0 |
| 4:50 PM | 4:55 PM | 0 | 62 | 0 | 0 | 0 | 0 | 6 | 93 | 0 | 0 | 0 | 8 | 169 | 533 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 94 | 0 | 0 | 0 | 0 | 8 | 77 | 0 | 2 | 0 | 9 | 190 | 534 | 0 | 0 |
| 5:00 PM | 5:05 PM | 0 | 79 | 1 | 0 | 0 | 0 | 10 | 76 | 0 | 0 | 0 | 8 | 174 | 542 | 0 | 0 |
| 5:05 PM | 5:10 PM | 0 | 71 | 1 | 0 | 0 | 0 | 11 | 86 | 0 | 0 | 0 | 1 | 170 | 548 | 0 | 0 |
| 5:10 PM | 5:15 PM | 0 | 86 | 0 | 0 | 0 | 0 | 13 | 92 | 0 | 0 | 0 | 7 | 198 | 589 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 75 | 0 | 0 | 0 | 0 | 18 | 81 | 0 | 1 | 0 | 5 | 180 | 604 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 83 | 0 | 0 | 0 | 0 | 12 | 113 | 0 | 0 | 0 | 3 | 211 | 638 | 0 | 0 |
| 5:25 PM | 5:30 PM | 0 | 89 | 2 | 0 | 0 | 0 | 10 | 102 | 0 | 0 | 0 | 10 | 213 | 600 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 78 | 0 | 0 | 0 | 0 | 10 | 119 | 0 | 1 | 0 | 6 | 214 | 609 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 79 | 0 | 0 | 0 | 0 | 9 | 80 | 0 | 1 | 0 | 4 | 173 | 567 | 0 | 0 |
| 5:40 PM | 5:45 PM | 0 | 85 | 1 | 0 | 0 | 0 | 11 | 116 | 0 | 0 | 0 | 9 | 222 | 590 | 0 | 2 |
| 5:45 PM | 5:50 PM | 0 | 71 | 0 | 0 | 0 | 0 | 5 | 88 | 0 | 1 | 0 | 7 | 172 | 557 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 75 | 0 | 0 | 0 | 0 | 8 | 102 | 0 | 1 | 0 | 10 | 196 | 385 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 75 | 6 | 0 | 0 | 0 | 9 | 85 | 0 | 0 | 0 | 14 | 189 | 189 | 0 | 0 |

# PM PEAK HOUR VOLUMES

Ped = 6

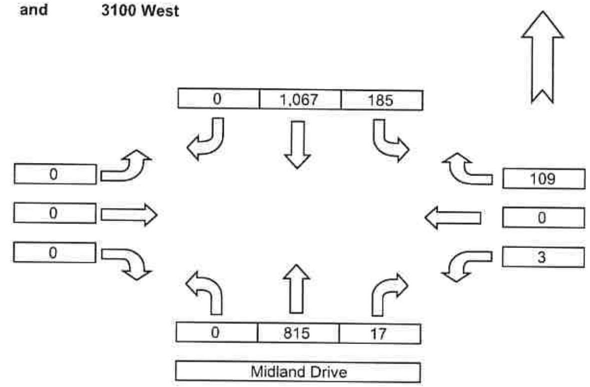
**INTERSECTION:** **Midland Drive** **and** **3100 West**

N-S STREET: **Midland Drive**
E-W STREET: **3100 West**

COUNT DATE: **May 1, 2023**
Day of the Week: **Monday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

PK HR VOLUME: 2,196
PHF: 0.94
PEAK HOUR:
FROM: 4:45 PM TO: 5:45 PM




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND (Name: Heather) | | | EASTBOUND (Name: Heather) | | | SOUTHBOUND (Name: Heather) | | | WESTBOUND (Name: Heather) | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 0 | 47 | 2 | 0 | 0 | 0 | 17 | 59 | 0 | 0 | 0 | 9 | 134 | 477 | 0 | 0 |
| 4:05 PM | 4:10 PM | 0 | 68 | 3 | 0 | 0 | 0 | 11 | 83 | 0 | 1 | 0 | 9 | 175 | 523 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 58 | 0 | 0 | 0 | 0 | 16 | 82 | 0 | 0 | 0 | 12 | 168 | 505 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 70 | 0 | 0 | 0 | 0 | 16 | 84 | 0 | 0 | 0 | 10 | 180 | 545 | 0 | 1 |
| 4:20 PM | 4:25 PM | 0 | 74 | 1 | 0 | 0 | 0 | 15 | 62 | 0 | 0 | 0 | 5 | 157 | 530 | 0 | 0 |
| 4:25 PM | 4:30 PM | 0 | 72 | 0 | 0 | 0 | 0 | 22 | 99 | 0 | 1 | 0 | 14 | 208 | 579 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 65 | 5 | 0 | 0 | 0 | 15 | 73 | 0 | 1 | 0 | 6 | 165 | 534 | 0 | 0 |
| 4:35 PM | 4:40 PM | 0 | 87 | 4 | 0 | 0 | 0 | 17 | 85 | 0 | 0 | 0 | 13 | 206 | 574 | 0 | 1 |
| 4:40 PM | 4:45 PM | 0 | 62 | 4 | 0 | 0 | 0 | 18 | 64 | 0 | 1 | 0 | 14 | 163 | 551 | 0 | 0 |
| 4:45 PM | 4:50 PM | 0 | 73 | 1 | 0 | 0 | 0 | 19 | 104 | 0 | 0 | 0 | 8 | 205 | 573 | 0 | 0 |
| 4:50 PM | 4:55 PM | 0 | 84 | 0 | 0 | 0 | 0 | 17 | 75 | 0 | 0 | 0 | 7 | 183 | 496 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 65 | 3 | 0 | 0 | 0 | 15 | 98 | 0 | 0 | 0 | 4 | 185 | 485 | 0 | 2 |
| 5:00 PM | 5:05 PM | 0 | 55 | 2 | 0 | 0 | 0 | 7 | 57 | 0 | 1 | 0 | 6 | 128 | 482 | 0 | 1 |
| 5:05 PM | 5:10 PM | 0 | 67 | 1 | 0 | 0 | 0 | 16 | 81 | 0 | 0 | 0 | 7 | 172 | 556 | 0 | 0 |
| 5:10 PM | 5:15 PM | 0 | 63 | 1 | 0 | 0 | 0 | 16 | 92 | 0 | 0 | 0 | 10 | 182 | 554 | 0 | 1 |
| 5:15 PM | 5:20 PM | 0 | 75 | 1 | 0 | 0 | 0 | 22 | 94 | 0 | 0 | 0 | 10 | 202 | 583 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 73 | 1 | 0 | 0 | 0 | 11 | 75 | 0 | 2 | 0 | 8 | 170 | 549 | 0 | 1 |
| 5:25 PM | 5:30 PM | 0 | 69 | 0 | 0 | 0 | 0 | 19 | 113 | 0 | 0 | 0 | 10 | 211 | 573 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 61 | 2 | 0 | 0 | 0 | 17 | 80 | 0 | 0 | 0 | 8 | 168 | 558 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 57 | 2 | 0 | 0 | 0 | 14 | 109 | 0 | 0 | 0 | 12 | 194 | 526 | 0 | 1 |
| 5:40 PM | 5:45 PM | 0 | 73 | 3 | 0 | 0 | 0 | 12 | 89 | 0 | 0 | 0 | 19 | 196 | 514 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 49 | 1 | 0 | 0 | 0 | 10 | 64 | 0 | 0 | 0 | 12 | 136 | 502 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 75 | 4 | 0 | 0 | 0 | 13 | 80 | 0 | 0 | 0 | 10 | 182 | 366 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 80 | 3 | 0 | 0 | 0 | 11 | 78 | 0 | 0 | 0 | 12 | 184 | 184 | 0 | 0 |

Data from UDOT's Signal Performance Metrics

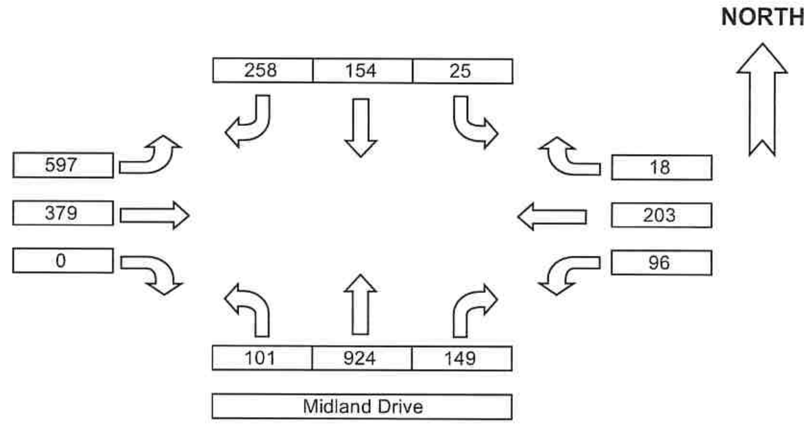
N-S STREET: **Midland Drive**
E-W STREET: **4000 South**

Date **11-Apr-23**

Intersection
5144

| PK HR VOLUME: | 2,904 |
|---|---|
| PHF: | 0.82 |

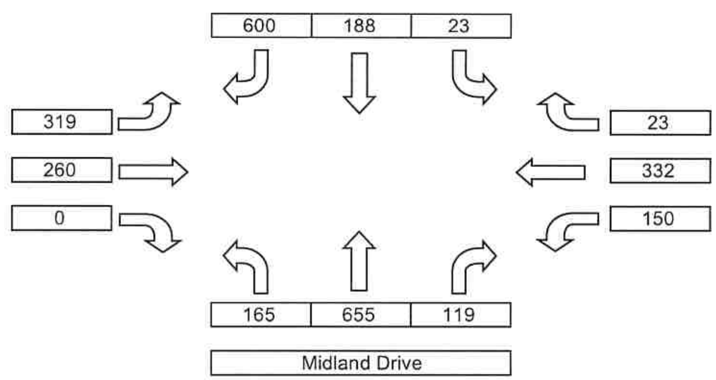
4000 South




| AM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 597 | 379 | | 96 | 203 | 18 | 101 | 924 | 149 | 25 | 154 | 258 |
| PHF | 0.86 | 0.86 | | 0.8 | 0.82 | 0.56 | 0.9 | 0.93 | 0.79 | 0.78 | 0.86 | 0.84 |

| PK HR VOLUME: | 2,834 |
|---|---|
| PHF: | 0.83 |

4000 South




| PM | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHV | 319 | 260 | | 150 | 332 | 23 | 165 | 655 | 119 | 23 | 188 | 600 |
| PHF | 0.91 | 0.87 | | 0.87 | 0.92 | 0.48 | 0.86 | 0.92 | 0.83 | 0.72 | 0.9 | 0.88 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **Midland Drive** **and** **4275 South**

Ped = 2

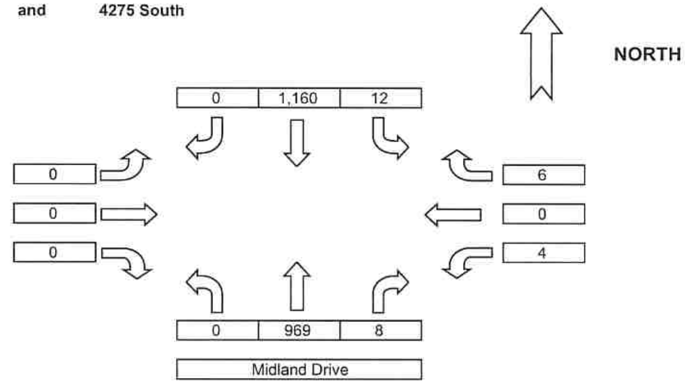
N-S STREET: **Midland Drive**
E-W STREET: **4275 South**

COUNT DATE: **April 27, 2023**
Day of the Week: **Thursday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 2,159 |
| PHF: | 0.90 |
| PEAK HOUR: | |
| FROM: 4:35 PM | TO: 5:35 PM |

4275 South




## PM Traffic

COUNT DATA INPUT: Name: Heather Name: Heather Name: Heather Name: Heather

| TIME PERIOD | | NORTHBOUND | | | EASTBOUND | | | SOUTHBOUND | | | WESTBOUND | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 138 | 479 | 0 | 1 |
| 4:05 PM | 4:10 PM | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 0 | 0 | 0 | 203 | 524 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 67 | 1 | 0 | 0 | 0 | 1 | 69 | 0 | 0 | 0 | 0 | 138 | 485 | 0 | 1 |
| 4:15 PM | 4:20 PM | 1 | 73 | 0 | 0 | 0 | 0 | 1 | 108 | 0 | 0 | 0 | 0 | 183 | 526 | 0 | 0 |
| 4:20 PM | 4:25 PM | 0 | 66 | 1 | 0 | 0 | 0 | 1 | 96 | 0 | 0 | 0 | 0 | 164 | 474 | 0 | 2 |
| 4:25 PM | 4:30 PM | 0 | 80 | 0 | 0 | 0 | 0 | 1 | 98 | 0 | 0 | 0 | 0 | 179 | 474 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 67 | 0 | 0 | 0 | 0 | 2 | 61 | 0 | 0 | 0 | 1 | 131 | 449 | 0 | 0 |
| 4:35 PM | 4:40 PM | 0 | 76 | 0 | 0 | 0 | 0 | 0 | 88 | 0 | 0 | 0 | 0 | 164 | 500 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 73 | 0 | 0 | 0 | 0 | 0 | 81 | 0 | 0 | 0 | 0 | 154 | 519 | 0 | 0 |
| 4:45 PM | 4:50 PM | 0 | 72 | 0 | 0 | 0 | 0 | 1 | 109 | 0 | 0 | 0 | 0 | 182 | 534 | 0 | 0 |
| 4:50 PM | 4:55 PM | 0 | 85 | 0 | 0 | 0 | 0 | 3 | 95 | 0 | 0 | 0 | 0 | 183 | 507 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 76 | 0 | 0 | 0 | 0 | 1 | 92 | 0 | 0 | 0 | 0 | 169 | 508 | 0 | 1 |
| 5:00 PM | 5:05 PM | 0 | 70 | 1 | 0 | 0 | 0 | 0 | 84 | 0 | 0 | 0 | 0 | 155 | 511 | 0 | 0 |
| 5:05 PM | 5:10 PM | 0 | 90 | 1 | 0 | 0 | 0 | 2 | 88 | 0 | 2 | 0 | 1 | 184 | 555 | 0 | 0 |
| 5:10 PM | 5:15 PM | 0 | 72 | 0 | 0 | 0 | 0 | 3 | 96 | 0 | 1 | 0 | 0 | 172 | 576 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 94 | 0 | 0 | 0 | 0 | 0 | 105 | 0 | 0 | 0 | 0 | 199 | 594 | 0 | 1 |
| 5:20 PM | 5:25 PM | 0 | 95 | 3 | 0 | 0 | 0 | 1 | 106 | 0 | 0 | 0 | 0 | 205 | 597 | 0 | 0 |
| 5:25 PM | 5:30 PM | 0 | 84 | 1 | 0 | 0 | 0 | 1 | 101 | 0 | 1 | 0 | 2 | 190 | 554 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 82 | 2 | 0 | 0 | 0 | 0 | 115 | 0 | 0 | 0 | 3 | 202 | 516 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 162 | 485 | 0 | 0 |
| 5:40 PM | 5:45 PM | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 89 | 0 | 0 | 0 | 0 | 152 | 502 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 94 | 1 | 0 | 0 | 0 | 0 | 73 | 0 | 2 | 0 | 1 | 171 | 501 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 73 | 0 | 0 | 0 | 0 | 0 | 106 | 0 | 0 | 0 | 0 | 179 | 330 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 151 | 151 | 0 | 0 |

# PM PEAK HOUR VOLUMES

Ped =5

**INTERSECTION:** **Midland Drive** **and** **Hinkley Drive**

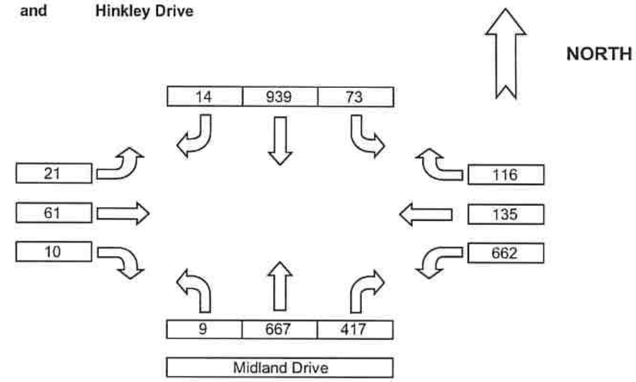
N-S STREET: **Midland Drive**
E-W STREET: **Hinkley Drive**

COUNT DATE: **April 19, 2023**
Day of the Week: **Wednesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 3,124 |
| PHF: | 0.96 |
| PEAK HOUR: | |
| FROM: 4:45 PM | TO: 5:45 PM |

Hinkley Drive




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND | | | EASTBOUND | | | SOUTHBOUND | | | WESTBOUND | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name: Julie | | | Name: Julie | | | Name: Leisel | | | Name: Leisel | | | | | | |
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 0 | 47 | 39 | 0 | 0 | 0 | 9 | 64 | 4 | 66 | 14 | 4 | 247 | 671 | 0 | 0 |
| 4:05 PM | 4:10 PM | 1 | 39 | 25 | 0 | 4 | 0 | 8 | 47 | 0 | 53 | 20 | 6 | 203 | 586 | 0 | 0 |
| 4:10 PM | 4:15 PM | 0 | 34 | 32 | 0 | 4 | 0 | 4 | 87 | 2 | 44 | 5 | 9 | 221 | 651 | 0 | 0 |
| 4:15 PM | 4:20 PM | 0 | 48 | 20 | 3 | 8 | 0 | 3 | 24 | 2 | 33 | 16 | 5 | 162 | 685 | 0 | 0 |
| 4:20 PM | 4:25 PM | 0 | 61 | 32 | 1 | 3 | 1 | 1 | 78 | 0 | 73 | 8 | 10 | 268 | 768 | 0 | 0 |
| 4:25 PM | 4:30 PM | 1 | 65 | 32 | 0 | 3 | 1 | 8 | 59 | 2 | 60 | 17 | 7 | 255 | 710 | 0 | 0 |
| 4:30 PM | 4:35 PM | 0 | 44 | 19 | 0 | 3 | 2 | 5 | 84 | 1 | 66 | 9 | 12 | 245 | 681 | 0 | 0 |
| 4:35 PM | 4:40 PM | 3 | 69 | 21 | 0 | 4 | 1 | 3 | 55 | 3 | 39 | 6 | 6 | 210 | 705 | 0 | 0 |
| 4:40 PM | 4:45 PM | 0 | 47 | 37 | 2 | 4 | 1 | 5 | 66 | 0 | 51 | 8 | 5 | 226 | 749 | 0 | 0 |
| 4:45 PM | 4:50 PM | 1 | 60 | 49 | 0 | 5 | 1 | 12 | 75 | 0 | 46 | 7 | 13 | 269 | 772 | 0 | 0 |
| 4:50 PM | 4:55 PM | 0 | 45 | 31 | 2 | 2 | 0 | 5 | 77 | 3 | 68 | 13 | 8 | 254 | 791 | 0 | 0 |
| 4:55 PM | 5:00 PM | 0 | 58 | 30 | 4 | 12 | 0 | 4 | 70 | 1 | 53 | 11 | 6 | 249 | 778 | 0 | 0 |
| 5:00 PM | 5:05 PM | 0 | 80 | 49 | 2 | 7 | 5 | 5 | 86 | 3 | 34 | 6 | 11 | 288 | 800 | 0 | 0 |
| 5:05 PM | 5:10 PM | 0 | 54 | 30 | 2 | 5 | 0 | 9 | 64 | 1 | 53 | 14 | 9 | 241 | 743 | 0 | 0 |
| 5:10 PM | 5:15 PM | 0 | 44 | 33 | 1 | 4 | 0 | 5 | 90 | 1 | 76 | 9 | 8 | 271 | 762 | 0 | 0 |
| 5:15 PM | 5:20 PM | 2 | 43 | 26 | 0 | 8 | 1 | 11 | 83 | 0 | 42 | 9 | 6 | 231 | 787 | 0 | 1 |
| 5:20 PM | 5:25 PM | 2 | 43 | 31 | 0 | 3 | 1 | 6 | 87 | 1 | 68 | 8 | 10 | 260 | 812 | 1 | 0 |
| 5:25 PM | 5:30 PM | 1 | 84 | 40 | 2 | 4 | 1 | 3 | 72 | 1 | 62 | 14 | 12 | 296 | 806 | 0 | 0 |
| 5:30 PM | 5:35 PM | 1 | 53 | 27 | 3 | 3 | 0 | 3 | 89 | 0 | 59 | 7 | 11 | 256 | 765 | 1 | 0 |
| 5:35 PM | 5:40 PM | 1 | 48 | 37 | 5 | 3 | 1 | 4 | 75 | 1 | 48 | 22 | 9 | 254 | 775 | 0 | 0 |
| 5:40 PM | 5:45 PM | 1 | 55 | 34 | 0 | 5 | 0 | 6 | 71 | 2 | 53 | 15 | 13 | 255 | 761 | 1 | 1 |
| 5:45 PM | 5:50 PM | 1 | 73 | 28 | 1 | 10 | 1 | 4 | 90 | 2 | 34 | 5 | 17 | 266 | 748 | 0 | 0 |
| 5:50 PM | 5:55 PM | 1 | 48 | 21 | 0 | 2 | 0 | 5 | 77 | 1 | 62 | 16 | 7 | 240 | 482 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 63 | 29 | 0 | 5 | 1 | 4 | 53 | 0 | 66 | 13 | 8 | 242 | 242 | 0 | 0 |

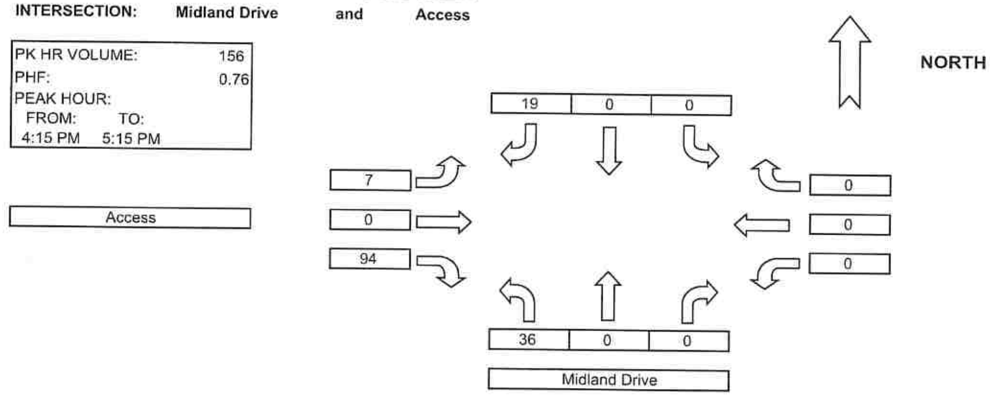
# PM PEAK HOUR VOLUMES

**INTERSECTION:** **Midland Drive** **and** **Access**

Ped = 0

| | |
|---|---|
| N-S STREET: | **Midland Drive** |
| E-W STREET: | **Access** |
| COUNT DATE: | **November 17, 2023** |
| Day of the Week: | **Thursday** |
| NOTES: | |
| COUNT TIME: | |
| FROM: | **4:15 PM** |
| TO: | **5:15 PM** |

| | |
|---|---|
| PK HR VOLUME: | 156 |
| PHF: | 0.76 |
| PEAK HOUR: | |
| FROM: 4:15 PM | TO: 5:15 PM |




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD FROM: | TO: | NORTHBOUND (Name: Leisel) NBL | NBT | NBR | EASTBOUND (Name: Leisel) EBL | EBT | EBR | SOUTHBOUND (Name: Leisel) SBL | SBT | SBR | WESTBOUND (Name: Leisel) WBL | WBT | WBR | TOTAL 5' VOLUMES | TOTAL 15' VOLUMES | PEDESTRIAN E/W | N/S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4:15 PM | 4:20 PM | 4 | 0 | 0 | 2 | 0 | 8 | 0 | 0 | 4 | 0 | 0 | 0 | 18 | 44 | 0 | 0 |
| 4:20 PM | 4:25 PM | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 15 | 50 | 0 | 0 |
| 4:25 PM | 4:30 PM | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 0 | 11 | 51 | 0 | 0 |
| 4:30 PM | 4:35 PM | 2 | 0 | 0 | 2 | 0 | 17 | 0 | 0 | 3 | 0 | 0 | 0 | 24 | 47 | 0 | 0 |
| 4:35 PM | 4:40 PM | 4 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 2 | 0 | 0 | 0 | 16 | 33 | 0 | 0 |
| 4:40 PM | 4:45 PM | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 35 | 0 | 0 |
| 4:45 PM | 4:50 PM | 2 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 10 | 35 | 0 | 0 |
| 4:50 PM | 4:55 PM | 6 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 30 | 0 | 0 |
| 4:55 PM | 5:00 PM | 1 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 7 | 24 | 0 | 0 |
| 5:00 PM | 5:05 PM | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 5 | 30 | 0 | 0 |
| 5:05 PM | 5:10 PM | 3 | 0 | 0 | 2 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 12 | 25 | 0 | 0 |
| 5:10 PM | 5:15 PM | 1 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 |
| 5:15 PM | 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 5:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 5:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 6:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:00 PM | 6:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:05 PM | 6:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:10 PM | 6:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# PM PEAK HOUR VOLUMES

**INTERSECTION:** **Midland Drive** **and** **4600 South**

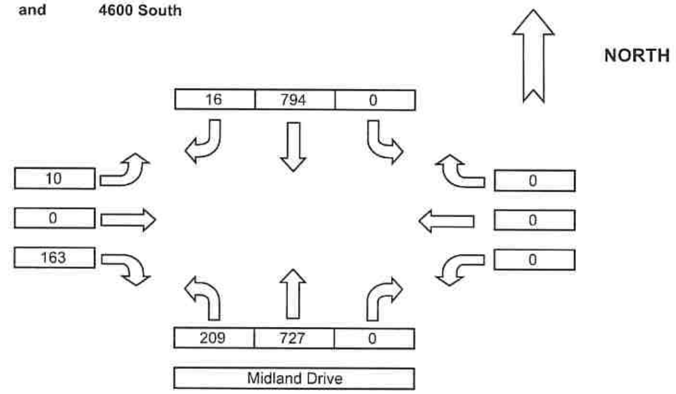
Ped = 0

N-S STREET: **Midland Drive**
E-W STREET: **4600 South**

COUNT DATE: **November 15, 2023**
Day of the Week: **Wednesday**
NOTES:

COUNT TIME:
FROM: **4:00 PM**
TO: **6:00 PM**

| | |
|---|---|
| PK HR VOLUME: | 1,919 |
| PHF: | 0.96 |
| PEAK HOUR: | |
| FROM: 4:05 PM | TO: 5:05 PM |




## PM Traffic

COUNT DATA INPUT:

| TIME PERIOD | | NORTHBOUND | | | EASTBOUND | | | SOUTHBOUND | | | WESTBOUND | | | TOTAL 5' | TOTAL 15' | PEDESTRIAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name: Leisel | | | Name: Leisel | | | Name: Leisel | | | Name: Leisel | | | | | | |
| FROM: | TO: | NBL | NBT | NBR | EBL | EBT | EBR | SBL | SBT | SBR | WBL | WBT | WBR | VOLUMES | VOLUMES | E/W | N/S |
| 4:00 PM | 4:05 PM | 17 | 55 | 0 | 0 | 0 | 14 | 0 | 61 | 0 | 0 | 0 | 0 | 147 | 445 | 0 | 0 |
| 4:05 PM | 4:10 PM | 13 | 53 | 0 | 0 | 0 | 23 | 0 | 50 | 0 | 0 | 0 | 0 | 139 | 462 | 0 | 0 |
| 4:10 PM | 4:15 PM | 16 | 61 | 0 | 0 | 0 | 13 | 0 | 68 | 1 | 0 | 0 | 0 | 159 | 485 | 0 | 0 |
| 4:15 PM | 4:20 PM | 21 | 60 | 0 | 0 | 0 | 6 | 0 | 74 | 3 | 0 | 0 | 0 | 164 | 482 | 0 | 0 |
| 4:20 PM | 4:25 PM | 21 | 59 | 0 | 2 | 0 | 9 | 0 | 69 | 2 | 0 | 0 | 0 | 162 | 481 | 0 | 0 |
| 4:25 PM | 4:30 PM | 19 | 53 | 0 | 0 | 0 | 19 | 0 | 63 | 2 | 0 | 0 | 0 | 156 | 483 | 0 | 0 |
| 4:30 PM | 4:35 PM | 17 | 59 | 0 | 1 | 0 | 10 | 0 | 76 | 0 | 0 | 0 | 0 | 163 | 495 | 0 | 0 |
| 4:35 PM | 4:40 PM | 18 | 63 | 0 | 1 | 0 | 18 | 0 | 63 | 1 | 0 | 0 | 0 | 164 | 502 | 0 | 0 |
| 4:40 PM | 4:45 PM | 18 | 75 | 0 | 0 | 0 | 8 | 0 | 67 | 0 | 0 | 0 | 0 | 168 | 499 | 0 | 0 |
| 4:45 PM | 4:50 PM | 27 | 62 | 0 | 3 | 0 | 15 | 0 | 61 | 2 | 0 | 0 | 0 | 170 | 483 | 0 | 0 |
| 4:50 PM | 4:55 PM | 9 | 67 | 0 | 1 | 0 | 14 | 0 | 68 | 2 | 0 | 0 | 0 | 161 | 474 | 0 | 0 |
| 4:55 PM | 5:00 PM | 15 | 60 | 0 | 0 | 0 | 11 | 0 | 64 | 2 | 0 | 0 | 0 | 152 | 451 | 0 | 0 |
| 5:00 PM | 5:05 PM | 15 | 55 | 0 | 2 | 0 | 17 | 0 | 71 | 1 | 0 | 0 | 0 | 161 | 445 | 0 | 0 |
| 5:05 PM | 5:10 PM | 18 | 46 | 0 | 1 | 0 | 14 | 0 | 58 | 1 | 0 | 0 | 0 | 138 | 431 | 0 | 0 |
| 5:10 PM | 5:15 PM | 14 | 67 | 0 | 0 | 0 | 17 | 0 | 48 | 0 | 0 | 0 | 0 | 146 | 459 | 0 | 0 |
| 5:15 PM | 5:20 PM | 18 | 53 | 0 | 0 | 0 | 6 | 0 | 70 | 0 | 0 | 0 | 0 | 147 | 460 | 0 | 0 |
| 5:20 PM | 5:25 PM | 20 | 48 | 0 | 1 | 0 | 14 | 0 | 80 | 3 | 0 | 0 | 0 | 166 | 453 | 0 | 0 |
| 5:25 PM | 5:30 PM | 9 | 67 | 0 | 0 | 0 | 11 | 0 | 59 | 1 | 0 | 0 | 0 | 147 | 438 | 0 | 0 |
| 5:30 PM | 5:35 PM | 10 | 55 | 0 | 0 | 0 | 10 | 0 | 65 | 0 | 0 | 0 | 0 | 140 | 436 | 0 | 0 |
| 5:35 PM | 5:40 PM | 18 | 53 | 0 | 1 | 0 | 16 | 0 | 62 | 1 | 0 | 0 | 0 | 151 | 465 | 0 | 0 |
| 5:40 PM | 5:45 PM | 17 | 45 | 0 | 0 | 0 | 20 | 0 | 61 | 2 | 0 | 0 | 0 | 145 | 489 | 0 | 0 |
| 5:45 PM | 5:50 PM | 17 | 57 | 0 | 0 | 0 | 10 | 0 | 84 | 1 | 0 | 0 | 0 | 169 | 492 | 0 | 0 |
| 5:50 PM | 5:55 PM | 25 | 61 | 0 | 5 | 0 | 15 | 0 | 68 | 1 | 0 | 0 | 0 | 175 | 323 | 0 | 0 |
| 5:55 PM | 6:00 PM | 11 | 57 | 0 | 1 | 0 | 7 | 0 | 67 | 5 | 0 | 0 | 0 | 148 | 148 | 0 | 0 |

# Appendix B Intersection Analyses

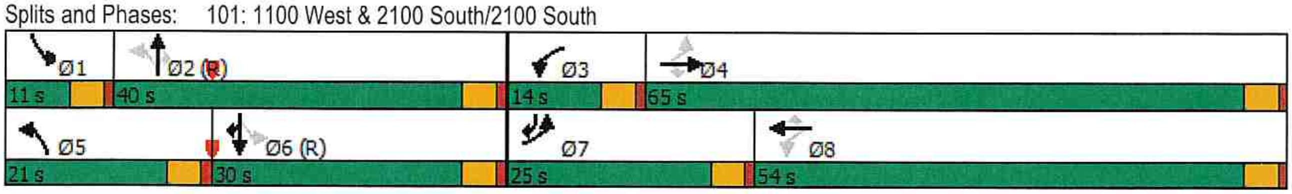
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑↑ | ↱ | ↰ | ↑↑ | ↱ | ↰ | ↑ | ↱ | ↰ | ↑ | ↱ |
| Traffic Volume (vph) | 158 | 361 | 65 | 110 | 693 | 51 | 146 | 31 | 124 | 46 | 24 | 166 |
| Future Volume (vph) | 158 | 361 | 65 | 110 | 693 | 51 | 146 | 31 | 124 | 46 | 24 | 166 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 300 | | 0 | 250 | | 250 | 100 | | 100 | 100 | | 100 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.124 | | | 0.517 | | | 0.677 | | | 0.735 | | |
| Satd. Flow (perm) | 231 | 3539 | 1583 | 963 | 3539 | 1583 | 1261 | 1863 | 1583 | 1369 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 126 | | | 164 | | | 135 | | | 169 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1051 | | | 1951 | | | 963 | | | 975 | |
| Travel Time (s) | | 23.9 | | | 44.3 | | | 21.9 | | | 22.2 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 172 | 392 | 71 | 120 | 753 | 55 | 159 | 34 | 135 | 50 | 26 | 180 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 172 | 392 | 71 | 120 | 753 | 55 | 159 | 34 | 135 | 50 | 26 | 180 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | Perm | pm+pt | NA | pt+ov |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | 6 7 |
| Permitted Phases | 4 | | 4 | 8 | | 8 | 2 | | 2 | 6 | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 7 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | |
| Total Split (s) | 25.0 | 65.0 | 65.0 | 14.0 | 54.0 | 54.0 | 21.0 | 40.0 | 40.0 | 11.0 | 30.0 | |
| Total Split (%) | 19.2% | 50.0% | 50.0% | 10.8% | 41.5% | 41.5% | 16.2% | 30.8% | 30.8% | 8.5% | 23.1% | |
| Maximum Green (s) | 20.5 | 60.5 | 60.5 | 9.5 | 49.5 | 49.5 | 16.5 | 35.5 | 35.5 | 6.5 | 25.5 | |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | |
| Act Effct Green (s) | 55.6 | 42.4 | 42.4 | 45.0 | 35.8 | 35.8 | 64.7 | 54.9 | 54.9 | 55.7 | 48.1 | 68.4 |
| Actuated g/C Ratio | 0.43 | 0.33 | 0.33 | 0.35 | 0.28 | 0.28 | 0.50 | 0.42 | 0.42 | 0.43 | 0.37 | 0.53 |
| v/c Ratio | 0.60 | 0.34 | 0.12 | 0.31 | 0.77 | 0.10 | 0.24 | 0.04 | 0.18 | 0.08 | 0.04 | 0.20 |
| Control Delay | 32.1 | 32.9 | 0.5 | 23.5 | 48.8 | 0.4 | 21.3 | 28.8 | 5.8 | 21.2 | 33.3 | 4.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 32.1 | 32.9 | 0.5 | 23.5 | 48.8 | 0.4 | 21.3 | 28.8 | 5.8 | 21.2 | 33.3 | 4.3 |
| LOS | C | C | A | C | D | A | C | C | A | C | C | A |
| Approach Delay | | 29.0 | | | 42.7 | | | 15.7 | | | 10.5 | |
| Approach LOS | | C | | | D | | | B | | | B | |

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 30.7 Intersection LOS: C
Intersection Capacity Utilization 53.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 101: 1100 West & 2100 South/2100 South



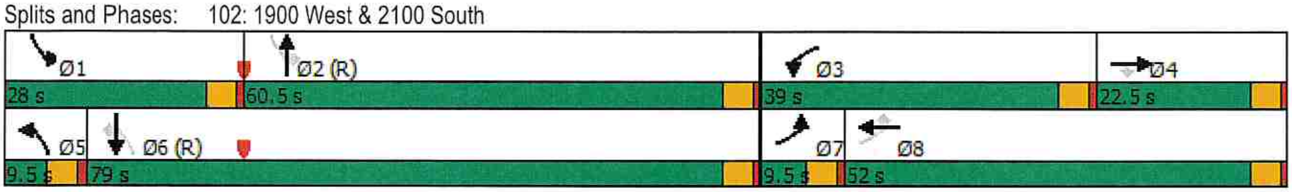
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 16 | 10 | 562 | 18 | 219 | 5 | 927 | 405 | 217 | 754 | 19 |
| Future Volume (vph) | 5 | 16 | 10 | 562 | 18 | 219 | 5 | 927 | 405 | 217 | 754 | 19 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 125 | | 125 | 275 | | 275 | 350 | | 250 | 350 | | 350 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.744 | | | 0.950 | | | 0.295 | | | 0.187 | | |
| Satd. Flow (perm) | 1386 | 3539 | 1583 | 3433 | 1863 | 1583 | 550 | 3539 | 1583 | 348 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 142 | | | 238 | | | 349 | | | 109 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1539 | | | 1539 | | | 3258 | | | 8394 | |
| Travel Time (s) | | 35.0 | | | 35.0 | | | 74.0 | | | 190.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 5 | 17 | 11 | 611 | 20 | 238 | 5 | 1008 | 440 | 236 | 820 | 21 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 5 | 17 | 11 | 611 | 20 | 238 | 5 | 1008 | 440 | 236 | 820 | 21 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | D.P+P | NA | Perm | Prot | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 8 | | 4 | | | 8 | 6 | | 2 | 2 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 |
| Total Split (s) | 9.5 | 22.5 | 22.5 | 39.0 | 52.0 | 52.0 | 9.5 | 60.5 | 60.5 | 28.0 | 79.0 | 79.0 |
| Total Split (%) | 6.3% | 15.0% | 15.0% | 26.0% | 34.7% | 34.7% | 6.3% | 40.3% | 40.3% | 18.7% | 52.7% | 52.7% |
| Maximum Green (s) | 5.0 | 18.0 | 18.0 | 34.5 | 47.5 | 47.5 | 5.0 | 56.0 | 56.0 | 23.5 | 74.5 | 74.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 36.8 | 6.2 | 6.2 | 31.0 | 35.8 | 35.8 | 102.4 | 80.1 | 80.1 | 98.8 | 101.2 | 101.2 |
| Actuated g/C Ratio | 0.25 | 0.04 | 0.04 | 0.21 | 0.24 | 0.24 | 0.68 | 0.53 | 0.53 | 0.66 | 0.67 | 0.67 |
| v/c Ratio | 0.01 | 0.12 | 0.05 | 0.86 | 0.05 | 0.43 | 0.01 | 0.53 | 0.44 | 0.58 | 0.34 | 0.02 |
| Control Delay | 36.8 | 70.6 | 0.5 | 70.3 | 41.5 | 7.4 | 14.0 | 41.1 | 20.7 | 16.4 | 12.3 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.8 | 70.6 | 0.5 | 70.3 | 41.5 | 7.4 | 14.0 | 41.1 | 20.7 | 16.4 | 12.3 | 0.1 |
| LOS | D | E | A | E | D | A | B | D | C | B | B | A |
| Approach Delay | | 42.1 | | | 52.4 | | | 34.8 | | | 13.0 | |
| Approach LOS | | D | | | D | | | C | | | B | |

## Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 32.5 Intersection LOS: C
Intersection Capacity Utilization 71.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 102: 1900 West & 2100 South



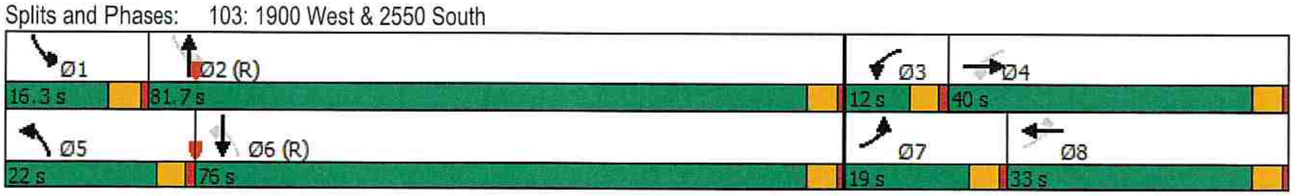
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 153 | 141 | 121 | 102 | 210 | 204 | 152 | 971 | 59 | 122 | 1218 | 174 |
| Future Volume (vph) | 153 | 141 | 121 | 102 | 210 | 204 | 152 | 971 | 59 | 122 | 1218 | 174 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | 150 | 150 | | 150 | 375 | | 375 | 350 | | 300 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.247 | | | 0.511 | | | 0.109 | | | 0.194 | | |
| Satd. Flow (perm) | 460 | 1863 | 1583 | 952 | 1863 | 1583 | 203 | 3539 | 1583 | 361 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | | 202 | | | 109 | | | 162 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 2628 | | | 2249 | | | 5138 | | | 3258 | |
| Travel Time (s) | | 59.7 | | | 51.1 | | | 116.8 | | | 74.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 166 | 153 | 132 | 111 | 228 | 222 | 165 | 1055 | 64 | 133 | 1324 | 189 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 166 | 153 | 132 | 111 | 228 | 222 | 165 | 1055 | 64 | 133 | 1324 | 189 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | D.P+P | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 8 | | 4 | 4 | | 8 | 6 | | 2 | 2 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 |
| Total Split (s) | 19.0 | 40.0 | 40.0 | 12.0 | 33.0 | 33.0 | 22.0 | 81.7 | 81.7 | 16.3 | 76.0 | 76.0 |
| Total Split (%) | 12.7% | 26.7% | 26.7% | 8.0% | 22.0% | 22.0% | 14.7% | 54.5% | 54.5% | 10.9% | 50.7% | 50.7% |
| Maximum Green (s) | 14.5 | 35.5 | 35.5 | 7.5 | 28.5 | 28.5 | 17.5 | 77.2 | 77.2 | 11.8 | 71.5 | 71.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 37.1 | 29.6 | 29.6 | 37.1 | 23.2 | 23.2 | 94.9 | 85.3 | 85.3 | 94.9 | 81.8 | 81.8 |
| Actuated g/C Ratio | 0.25 | 0.20 | 0.20 | 0.25 | 0.15 | 0.15 | 0.63 | 0.57 | 0.57 | 0.63 | 0.55 | 0.55 |
| v/c Ratio | 0.71 | 0.42 | 0.32 | 0.40 | 0.79 | 0.53 | 0.62 | 0.52 | 0.07 | 0.42 | 0.69 | 0.20 |
| Control Delay | 59.3 | 55.0 | 9.1 | 45.7 | 80.3 | 14.1 | 27.0 | 13.6 | 2.1 | 11.2 | 20.8 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 59.3 | 55.0 | 9.1 | 45.7 | 80.3 | 14.1 | 27.0 | 13.6 | 2.1 | 11.2 | 20.8 | 1.2 |
| LOS | E | E | A | D | F | B | C | B | A | B | C | A |
| Approach Delay | | 43.2 | | | 47.2 | | | 14.8 | | | 17.8 | |
| Approach LOS | | D | | | D | | | B | | | B | |

**Intersection Summary**

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 23.9 Intersection LOS: C
Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 103: 1900 West & 2550 South



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 345 | 5 | 21 | 472 | 16 | 2 | 0 | 4 | 13 | 1 | 6 |
| Future Volume (vph) | 5 | 345 | 5 | 21 | 472 | 16 | 2 | 0 | 4 | 13 | 1 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 100 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.995 | | | 0.910 | | | 0.957 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.984 | | | 0.969 | |
| Satd. Flow (prot) | 1770 | 1859 | 0 | 1770 | 1853 | 0 | 0 | 1668 | 0 | 0 | 1727 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.984 | | | 0.969 | |
| Satd. Flow (perm) | 1770 | 1859 | 0 | 1770 | 1853 | 0 | 0 | 1668 | 0 | 0 | 1727 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 2588 | | | 2628 | | | 466 | | | 1804 | |
| Travel Time (s) | | 58.8 | | | 59.7 | | | 10.6 | | | 41.0 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 5 | 375 | 5 | 23 | 513 | 17 | 2 | 0 | 4 | 14 | 1 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 5 | 380 | 0 | 23 | 530 | 0 | 0 | 6 | 0 | 0 | 22 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | Yes | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 35.8% ICU Level of Service A
Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 5 | 345 | 5 | 21 | 472 | 16 | 2 | 0 | 4 | 13 | 1 | 6 |
| Future Vol, veh/h | 5 | 345 | 5 | 21 | 472 | 16 | 2 | 0 | 4 | 13 | 1 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 100 | - | - | 100 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 5 | 375 | 5 | 23 | 513 | 17 | 2 | 0 | 4 | 14 | 1 | 7 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 530 | 0 | 0 | 380 | 0 | 0 | 960 | 964 | 378 | 958 | 958 | 522 |
| Stage 1 | - | - | - | - | - | - | 388 | 388 | - | 568 | 568 | - |
| Stage 2 | - | - | - | - | - | - | 572 | 576 | - | 390 | 390 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1037 | - | - | 1178 | - | - | 236 | 255 | 669 | 237 | 257 | 555 |
| Stage 1 | - | - | - | - | - | - | 636 | 609 | - | 508 | 506 | - |
| Stage 2 | - | - | - | - | - | - | 505 | 502 | - | 634 | 608 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1037 | - | - | 1178 | - | - | 228 | 249 | 669 | 231 | 251 | 555 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 228 | 249 | - | 231 | 251 | - |
| Stage 1 | - | - | - | - | - | - | 633 | 606 | - | 505 | 496 | - |
| Stage 2 | - | - | - | - | - | - | 488 | 492 | - | 627 | 605 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.1 | 0.3 | 14 | 18.9 |
| HCM LOS | | | B | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 407 | 1037 | - | - | 1178 | - | - | 281 |
| HCM Lane V/C Ratio | 0.016 | 0.005 | - | - | 0.019 | - | - | 0.077 |
| HCM Control Delay (s) | 14 | 8.5 | - | - | 8.1 | - | - | 18.9 |
| HCM Lane LOS | B | A | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0 | 0 | - | - | 0.1 | - | - | 0.2 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 213 | 10 | 60 | 344 | 48 | 20 | 40 | 57 | 32 | 36 | 13 |
| Future Volume (vph) | 12 | 213 | 10 | 60 | 344 | 48 | 20 | 40 | 57 | 32 | 36 | 13 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 100 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.993 | | | 0.982 | | | 0.934 | | | 0.979 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.991 | | | 0.981 | |
| Satd. Flow (prot) | 1770 | 1850 | 0 | 1770 | 1829 | 0 | 0 | 1724 | 0 | 0 | 1789 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.991 | | | 0.981 | |
| Satd. Flow (perm) | 1770 | 1850 | 0 | 1770 | 1829 | 0 | 0 | 1724 | 0 | 0 | 1789 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1305 | | | 2588 | | | 2103 | | | 1422 | |
| Travel Time (s) | | 29.7 | | | 58.8 | | | 47.8 | | | 32.3 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 13 | 232 | 11 | 65 | 374 | 52 | 22 | 43 | 62 | 35 | 39 | 14 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 13 | 243 | 0 | 65 | 426 | 0 | 0 | 127 | 0 | 0 | 88 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | Yes | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |

| Intersection Summary | |
|---|---|
| Area Type: Other | |
| Control Type: Unsignalized | |
| Intersection Capacity Utilization 43.3% | ICU Level of Service A |
| Analysis Period (min) 15 | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 12 | 213 | 10 | 60 | 344 | 48 | 20 | 40 | 57 | 32 | 36 | 13 |
| Future Vol, veh/h | 12 | 213 | 10 | 60 | 344 | 48 | 20 | 40 | 57 | 32 | 36 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 100 | - | - | 100 | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 232 | 11 | 65 | 374 | 52 | 22 | 43 | 62 | 35 | 39 | 14 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 426 | 0 | 0 | 243 | 0 | 0 | 821 | 820 | 238 | 846 | 799 | 400 |
| Stage 1 | - | - | - | - | - | - | 264 | 264 | - | 530 | 530 | - |
| Stage 2 | - | - | - | - | - | - | 557 | 556 | - | 316 | 269 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1133 | - | - | 1323 | - | - | 293 | 310 | 801 | 282 | 319 | 650 |
| Stage 1 | - | - | - | - | - | - | 741 | 690 | - | 533 | 527 | - |
| Stage 2 | - | - | - | - | - | - | 515 | 513 | - | 695 | 687 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1133 | - | - | 1323 | - | - | 246 | 292 | 801 | 220 | 300 | 650 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 246 | 292 | - | 220 | 300 | - |
| Stage 1 | - | - | - | - | - | - | 733 | 682 | - | 527 | 501 | - |
| Stage 2 | - | - | - | - | - | - | 442 | 488 | - | 593 | 679 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.4 | 1 | 18 | 23.3 |
| HCM LOS | | | C | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 404 | 1133 | - | - | 1323 | - | - | 284 |
| HCM Lane V/C Ratio | 0.315 | 0.012 | - | - | 0.049 | - | - | 0.31 |
| HCM Control Delay (s) | 18 | 8.2 | - | - | 7.9 | - | - | 23.3 |
| HCM Lane LOS | C | A | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 1.3 | 0 | - | - | 0.2 | - | - | 1.3 |

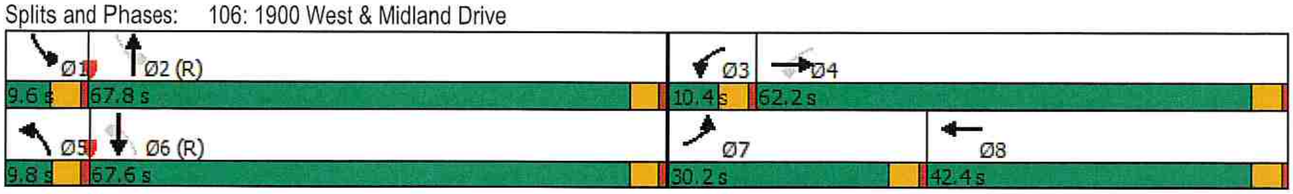
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 449 | 145 | 123 | 93 | 224 | 141 | 73 | 650 | 24 | 35 | 705 | 807 |
| Future Volume (vph) | 449 | 145 | 123 | 93 | 224 | 141 | 73 | 650 | 24 | 35 | 705 | 807 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 250 | | 250 | 125 | | 125 | 375 | | 125 | 375 | | 375 |
| Storage Lanes | 2 | | 1 | 1 | | 0 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | 0.942 | | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3433 | 1863 | 1583 | 1770 | 1755 | 0 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.950 | | | 0.599 | | | 0.254 | | | 0.287 | | |
| Satd. Flow (perm) | 3433 | 1863 | 1583 | 1116 | 1755 | 0 | 473 | 3539 | 1583 | 535 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 134 | | 20 | | | | 109 | | | 588 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1016 | | | 669 | | | 2602 | | | 5138 | |
| Travel Time (s) | | 23.1 | | | 15.2 | | | 59.1 | | | 116.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 488 | 158 | 134 | 101 | 243 | 153 | 79 | 707 | 26 | 38 | 766 | 877 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 488 | 158 | 134 | 101 | 396 | 0 | 79 | 707 | 26 | 38 | 766 | 877 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Prot | NA | Perm | D.P+P | NA | | D.P+P | NA | Perm | D.P+P | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | 4 | | | 6 | | 2 | 2 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 |
| Total Split (s) | 30.2 | 62.2 | 62.2 | 10.4 | 42.4 | | 9.8 | 67.8 | 67.8 | 9.6 | 67.6 | 67.6 |
| Total Split (%) | 20.1% | 41.5% | 41.5% | 6.9% | 28.3% | | 6.5% | 45.2% | 45.2% | 6.4% | 45.1% | 45.1% |
| Maximum Green (s) | 25.7 | 57.7 | 57.7 | 5.9 | 37.9 | | 5.3 | 63.3 | 63.3 | 5.1 | 63.1 | 63.1 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 24.5 | 54.0 | 54.0 | 59.9 | 35.4 | | 72.1 | 68.7 | 68.7 | 73.0 | 66.1 | 66.1 |
| Actuated g/C Ratio | 0.16 | 0.36 | 0.36 | 0.40 | 0.24 | | 0.48 | 0.46 | 0.46 | 0.49 | 0.44 | 0.44 |
| v/c Ratio | 0.87 | 0.24 | 0.20 | 0.21 | 0.92 | | 0.28 | 0.44 | 0.03 | 0.12 | 0.49 | 0.85 |
| Control Delay | 77.9 | 33.7 | 5.3 | 26.5 | 80.6 | | 30.6 | 33.0 | 2.0 | 9.9 | 25.2 | 32.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 77.9 | 33.7 | 5.3 | 26.5 | 80.6 | | 30.6 | 33.0 | 2.0 | 9.9 | 25.2 | 32.6 |
| LOS | E | C | A | C | F | | C | C | A | A | C | C |
| Approach Delay | | 56.5 | | | 69.6 | | | 31.8 | | | 28.7 | |
| Approach LOS | | E | | | E | | | C | | | C | |

**Intersection Summary**

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 40.5 Intersection LOS: D
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 106: 1900 West & Midland Drive



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑↱ | | ↰ | ↑ | ↱ | ↰ | ↑↱ | | ↰ | ↑↱ | |
| Traffic Volume (vph) | 12 | 16 | 27 | 37 | 40 | 12 | 26 | 174 | 38 | 10 | 208 | 10 |
| Future Volume (vph) | 12 | 16 | 27 | 37 | 40 | 12 | 26 | 174 | 38 | 10 | 208 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 100 | | 100 | 100 | | 0 | 100 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 1 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.905 | | | | 0.850 | | 0.973 | | | 0.993 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 1686 | 0 | 1770 | 1863 | 1583 | 1770 | 1812 | 0 | 1770 | 1850 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1770 | 1686 | 0 | 1770 | 1863 | 1583 | 1770 | 1812 | 0 | 1770 | 1850 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 7799 | | | 2596 | | | 5296 | | | 1227 | |
| Travel Time (s) | | 177.3 | | | 59.0 | | | 120.4 | | | 27.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 13 | 17 | 29 | 40 | 43 | 13 | 28 | 189 | 41 | 11 | 226 | 11 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 13 | 46 | 0 | 40 | 43 | 13 | 28 | 230 | 0 | 11 | 237 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.6% ICU Level of Service A

Analysis Period (min) 15

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.8 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 12 | 16 | 27 | 37 | 40 | 12 | 26 | 174 | 38 | 10 | 208 | 10 |
| Future Vol, veh/h | 12 | 16 | 27 | 37 | 40 | 12 | 26 | 174 | 38 | 10 | 208 | 10 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 17 | 29 | 40 | 43 | 13 | 28 | 189 | 41 | 11 | 226 | 11 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 3 | 2 |
| HCM Control Delay | 9.3 | 9.6 | 11 | 11.5 |
| HCM LOS | A | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 82% | 0% | 37% | 0% | 100% | 0% | 0% | 95% |
| Vol Right, % | 0% | 18% | 0% | 63% | 0% | 0% | 100% | 0% | 5% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 26 | 212 | 12 | 43 | 37 | 40 | 12 | 10 | 218 |
| LT Vol | 26 | 0 | 12 | 0 | 37 | 0 | 0 | 10 | 0 |
| Through Vol | 0 | 174 | 0 | 16 | 0 | 40 | 0 | 0 | 208 |
| RT Vol | 0 | 38 | 0 | 27 | 0 | 0 | 12 | 0 | 10 |
| Lane Flow Rate | 28 | 230 | 13 | 47 | 40 | 43 | 13 | 11 | 237 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.048 | 0.348 | 0.025 | 0.077 | 0.075 | 0.075 | 0.02 | 0.019 | 0.371 |
| Departure Headway (Hd) | 6.173 | 5.544 | 6.865 | 5.912 | 6.746 | 6.24 | 5.532 | 6.174 | 5.64 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 584 | 652 | 523 | 608 | 532 | 576 | 649 | 583 | 642 |
| Service Time | 3.873 | 3.244 | 4.583 | 3.63 | 4.466 | 3.96 | 3.252 | 3.874 | 3.34 |
| HCM Lane V/C Ratio | 0.048 | 0.353 | 0.025 | 0.077 | 0.075 | 0.075 | 0.02 | 0.019 | 0.369 |
| HCM Control Delay | 9.2 | 11.2 | 9.8 | 9.1 | 10 | 9.5 | 8.4 | 9 | 11.6 |
| HCM Lane LOS | A | B | A | A | A | A | A | A | B |
| HCM 95th-tile Q | 0.2 | 1.6 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 1.7 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 4 | 7 | 6 | 51 | 10 | 21 | 7 | 285 | 37 | 32 | 303 | 14 |
| Future Volume (vph) | 4 | 7 | 6 | 51 | 10 | 21 | 7 | 285 | 37 | 32 | 303 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 100 | | 100 | 100 | | 0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 1 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.950 | | | 0.965 | | | | 0.850 | | 0.993 | |
| Flt Protected | | 0.990 | | | 0.970 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1752 | 0 | 0 | 1744 | 0 | 1770 | 1863 | 1583 | 1770 | 1850 | 0 |
| Flt Permitted | | 0.990 | | | 0.970 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1752 | 0 | 0 | 1744 | 0 | 1770 | 1863 | 1583 | 1770 | 1850 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1249 | | | 7799 | | | 5337 | | | 1260 | |
| Travel Time (s) | | 28.4 | | | 177.3 | | | 121.3 | | | 28.6 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 4 | 8 | 7 | 55 | 11 | 23 | 8 | 310 | 40 | 35 | 329 | 15 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 19 | 0 | 0 | 89 | 0 | 8 | 310 | 40 | 35 | 344 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

**Intersection Summary**

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 40.7% ICU Level of Service A
Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.6 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 4 | 7 | 6 | 51 | 10 | 21 | 7 | 285 | 37 | 32 | 303 | 14 |
| Future Vol, veh/h | 4 | 7 | 6 | 51 | 10 | 21 | 7 | 285 | 37 | 32 | 303 | 14 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | - | - | - | - | 100 | - | 100 | 100 | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 8 | 7 | 55 | 11 | 23 | 8 | 310 | 40 | 35 | 329 | 15 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 770 | 773 | 337 | 740 | 740 | 310 | 344 | 0 | 0 | 350 | 0 | 0 |
| Stage 1 | 407 | 407 | - | 326 | 326 | - | - | - | - | - | - | - |
| Stage 2 | 363 | 366 | - | 414 | 414 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 318 | 330 | 705 | 333 | 345 | 730 | 1215 | - | - | 1209 | - | - |
| Stage 1 | 621 | 597 | - | 687 | 648 | - | - | - | - | - | - | - |
| Stage 2 | 656 | 623 | - | 616 | 593 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 292 | 318 | 705 | 315 | 333 | 730 | 1215 | - | - | 1209 | - | - |
| Mov Cap-2 Maneuver | 292 | 318 | - | 315 | 333 | - | - | - | - | - | - | - |
| Stage 1 | 617 | 580 | - | 682 | 643 | - | - | - | - | - | - | - |
| Stage 2 | 621 | 619 | - | 585 | 576 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 14.8 | 17.7 | 0.2 | 0.7 |
| HCM LOS | B | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1215 | - | - | 384 | 372 | 1209 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | - | 0.048 | 0.24 | 0.029 | - | - |
| HCM Control Delay (s) | 8 | - | - | 14.8 | 17.7 | 8.1 | - | - |
| HCM Lane LOS | A | - | - | B | C | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | - | 0.2 | 0.9 | 0.1 | - | - |

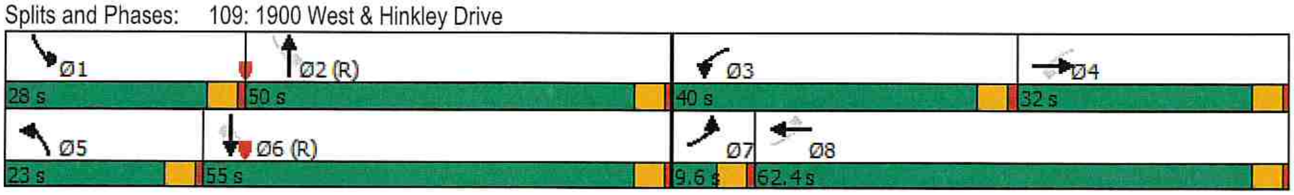
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 19 | 402 | 17 | 308 | 655 | 175 | 178 | 402 | 429 | 253 | 637 | 36 |
| Future Volume (vph) | 19 | 402 | 17 | 308 | 655 | 175 | 178 | 402 | 429 | 253 | 637 | 36 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 400 | | 400 | 450 | | 350 | 500 | | 200 | 500 | | 300 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.218 | | | 0.228 | | | 0.286 | | | 0.428 | | |
| Satd. Flow (perm) | 406 | 3539 | 1583 | 425 | 3539 | 1583 | 533 | 3539 | 1583 | 797 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 142 | | | 190 | | | 466 | | | 109 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 3906 | | | 1649 | | | 5295 | | | 2602 | |
| Travel Time (s) | | 88.8 | | | 37.5 | | | 120.3 | | | 59.1 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 21 | 437 | 18 | 335 | 712 | 190 | 193 | 437 | 466 | 275 | 692 | 39 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 21 | 437 | 18 | 335 | 712 | 190 | 193 | 437 | 466 | 275 | 692 | 39 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | D.P+P | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 8 | | 4 | 4 | | 8 | 6 | | 2 | 2 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 |
| Total Split (s) | 9.6 | 32.0 | 32.0 | 40.0 | 62.4 | 62.4 | 23.0 | 50.0 | 50.0 | 28.0 | 55.0 | 55.0 |
| Total Split (%) | 6.4% | 21.3% | 21.3% | 26.7% | 41.6% | 41.6% | 15.3% | 33.3% | 33.3% | 18.7% | 36.7% | 36.7% |
| Maximum Green (s) | 5.1 | 27.5 | 27.5 | 35.5 | 57.9 | 57.9 | 18.5 | 45.5 | 45.5 | 23.5 | 50.5 | 50.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 53.5 | 23.5 | 23.5 | 51.7 | 50.5 | 50.5 | 80.3 | 62.7 | 62.7 | 80.3 | 66.6 | 66.6 |
| Actuated g/C Ratio | 0.36 | 0.16 | 0.16 | 0.34 | 0.34 | 0.34 | 0.54 | 0.42 | 0.42 | 0.54 | 0.44 | 0.44 |
| v/c Ratio | 0.11 | 0.79 | 0.05 | 0.84 | 0.60 | 0.29 | 0.49 | 0.30 | 0.50 | 0.51 | 0.44 | 0.05 |
| Control Delay | 27.3 | 71.3 | 0.2 | 55.9 | 43.3 | 5.1 | 22.1 | 32.2 | 5.1 | 43.0 | 58.7 | 10.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 27.3 | 71.3 | 0.2 | 55.9 | 43.3 | 5.1 | 22.1 | 32.2 | 5.1 | 43.0 | 58.7 | 10.6 |
| LOS | C | E | A | E | D | A | C | C | A | D | E | B |
| Approach Delay | | 66.7 | | | 40.8 | | | 18.9 | | | 52.6 | |
| Approach LOS | | E | | | D | | | B | | | D | |

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:NBSB, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 40.8 Intersection LOS: D
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 109: 1900 West & Hinkley Drive



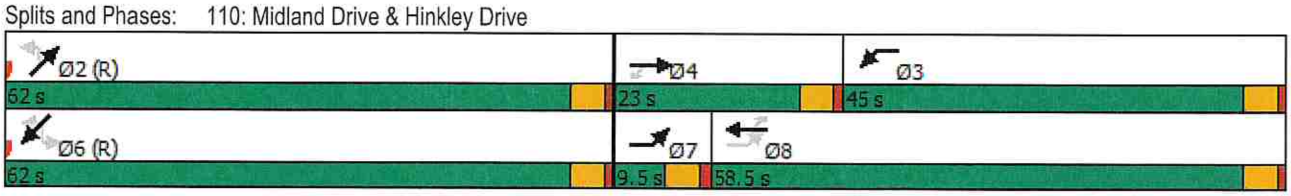
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 21 | 61 | 10 | 662 | 135 | 116 | 9 | 667 | 417 | 73 | 939 | 14 |
| Future Volume (vph) | 21 | 61 | 10 | 662 | 135 | 116 | 9 | 667 | 417 | 73 | 939 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 100 | 400 | | 200 | 500 | | 350 | 450 | | 250 |
| Storage Lanes | 1 | | 1 | 2 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 1863 | 1583 | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.604 | | | 0.950 | | | 0.207 | | | 0.322 | | |
| Satd. Flow (perm) | 1125 | 1863 | 1583 | 3433 | 1863 | 1583 | 386 | 3539 | 1583 | 600 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 50 | | | 126 | | | 453 | | | 88 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1374 | | | 3906 | | | 3350 | | | 874 | |
| Travel Time (s) | | 31.2 | | | 88.8 | | | 76.1 | | | 19.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 66 | 11 | 720 | 147 | 126 | 10 | 725 | 453 | 79 | 1021 | 15 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 23 | 66 | 11 | 720 | 147 | 126 | 10 | 725 | 453 | 79 | 1021 | 15 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | L NA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | D.P+P | NA | Perm | Prot | NA | Perm | Perm | NA | Free | Perm | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | 8 | | 4 | | | 8 | 2 | | Free | 6 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 2 | 2 | | 6 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 22.5 | 22.5 | | 22.5 | 22.5 | 22.5 |
| Total Split (s) | 9.5 | 23.0 | 23.0 | 45.0 | 58.5 | 58.5 | 62.0 | 62.0 | | 62.0 | 62.0 | 62.0 |
| Total Split (%) | 7.3% | 17.7% | 17.7% | 34.6% | 45.0% | 45.0% | 47.7% | 47.7% | | 47.7% | 47.7% | 47.7% |
| Maximum Green (s) | 5.0 | 18.5 | 18.5 | 40.5 | 54.0 | 54.0 | 57.5 | 57.5 | | 57.5 | 57.5 | 57.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lead | Lead | Lead | Lag | Lag | Lag | | | | | | |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | C-Max | C-Max | | C-Max | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | 11.0 | 11.0 | | 11.0 | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |
| Act Effct Green (s) | 42.7 | 10.0 | 10.0 | 33.0 | 39.7 | 39.7 | 75.6 | 75.6 | 130.0 | 75.6 | 75.6 | 75.6 |
| Actuated g/C Ratio | 0.33 | 0.08 | 0.08 | 0.25 | 0.31 | 0.31 | 0.58 | 0.58 | 1.00 | 0.58 | 0.58 | 0.58 |
| v/c Ratio | 0.06 | 0.46 | 0.07 | 0.83 | 0.26 | 0.22 | 0.04 | 0.35 | 0.29 | 0.23 | 0.50 | 0.02 |
| Control Delay | 23.6 | 67.2 | 0.8 | 54.2 | 33.8 | 5.6 | 8.0 | 7.3 | 0.4 | 18.6 | 18.8 | 0.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 23.6 | 67.2 | 0.8 | 54.2 | 33.8 | 5.6 | 8.0 | 7.3 | 0.4 | 18.6 | 18.8 | 0.0 |
| LOS | C | E | A | D | C | A | A | A | A | B | B | A |
| Approach Delay | | 49.8 | | | 45.0 | | | 4.7 | | | 18.6 | |
| Approach LOS | | D | | | D | | | A | | | B | |

**Intersection Summary**

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 72 (55%), Referenced to phase 2:NETL and 6:SWTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 22.3 Intersection LOS: C
Intersection Capacity Utilization 66.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 110: Midland Drive & Hinkley Drive



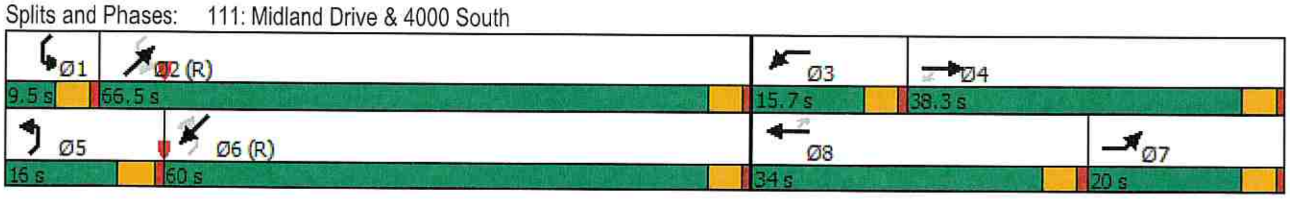
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 319 | 260 | 97 | 150 | 332 | 23 | 165 | 655 | 119 | 23 | 1188 | 188 |
| Future Volume (vph) | 319 | 260 | 97 | 150 | 332 | 23 | 165 | 655 | 119 | 23 | 1188 | 188 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 350 | | 250 | 200 | | 200 | 300 | | 400 | 300 | | 400 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3433 | 3539 | 1583 | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.070 | | | 0.309 | | |
| Satd. Flow (perm) | 3433 | 3539 | 1583 | 3433 | 1863 | 1583 | 130 | 3539 | 1583 | 576 | 3539 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 126 | | | 126 | | | 129 | | | 204 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 4277 | | | 3475 | | | 1476 | | | 3350 | |
| Travel Time (s) | | 97.2 | | | 79.0 | | | 33.5 | | | 76.1 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 347 | 283 | 105 | 163 | 361 | 25 | 179 | 712 | 129 | 25 | 1291 | 204 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 347 | 283 | 105 | 163 | 361 | 25 | 179 | 712 | 129 | 25 | 1291 | 204 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | Yes | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | D.P+P | NA | Perm | D.P+P | NA | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | 6 | | 2 | 2 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 7 | 4 | 4 | 3 | 8 | 8 | 5 | 2 | 2 | 1 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 |
| Total Split (s) | 20.0 | 38.3 | 38.3 | 15.7 | 34.0 | 34.0 | 16.0 | 66.5 | 66.5 | 9.5 | 60.0 | 60.0 |
| Total Split (%) | 15.4% | 29.5% | 29.5% | 12.1% | 26.2% | 26.2% | 12.3% | 51.2% | 51.2% | 7.3% | 46.2% | 46.2% |
| Maximum Green (s) | 15.5 | 33.8 | 33.8 | 11.2 | 29.5 | 29.5 | 11.5 | 62.0 | 62.0 | 5.0 | 55.5 | 55.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | Lag | Lag | Lag | Lead | Lead | Lead | Lead | Lag | Lag | Lead | Lag | Lag |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | None | C-Max | C-Max | None | C-Max | C-Max |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 7.0 | 7.0 |
| Flash Dont Walk (s) | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 | | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| Act Effct Green (s) | 15.6 | 33.0 | 33.0 | 10.4 | 27.8 | 27.8 | 68.6 | 67.4 | 67.4 | 70.4 | 57.5 | 57.5 |
| Actuated g/C Ratio | 0.12 | 0.25 | 0.25 | 0.08 | 0.21 | 0.21 | 0.53 | 0.52 | 0.52 | 0.54 | 0.44 | 0.44 |
| v/c Ratio | 0.84 | 0.32 | 0.21 | 0.59 | 0.91 | 0.06 | 0.86 | 0.39 | 0.15 | 0.07 | 0.83 | 0.25 |
| Control Delay | 74.9 | 40.2 | 4.8 | 66.9 | 76.6 | 0.3 | 65.1 | 20.7 | 3.5 | 8.0 | 35.1 | 5.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 74.9 | 40.2 | 4.8 | 66.9 | 76.6 | 0.3 | 65.1 | 20.7 | 3.5 | 8.0 | 35.1 | 5.8 |
| LOS | E | D | A | E | E | A | E | C | A | A | D | A |
| Approach Delay | | 51.5 | | | 70.2 | | | 26.3 | | | 30.7 | |
| Approach LOS | | D | | | E | | | C | | | C | |

## Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 8 (6%), Referenced to phase 2:NESW and 6:NESW, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 39.2 Intersection LOS: D
Intersection Capacity Utilization 83.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 111: Midland Drive & 4000 South



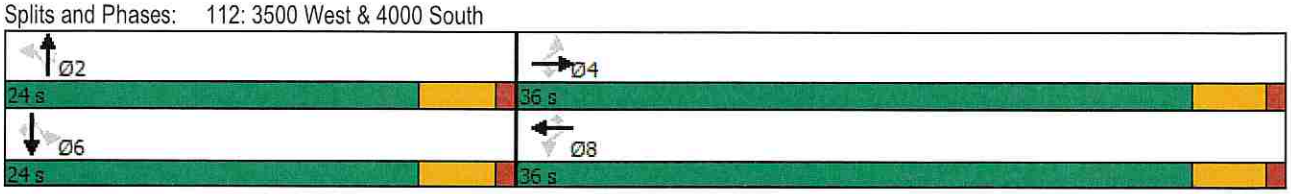
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑↑ | ↱ | ↰ | ↑↑ | ↱ | ↰ | ↑ | ↱ | ↰ | ↑ | ↱ |
| Traffic Volume (vph) | 136 | 410 | 74 | 124 | 734 | 79 | 93 | 98 | 95 | 78 | 108 | 158 |
| Future Volume (vph) | 136 | 410 | 74 | 124 | 734 | 79 | 93 | 98 | 95 | 78 | 108 | 158 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 300 | | 300 | 350 | | 350 | 100 | | 100 | 150 | | 150 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.276 | | | 0.494 | | | 0.682 | | | 0.688 | | |
| Satd. Flow (perm) | 514 | 3539 | 1583 | 920 | 3539 | 1583 | 1270 | 1863 | 1583 | 1282 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 80 | | | 86 | | | 103 | | | 147 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 2654 | | | 4277 | | | 1308 | | | 5296 | |
| Travel Time (s) | | 60.3 | | | 97.2 | | | 29.7 | | | 120.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 148 | 446 | 80 | 135 | 798 | 86 | 101 | 107 | 103 | 85 | 117 | 172 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 148 | 446 | 80 | 135 | 798 | 86 | 101 | 107 | 103 | 85 | 117 | 172 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | 4 | 8 | | 8 | 2 | | 2 | 6 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 4 | 4 | 4 | 8 | 8 | 8 | 2 | 2 | 2 | 6 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 |
| Total Split (s) | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 |
| Total Split (%) | 60.0% | 60.0% | 60.0% | 60.0% | 60.0% | 60.0% | 40.0% | 40.0% | 40.0% | 40.0% | 40.0% | 40.0% |
| Maximum Green (s) | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | Max | Max | Max | Max | Max | Max |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Flash Dont Walk (s) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Act Effct Green (s) | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 |
| Actuated g/C Ratio | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| v/c Ratio | 0.70 | 0.31 | 0.11 | 0.36 | 0.55 | 0.12 | 0.20 | 0.14 | 0.15 | 0.16 | 0.16 | 0.24 |
| Control Delay | 30.8 | 9.8 | 2.6 | 12.2 | 12.1 | 2.6 | 13.5 | 12.5 | 4.3 | 13.2 | 12.6 | 5.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 30.8 | 9.8 | 2.6 | 12.2 | 12.1 | 2.6 | 13.5 | 12.5 | 4.3 | 13.2 | 12.6 | 5.0 |
| LOS | C | A | A | B | B | A | B | B | A | B | B | A |
| Approach Delay | | 13.5 | | | 11.3 | | | 10.1 | | | 9.3 | |
| Approach LOS | | B | | | B | | | B | | | A | |

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 49.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 11.5 Intersection LOS: B
Intersection Capacity Utilization 50.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 112: 3500 West & 4000 South



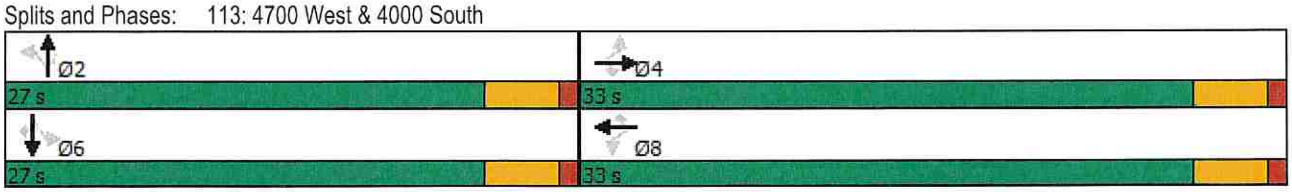
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↑ | ↱ | ↰ | ↑ | ↱ | ↰ | ↑ | ↱ | ↰ | ↑ | ↱ |
| Traffic Volume (vph) | 138 | 221 | 11 | 77 | 374 | 172 | 10 | 78 | 36 | 142 | 89 | 179 |
| Future Volume (vph) | 138 | 221 | 11 | 77 | 374 | 172 | 10 | 78 | 36 | 142 | 89 | 179 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 325 | | 325 | 350 | | 0 | 100 | | 100 | 225 | | 225 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | | 0.850 | | | 0.850 |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted | 0.377 | | | 0.595 | | | 0.694 | | | 0.702 | | |
| Satd. Flow (perm) | 702 | 1863 | 1583 | 1108 | 1863 | 1583 | 1293 | 1863 | 1583 | 1308 | 1863 | 1583 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 27 | | | 187 | | | 39 | | | 195 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 2650 | | | 5143 | | | 2144 | | | 5337 | |
| Travel Time (s) | | 60.2 | | | 116.9 | | | 48.7 | | | 121.3 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 150 | 240 | 12 | 84 | 407 | 187 | 11 | 85 | 39 | 154 | 97 | 195 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 150 | 240 | 12 | 84 | 407 | 187 | 11 | 85 | 39 | 154 | 97 | 195 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | Yes | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 |
| Detector Template | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Leading Detector (ft) | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 | 20 | 100 | 20 |
| Trailing Detector (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Position(ft) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Detector 1 Size(ft) | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 | 20 | 6 | 20 |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position(ft) | | 94 | | | 94 | | | 94 | | | 94 | |
| Detector 2 Size(ft) | | 6 | | | 6 | | | 6 | | | 6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | Perm | Perm | NA | Perm |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | 4 | 8 | | 8 | 2 | | 2 | 6 | | 6 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector Phase | 4 | 4 | 4 | 8 | 8 | 8 | 2 | 2 | 2 | 6 | 6 | 6 |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Minimum Split (s) | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 |
| Total Split (s) | 33.0 | 33.0 | 33.0 | 33.0 | 33.0 | 33.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| Total Split (%) | 55.0% | 55.0% | 55.0% | 55.0% | 55.0% | 55.0% | 45.0% | 45.0% | 45.0% | 45.0% | 45.0% | 45.0% |
| Maximum Green (s) | 28.5 | 28.5 | 28.5 | 28.5 | 28.5 | 28.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Lead/Lag | | | | | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Recall Mode | None | None | None | None | None | None | Max | Max | Max | Max | Max | Max |
| Walk Time (s) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Flash Dont Walk (s) | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| Pedestrian Calls (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Act Effct Green (s) | 17.3 | 17.3 | 17.3 | 17.3 | 17.3 | 17.3 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 |
| Actuated g/C Ratio | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 | 0.35 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 |
| v/c Ratio | 0.61 | 0.37 | 0.02 | 0.22 | 0.62 | 0.28 | 0.02 | 0.10 | 0.05 | 0.25 | 0.11 | 0.23 |
| Control Delay | 24.1 | 12.9 | 2.0 | 11.8 | 17.3 | 3.1 | 10.2 | 10.1 | 4.6 | 11.7 | 10.1 | 3.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 24.1 | 12.9 | 2.0 | 11.8 | 17.3 | 3.1 | 10.2 | 10.1 | 4.6 | 11.7 | 10.1 | 3.1 |
| LOS | C | B | A | B | B | A | B | B | A | B | B | A |
| Approach Delay | | 16.8 | | | 12.7 | | | 8.5 | | | 7.6 | |
| Approach LOS | | B | | | B | | | A | | | A | |

**Intersection Summary**

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 49.3
Natural Cycle: 45
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 12.0 Intersection LOS: B
Intersection Capacity Utilization 53.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 113: 4700 West & 4000 South



| Lane Group | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 5 | 89 | 971 | 6 | 129 | 1123 |
| Future Volume (vph) | 5 | 89 | 971 | 6 | 129 | 1123 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 50 | 50 | |
| Storage Lanes | 1 | 0 | | 1 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 |
| Frt | 0.872 | | | 0.850 | | |
| Flt Protected | 0.998 | | | | 0.950 | |
| Satd. Flow (prot) | 1621 | 0 | 3539 | 1583 | 1770 | 3539 |
| Flt Permitted | 0.998 | | | | 0.950 | |
| Satd. Flow (perm) | 1621 | 0 | 3539 | 1583 | 1770 | 3539 |
| Link Speed (mph) | 30 | | 30 | | | 30 |
| Link Distance (ft) | 807 | | 765 | | | 1476 |
| Travel Time (s) | 18.3 | | 17.4 | | | 33.5 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 5 | 97 | 1055 | 7 | 140 | 1221 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 102 | 0 | 1055 | 7 | 140 | 1221 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | Yes | | | Yes |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 49.8% ICU Level of Service A
Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 89 | 971 | 6 | 129 | 1123 |
| Future Vol, veh/h | 5 | 89 | 971 | 6 | 129 | 1123 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | 50 | 50 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 5 | 97 | 1055 | 7 | 140 | 1221 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1946 | 528 | 0 | 0 | 1062 | 0 |
| Stage 1 | 1055 | - | - | - | - | - |
| Stage 2 | 891 | - | - | - | - | - |
| Critical Hdwy | 6.84 | 6.94 | - | - | 4.14 | - |
| Critical Hdwy Stg 1 | 5.84 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.84 | - | - | - | - | - |
| Follow-up Hdwy | 3.52 | 3.32 | - | - | 2.22 | - |
| Pot Cap-1 Maneuver | 57 | 495 | - | - | 652 | - |
| Stage 1 | 296 | - | - | - | - | - |
| Stage 2 | 361 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 45 | 495 | - | - | 652 | - |
| Mov Cap-2 Maneuver | 153 | - | - | - | - | - |
| Stage 1 | 296 | - | - | - | - | - |
| Stage 2 | 283 | - | - | - | - | - |

| Approach | NW | NE | SW |
|---|---|---|---|
| HCM Control Delay, s | 15.6 | 0 | 1.2 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NET | NER | NWLn1 | SWL | SWT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 442 | 652 | - |
| HCM Lane V/C Ratio | - | - | 0.231 | 0.215 | - |
| HCM Control Delay (s) | - | - | 15.6 | 12 | - |
| HCM Lane LOS | - | - | C | B | - |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 0.8 | - |

| Lane Group | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 4 | 6 | 969 | 8 | 12 | 1160 |
| Future Volume (vph) | 4 | 6 | 969 | 8 | 12 | 1160 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 50 | 0 | | 50 | 50 | |
| Storage Lanes | 1 | 1 | | 1 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 |
| Frt | | 0.850 | | 0.850 | | |
| Flt Protected | 0.950 | | | | 0.950 | |
| Satd. Flow (prot) | 1770 | 1583 | 3539 | 1583 | 1770 | 3539 |
| Flt Permitted | 0.950 | | | | 0.950 | |
| Satd. Flow (perm) | 1770 | 1583 | 3539 | 1583 | 1770 | 3539 |
| Link Speed (mph) | 30 | | 30 | | | 30 |
| Link Distance (ft) | 704 | | 447 | | | 765 |
| Travel Time (s) | 16.0 | | 10.2 | | | 17.4 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 4 | 7 | 1053 | 9 | 13 | 1261 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 4 | 7 | 1053 | 9 | 13 | 1261 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | Yes | | | Yes |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 42.1% ICU Level of Service A
Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 4 | 6 | 969 | 8 | 12 | 1160 |
| Future Vol, veh/h | 4 | 6 | 969 | 8 | 12 | 1160 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 50 | 0 | - | 50 | 50 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 7 | 1053 | 9 | 13 | 1261 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1710 | 527 | 0 | 0 | 1062 | 0 |
| Stage 1 | 1053 | - | - | - | - | - |
| Stage 2 | 657 | - | - | - | - | - |
| Critical Hdwy | 6.84 | 6.94 | - | - | 4.14 | - |
| Critical Hdwy Stg 1 | 5.84 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.84 | - | - | - | - | - |
| Follow-up Hdwy | 3.52 | 3.32 | - | - | 2.22 | - |
| Pot Cap-1 Maneuver | 82 | 496 | - | - | 652 | - |
| Stage 1 | 297 | - | - | - | - | - |
| Stage 2 | 477 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 80 | 496 | - | - | 652 | - |
| Mov Cap-2 Maneuver | 200 | - | - | - | - | - |
| Stage 1 | 297 | - | - | - | - | - |
| Stage 2 | 467 | - | - | - | - | - |

| Approach | NW | NE | SW |
|---|---|---|---|
| HCM Control Delay, s | 16.8 | 0 | 0.1 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NET | NER | NWLn1 | NWLn2 | SWL | SWT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 200 | 496 | 652 | - |
| HCM Lane V/C Ratio | - | - | 0.022 | 0.013 | 0.02 | - |
| HCM Control Delay (s) | - | - | 23.4 | 12.4 | 10.6 | - |
| HCM Lane LOS | - | - | C | B | B | - |
| HCM 95th %tile Q(veh) | - | - | 0.1 | 0 | 0.1 | - |

| Lane Group | NBL | NBR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 3 | 109 | 815 | 17 | 185 | 1067 |
| Future Volume (vph) | 3 | 109 | 815 | 17 | 185 | 1067 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 50 | 50 | |
| Storage Lanes | 1 | 0 | | 1 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 |
| Frt | 0.868 | | | 0.850 | | |
| Flt Protected | 0.999 | | | | 0.950 | |
| Satd. Flow (prot) | 1615 | 0 | 3539 | 1583 | 1770 | 3539 |
| Flt Permitted | 0.999 | | | | 0.950 | |
| Satd. Flow (perm) | 1615 | 0 | 3539 | 1583 | 1770 | 3539 |
| Link Speed (mph) | 30 | | 30 | | | 30 |
| Link Distance (ft) | 1335 | | 511 | | | 447 |
| Travel Time (s) | 30.3 | | 11.6 | | | 10.2 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 3 | 118 | 886 | 18 | 201 | 1160 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 121 | 0 | 886 | 18 | 201 | 1160 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | | 12 |
| Link Offset(ft) | 0 | | 0 | | | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | | 16 |
| Two way Left Turn Lane | | | Yes | | | Yes |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | |
|---|---|---|
| Area Type: Other | | |
| Control Type: Unsignalized | | |
| Intersection Capacity Utilization 49.7% | | ICU Level of Service A |
| Analysis Period (min) 15 | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | NBL | NBR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 109 | 815 | 17 | 185 | 1067 |
| Future Vol, veh/h | 3 | 109 | 815 | 17 | 185 | 1067 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | 50 | 50 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 118 | 886 | 18 | 201 | 1160 |

| Major/Minor | Minor1 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1868 | 443 | 0 | 0 | 904 | 0 |
| Stage 1 | 886 | - | - | - | - | - |
| Stage 2 | 982 | - | - | - | - | - |
| Critical Hdwy | 6.84 | 6.94 | - | - | 4.14 | - |
| Critical Hdwy Stg 1 | 5.84 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.84 | - | - | - | - | - |
| Follow-up Hdwy | 3.52 | 3.32 | - | - | 2.22 | - |
| Pot Cap-1 Maneuver | 64 | 562 | - | - | 748 | - |
| Stage 1 | 363 | - | - | - | - | - |
| Stage 2 | 323 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | | - |
| Mov Cap-1 Maneuver | 47 | 562 | - | - | 748 | - |
| Mov Cap-2 Maneuver | 151 | - | - | - | - | - |
| Stage 1 | 363 | - | - | - | - | - |
| Stage 2 | 236 | - | - | - | - | - |

| Approach | NB | NE | SW |
|---|---|---|---|
| HCM Control Delay, s | 13.9 | 0 | 1.7 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NET | NER | NBLn1 | SWL | SWT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | 524 | 748 | - |
| HCM Lane V/C Ratio | - | - | 0.232 | 0.269 | - |
| HCM Control Delay (s) | - | - | 13.9 | 11.6 | - |
| HCM Lane LOS | - | - | B | B | - |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 1.1 | - |

| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 10 | 163 | 209 | 727 | 764 | 16 |
| Future Volume (vph) | 10 | 163 | 209 | 727 | 764 | 16 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 1 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1770 | 1583 | 1770 | 1863 | 1863 | 1583 |
| Flt Permitted | 0.950 | | 0.950 | | | |
| Satd. Flow (perm) | 1770 | 1583 | 1770 | 1863 | 1863 | 1583 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 862 | | | 936 | 1903 | |
| Travel Time (s) | 19.6 | | | 21.3 | 43.3 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 11 | 177 | 227 | 790 | 830 | 17 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 11 | 177 | 227 | 790 | 830 | 17 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | Yes | Yes | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |

## Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 65.1% ICU Level of Service C
Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.4 |

| Movement | SEL | SER | NEL | NET | SWT | SWR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 10 | 163 | 209 | 727 | 764 | 16 |
| Future Vol, veh/h | 10 | 163 | 209 | 727 | 764 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 100 | 0 | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 11 | 177 | 227 | 790 | 830 | 17 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 2074 | 830 | 847 | 0 | - | 0 |
| Stage 1 | 830 | - | - | - | - | - |
| Stage 2 | 1244 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 59 | 370 | 790 | - | - | - |
| Stage 1 | 428 | - | - | - | - | - |
| Stage 2 | 272 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 42 | 370 | 790 | - | - | - |
| Mov Cap-2 Maneuver | 150 | - | - | - | - | - |
| Stage 1 | 305 | - | - | - | - | - |
| Stage 2 | 272 | - | - | - | - | - |

| Approach | SE | | NE | | SW | |
|---|---|---|---|---|---|---|
| HCM Control Delay, s | 23.8 | | 2.5 | | 0 | |
| HCM LOS | C | | | | | |

| Minor Lane/Major Mvmt | NEL | NET | SELn1 | SELn2 | SWT | SWR |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 790 | - | 150 | 370 | - | - |
| HCM Lane V/C Ratio | 0.288 | - | 0.072 | 0.479 | - | - |
| HCM Control Delay (s) | 11.4 | - | 30.9 | 23.4 | - | - |
| HCM Lane LOS | B | - | D | C | - | - |
| HCM 95th %tile Q(veh) | 1.2 | - | 0.2 | 2.5 | - | - |

| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 7 | 94 | 36 | 667 | 939 | 19 |
| Future Volume (vph) | 7 | 94 | 36 | 667 | 939 | 19 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | 100 | | | 0 |
| Storage Lanes | 1 | 0 | 1 | | | 0 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.875 | | | | 0.997 | |
| Flt Protected | 0.996 | | 0.950 | | | |
| Satd. Flow (prot) | 1623 | 0 | 1770 | 1863 | 1857 | 0 |
| Flt Permitted | 0.996 | | 0.950 | | | |
| Satd. Flow (perm) | 1623 | 0 | 1770 | 1863 | 1857 | 0 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 367 | | | 402 | 936 | |
| Travel Time (s) | 8.3 | | | 9.1 | 21.3 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 8 | 102 | 39 | 725 | 1021 | 21 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 110 | 0 | 39 | 725 | 1042 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | Yes | Yes | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | |
|---|---|
| Area Type: Other | |
| Control Type: Unsignalized | |
| Intersection Capacity Utilization 63.4% | ICU Level of Service B |
| Analysis Period (min) 15 | |

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 1.7 | | | | | |

| Movement | SEL | SER | NEL | NET | SWT | SWR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 7 | 94 | 36 | 667 | 939 | 19 |
| Future Vol, veh/h | 7 | 94 | 36 | 667 | 939 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 8 | 102 | 39 | 725 | 1021 | 21 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1835 | 1032 | 1042 | 0 | - | 0 |
| Stage 1 | 1032 | - | - | - | - | - |
| Stage 2 | 803 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 83 | 283 | 667 | - | - | - |
| Stage 1 | 344 | - | - | - | - | - |
| Stage 2 | 441 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 78 | 283 | 667 | - | - | - |
| Mov Cap-2 Maneuver | 205 | - | - | - | - | - |
| Stage 1 | 324 | - | - | - | - | - |
| Stage 2 | 441 | - | - | - | - | - |

| Approach | SE | NE | SW |
|---|---|---|---|
| HCM Control Delay, s | 26.4 | 0.5 | 0 |
| HCM LOS | D | | |

| Minor Lane/Major Mvmt | NEL | NET | SELn1 | SWT | SWR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 667 | - | 276 | - | - |
| HCM Lane V/C Ratio | 0.059 | - | 0.398 | - | - |
| HCM Control Delay (s) | 10.7 | - | 26.4 | - | - |
| HCM Lane LOS | B | - | D | - | - |
| HCM 95th %tile Q(veh) | 0.2 | - | 1.8 | - | - |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 23 | 211 | 10 | 104 | 376 | 24 | 8 | 22 | 34 | 16 | 35 | 19 |
| Future Volume (vph) | 23 | 211 | 10 | 104 | 376 | 24 | 8 | 22 | 34 | 16 | 35 | 19 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 100 | | 100 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 1 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.993 | | | | 0.850 | | 0.929 | | | 0.963 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.994 | | | 0.989 | |
| Satd. Flow (prot) | 1770 | 1850 | 0 | 1770 | 1863 | 1583 | 0 | 1720 | 0 | 0 | 1774 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.994 | | | 0.989 | |
| Satd. Flow (perm) | 1770 | 1850 | 0 | 1770 | 1863 | 1583 | 0 | 1720 | 0 | 0 | 1774 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 945 | | | 2650 | | | 1342 | | | 1038 | |
| Travel Time (s) | | 21.5 | | | 60.2 | | | 30.5 | | | 23.6 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 25 | 229 | 11 | 113 | 409 | 26 | 9 | 24 | 37 | 17 | 38 | 21 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 25 | 240 | 0 | 113 | 409 | 26 | 0 | 70 | 0 | 0 | 76 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | Yes | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 39.7% ICU Level of Service A

Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 23 | 211 | 10 | 104 | 376 | 24 | 8 | 22 | 34 | 16 | 35 | 19 |
| Future Vol, veh/h | 23 | 211 | 10 | 104 | 376 | 24 | 8 | 22 | 34 | 16 | 35 | 19 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 100 | - | - | 100 | - | 100 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 25 | 229 | 11 | 113 | 409 | 26 | 9 | 24 | 37 | 17 | 38 | 21 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 435 | 0 | 0 | 240 | 0 | 0 | 963 | 946 | 235 | 950 | 925 | 409 |
| Stage 1 | - | - | - | - | - | - | 285 | 285 | - | 635 | 635 | - |
| Stage 2 | - | - | - | - | - | - | 678 | 661 | - | 315 | 290 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 1125 | - | - | 1327 | - | - | 235 | 262 | 804 | 240 | 269 | 642 |
| Stage 1 | - | - | - | - | - | - | 722 | 676 | - | 467 | 472 | - |
| Stage 2 | - | - | - | - | - | - | 442 | 460 | - | 696 | 672 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1125 | - | - | 1327 | - | - | 184 | 234 | 804 | 194 | 241 | 642 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 184 | 234 | - | 194 | 241 | - |
| Stage 1 | - | - | - | - | - | - | 706 | 661 | - | 457 | 432 | - |
| Stage 2 | - | - | - | - | - | - | 357 | 421 | - | 626 | 657 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.8 | 1.6 | 17.6 | 23.3 |
| HCM LOS | | | C | C |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 356 | 1125 | - | - | 1327 | - | - | 272 |
| HCM Lane V/C Ratio | 0.195 | 0.022 | - | - | 0.085 | - | - | 0.28 |
| HCM Control Delay (s) | 17.6 | 8.3 | - | - | 8 | - | - | 23.3 |
| HCM Lane LOS | C | A | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 0.7 | 0.1 | - | - | 0.3 | - | - | 1.1 |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 136 | 552 | 60 | 52 | 545 | 16 | 45 | 5 | 59 | 1 | 4 | 2 |
| Future Volume (vph) | 136 | 552 | 60 | 52 | 545 | 16 | 45 | 5 | 59 | 1 | 4 | 2 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 100 | 100 | | 100 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 1 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | | 0.850 | | 0.927 | | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.980 | | | 0.993 | |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1692 | 0 | 0 | 1778 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.980 | | | 0.993 | |
| Satd. Flow (perm) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1692 | 0 | 0 | 1778 | 0 |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 5143 | | | 2654 | | | 1121 | | | 1103 | |
| Travel Time (s) | | 116.9 | | | 60.3 | | | 25.5 | | | 25.1 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 148 | 600 | 65 | 57 | 592 | 17 | 49 | 5 | 64 | 1 | 4 | 2 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 148 | 600 | 65 | 57 | 592 | 17 | 0 | 118 | 0 | 0 | 7 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 0 | | | 0 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | Yes | | | Yes | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |

## Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.6% ICU Level of Service A

Analysis Period (min) 15

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 136 | 552 | 60 | 52 | 545 | 16 | 45 | 5 | 59 | 1 | 4 | 2 |
| Future Vol, veh/h | 136 | 552 | 60 | 52 | 545 | 16 | 45 | 5 | 59 | 1 | 4 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 100 | - | 100 | 100 | - | 100 | - | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 148 | 600 | 65 | 57 | 592 | 17 | 49 | 5 | 64 | 1 | 4 | 2 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 609 | 0 | 0 | 665 | 0 | 0 | 1308 | 1619 | 300 | 1305 | 1667 | 296 |
| Stage 1 | - | - | - | - | - | - | 896 | 896 | - | 706 | 706 | - |
| Stage 2 | - | - | - | - | - | - | 412 | 723 | - | 599 | 961 | - |
| Critical Hdwy | 4.14 | - | - | 4.14 | - | - | 7.54 | 6.54 | 6.94 | 7.54 | 6.54 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.54 | 5.54 | - | 6.54 | 5.54 | - |
| Follow-up Hdwy | 2.22 | - | - | 2.22 | - | - | 3.52 | 4.02 | 3.32 | 3.52 | 4.02 | 3.32 |
| Pot Cap-1 Maneuver | 966 | - | - | 920 | - | - | 117 | 102 | 696 | 118 | 96 | 700 |
| Stage 1 | - | - | - | - | - | - | 301 | 357 | - | 393 | 437 | - |
| Stage 2 | - | - | - | - | - | - | 588 | 429 | - | 455 | 333 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 966 | - | - | 920 | - | - | 94 | 81 | 696 | 86 | 76 | 700 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 94 | 81 | - | 86 | 76 | - |
| Stage 1 | - | - | - | - | - | - | 255 | 302 | - | 333 | 410 | - |
| Stage 2 | - | - | - | - | - | - | 544 | 402 | - | 343 | 282 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.7 | 0.8 | 61.1 | 42.3 |
| HCM LOS | | | F | E |

| Minor Lane/Major Mvmt | NBLn1 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 174 | 966 | - | - | 920 | - | - | 104 |
| HCM Lane V/C Ratio | 0.681 | 0.153 | - | - | 0.061 | - | - | 0.073 |
| HCM Control Delay (s) | 61.1 | 9.4 | - | - | 9.2 | - | - | 42.3 |
| HCM Lane LOS | F | A | - | - | A | - | - | E |
| HCM 95th %tile Q(veh) | 4 | 0.5 | - | - | 0.2 | - | - | 0.2 |

# Appendix C Project Cost Estimates

# Appendix C Project Cost Estimates

**Cost Summary 2028/2033Transportation improvements**

The following are budget costs for the projects planned in the 2028/2033 planning window evaluated in the transportation master plan. This summary has been prepared by Gardner Engineering using cost estimates based on recent projects. Budget costs include construction, right of way, engineering, survey, and contingency.

The proposed projects are summarized in the tables below and overviews are shown in the attached exhibits.

**Tables**
Appendix C Table 1: 2028/2033 Recommended Roadway Widening Improvements

Appendix C Table 2: 2028/2033Intersection Improvements

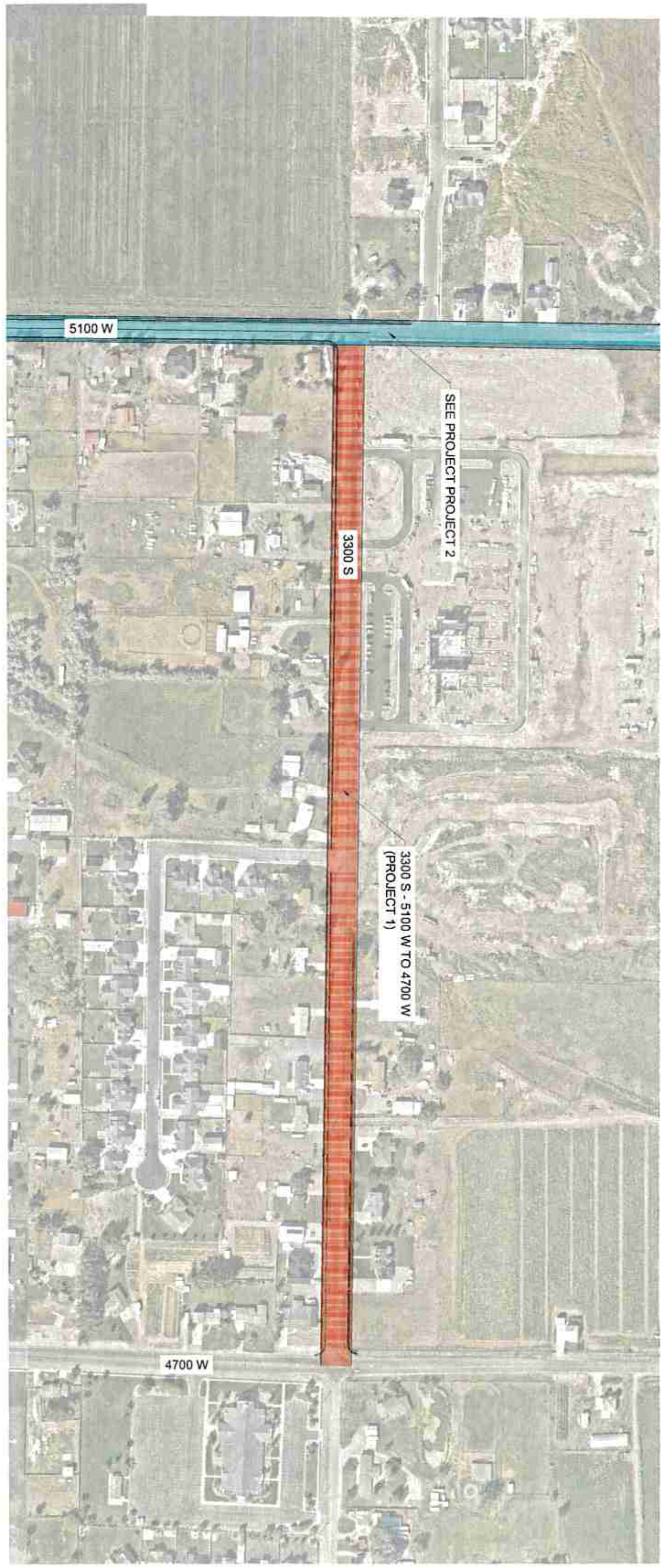
**Exhibits**
Exhibit 1 – 3300 South – 4700 West to 5100 West (Project #1)
Exhibit 2 – 5100 West - 3150 South TO 4000 South (Project #2)
Exhibit 3 – 2700 West – 2050 South to 2550 South (Project #3)
Exhibit 4 – 1800 South to 2100 South (Project #4, 10)
    Wilson Lane – 2700 West to 2400 South (Project #5)
    1800 South – 2700 West to 2300 West (Project #7)
Exhibit 5 – 1800 South – 2050 West to 1750 West (Project #6,15)
Exhibit 6 – 3600 South – 2700 West to Midland Dr (Project #8)
Exhibit 7 – 3300 South to 3600 South (Project #9,16,17)
Exhibit 8 – Midland Drive – 3300 South Alternative Intersection (Project #11)
Exhibit 9 – 4000 South – 5100 West Signal (Project #12)
Exhibit 10 – 4000 South – 4300 West Signal (Project #13)

**Appendix C Table 1: 2028 / 2033 Recommended Roadway Widening Improvements**

| PROJECT # | Road | From | To | Improvement | Cost Estimate | WACOG Funding | Proposed Start Date | Exhibit # |
|---|---|---|---|---|---|---|---|---|
| 1 | 3300 South | 4700 West | 5100 West | Widen Road from 2 to 3 lanes; install sidewalk and C&G | $2,615,457 | $ 1,999,000 | 2025 | 1 |
| 2 | 5100 West | 3150 South | 4000 South | Widen Road from 2 to 3 lanes; install sidewalk and C&G | $3,787,721 | $ 2,799,000 | 2025 | 2 |
| 3 | 2700 West | 2050 South | 2550 South | Widen Road from 2 to 3 lanes; install sidewalk and C&G | $3,550,000 | $ 1,892,000 | 2024 | 3 |
| 4 | Connector | 1800 South | 2100 South | New Road – 5 Lanes | $5,785,410 | $ 4,804,000 | 2026 | 4 |
| 5 | 1800 South | 2700 West | 1950 West | Widen to new Connector (2 to 5 lanes) | $5,513,418 | $ 3,479,360 | 2028 | 4 |
| 6 | 3600 South | 2700 West | Midland Drive | Widen Road to 5 Lanes | $1,223,056 | - | 2029 | 6 |
| 7 | Connector | 3300 W | 3600 South | New Road – 5 Lanes (ROW) | $12,624,360 | $ 2,800,000 | 2023 | 7 |

**Appendix C Table 2: 2028/2033 Intersection Improvements**

| PROJECT # | Intersection | | Improvement | Cost Estimate | WACOG Funding | Proposed Start Date | Exhibit # |
|---|---|---|---|---|---|---|---|
| 8 (part of #4) | 1800 South | Connector Road | Alternative Intersection (Roundabout) | $500,000 | - | 2026 | 4 |
| 9 | 4000 South | 5100 West | Signal & Widening | $1,000,000 | $ 900,000.00 | 2026 | 8 |
| 10 | 4000 South | 4300 West | Signal & Widening | $1,000,000 | $ 900,000.00 | 2026 | 9 |
| 11 | 1800 South | 1900 West | Signal & Widening (UDOT to install signage) | $2,248,300 | $1,848,300 | 2027 | 5 |
| 12 (part of #7) | 3300 South | Connector Road | Alternative Intersection (Roundabout) | $500,000.00 | - | 2029 | 7 |
| 13 | 2700 West | 3600 South | Alternative Intersection (Roundabout) | $500,000.00 | - | 2029 | 7 |

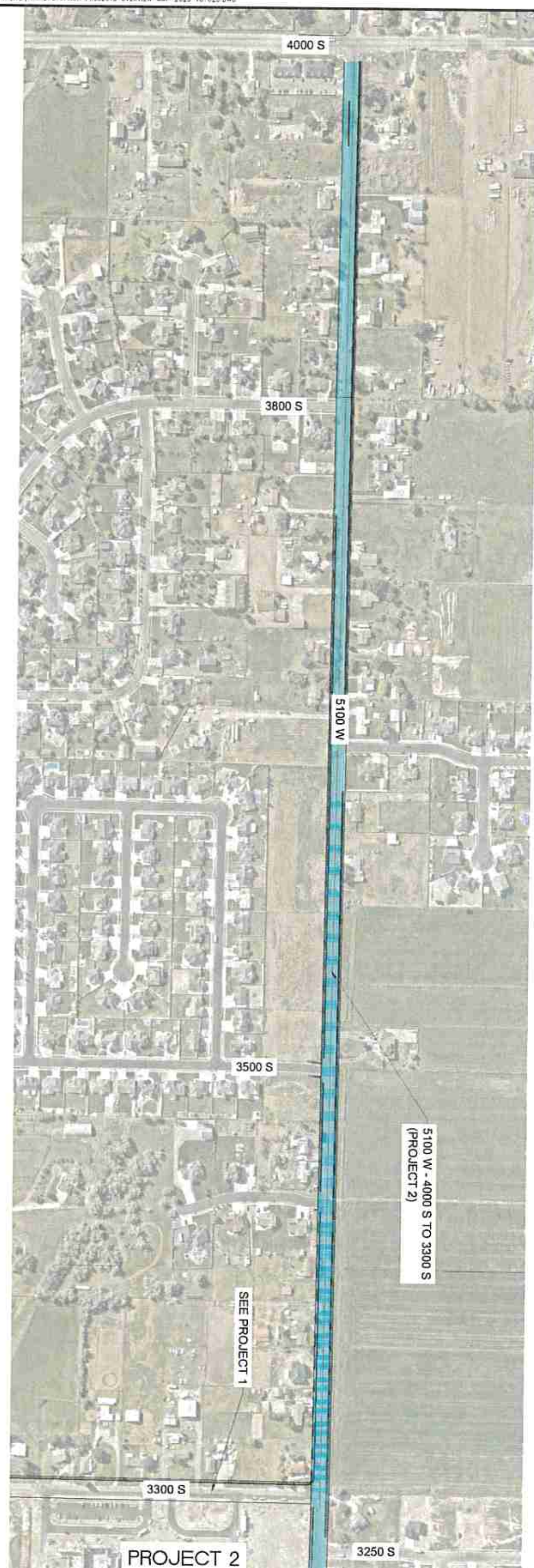



0' 150' 300' 600'
Scale in Feet
Custom

PROJECT 1

| | | | |
|---|---|---|---|
| EX1 | GARDNER ENGINEERING<br>CIVIL ■ LAND PLANNING<br>MUNICIPAL ■ LAND SURVEYING<br>1580 W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 3300 S - 4700 W TO 5100 W<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | Date: 07-11-25<br>Scale: Custom<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |

| Revisions | |
|---|---|
| Date | Description |




| EX2 | GARDNER ENGINEERING<br>CIVIL ■ LAND PLANNING<br>MUNICIPAL ■ LAND SURVEYING<br>1580 W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 5100 W - 3150 S TO 4000 S<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH |
|---|---|---|

| Revisions | | |
|---|---|---|
| Date | Description | Date: 07-11-25 |
| | | Scale: Custom |
| | | Designed: KAN |
| | | Drafted: KAN |
| | | Checked: RC |

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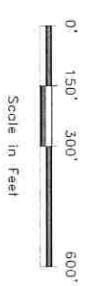


PROJECT 3

| | | | |
|---|---|---|---|
| EX3 | GARDNER ENGINEERING<br>CIVIL ▪ LAND PLANNING<br>MUNICIPAL ▪ LAND SURVEYING<br>1580 W 2100 S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 2700 W - 2050 S TO 2550 S<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | Date: 07-11-25<br>Scale: Custom<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |

| Revisions | |
|---|---|
| Date | Description |

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0' 150' 300' 600'
Scale in Feet
Custom

PROJECTS 4, 5 AND 8

EX4

GARDNER ENGINEERING
CIVIL ▪ LAND PLANNING
MUNICIPAL ▪ LAND SURVEYING
1580 W 2100S, WEST HAVEN, UT 84401
P 801.476.0202 F 801.476.0066

1800 S TO 2100 S
WILSON LANE
TRANSPORTATION MASTER PLAN
WEST HAVEN, WEBER, UTAH

| Revisions | |
|---|---|
| Date | Description |
| | |

Date: 07-11-25
Scale: Custom
Designed: KAN
Drafted: KAN
Checked: RC

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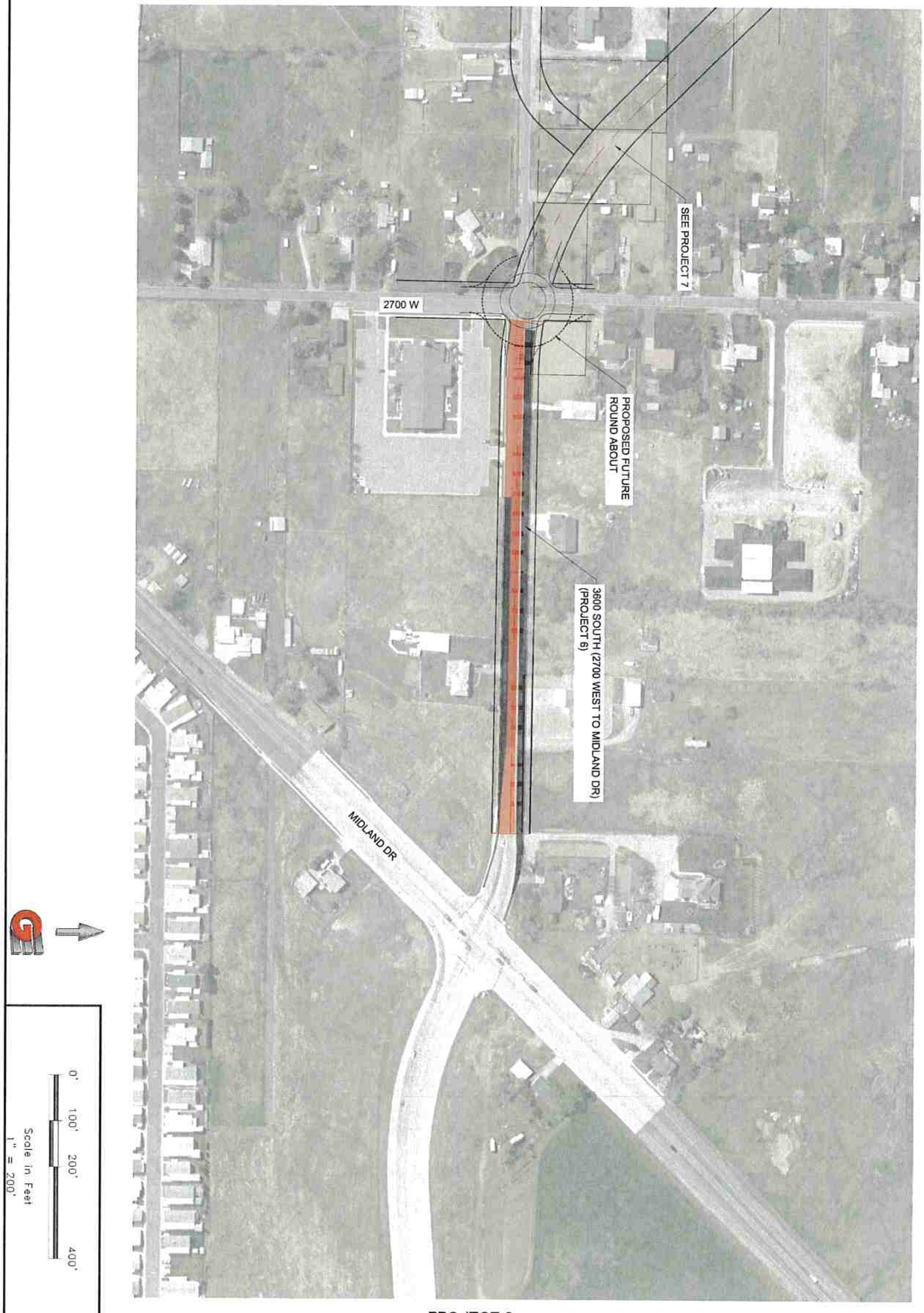
0' 103' 206' 412'

Scale in Feet
Custom

| EX5 | GARDNER ENGINEERING<br>CIVIL ▪ LAND PLANNING<br>MUNICIPAL ▪ LAND SURVEYING<br>1580W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 1800 S -1900 W<br>2050 W TO 1750 W<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | | Revisions | | Date: 07-11-25 |
|---|---|---|---|---|---|---|
| | | | | Date | Description | Scale: Custom |
| | | | | | | Designed: KAN |
| | | | | | | Drafted: KAN |
| | | | | | | Checked: RC |




PROJECT 8

| | | | | |
|---|---|---|---|---|
| EX6 | GARDNER ENGINEERING<br>CIVIL ■ LAND PLANNING<br>MUNICIPAL ■ LAND SURVEYING<br>1580 W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 3600 SOUTH - 2700 TO MIDLAND<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | Revisions: Date / Description | Date: 07-11-25<br>Scale: 1" = 200'<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |

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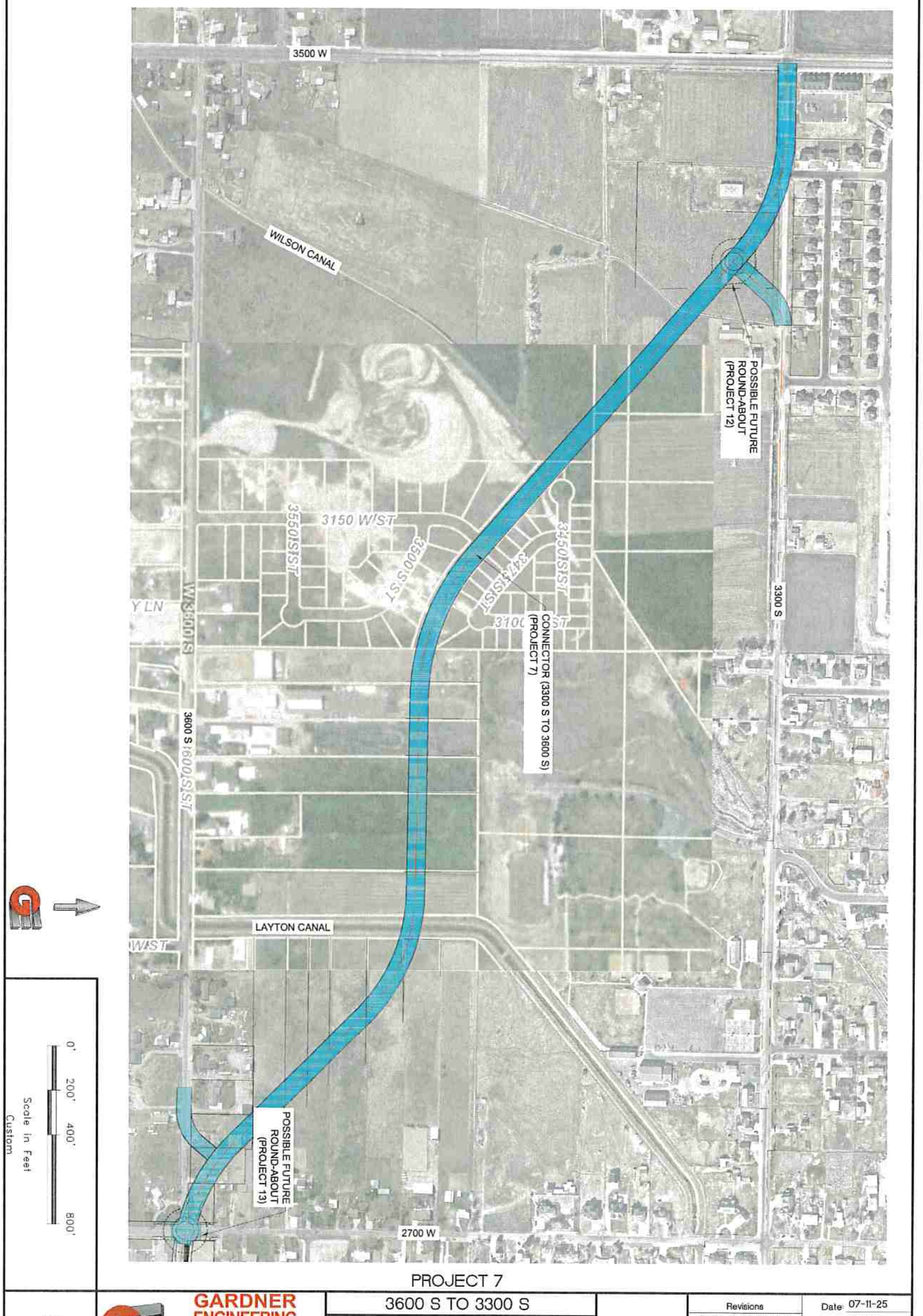


PROJECT 7

| EX7 | GARDNER ENGINEERING<br>CIVIL • LAND PLANNING<br>MUNICIPAL • LAND SURVEYING<br>1580 W 2100 S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 3600 S TO 3300 S<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | Revisions | | Date: 07-11-25<br>Scale: Custom<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |
|---|---|---|---|---|---|
| | | | Date | Description | |

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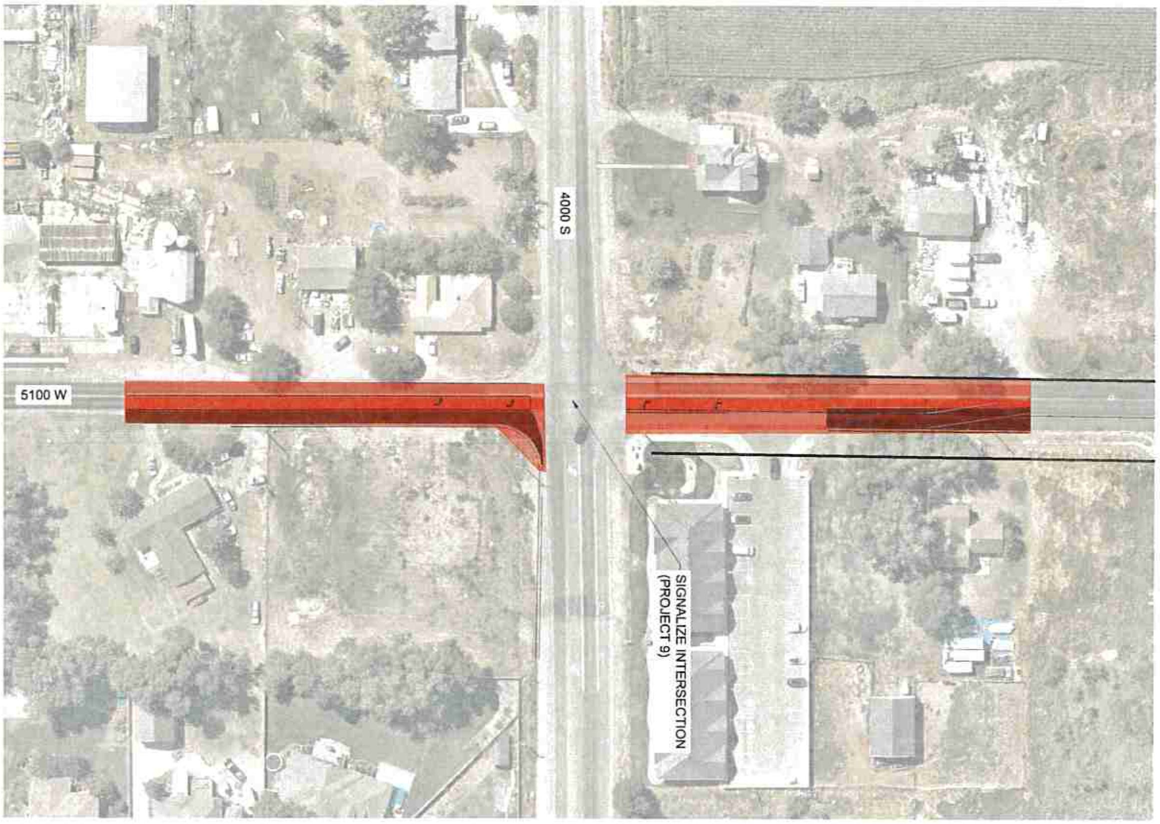


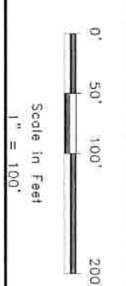


PROJECT 9

| | | | | | |
|---|---|---|---|---|---|
| EX8 | GARDNER ENGINEERING<br>CIVIL • LAND PLANNING<br>MUNICIPAL • LAND SURVEYING<br>1580 W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 801.476.0066 | 5100 W SIGNAL<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | | Revisions<br>Date / Description | Date: 07-11-25<br>Scale: 1" = 100'<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |

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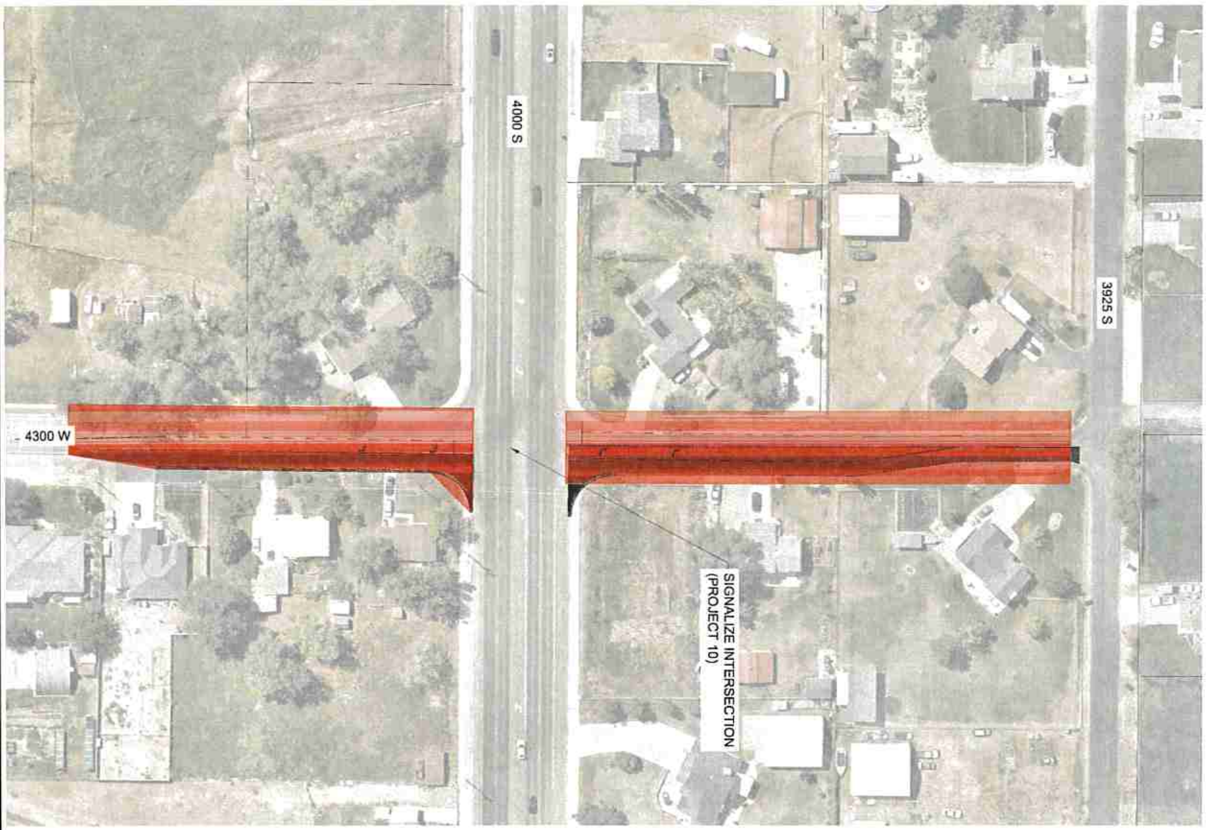


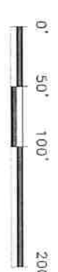


PROJECT 10

| | | | | |
|---|---|---|---|---|
| EX9 | GARDNER ENGINEERING<br>CIVIL • LAND PLANNING<br>MUNICIPAL • LAND SURVEYING<br>1580 W 2100S, WEST HAVEN, UT 84401<br>P 801.476.0202 F 601.476.0066 | 4300 W SIGNAL<br>TRANSPORTATION MASTER PLAN<br>WEST HAVEN, WEBER, UTAH | Revisions (Date / Description) | Date: 07-11-25<br>Scale: 1" = 100'<br>Designed: KAN<br>Drafted: KAN<br>Checked: RC |

# WEST HAVEN CITY

## *STORM DRAIN*
## *IMPACT FEE FACILITIES PLAN*

CITY OF
WEST HAVEN

**SEPTEMBER 2022**
**REVISED SEPTEMBER 2025**

Prepared by:
**GARDNER ENGINEERING**

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# APPENDICES

**A. CAPITAL PROJECTS**

Table 3 – Capital Projects

Figure 4 – Capital Projects Map

Table 4 – Proposed Project sizing

**B. EXISTING STORM DRAIN SYSTEM MAPPING**

**C. Storm Drain Basin Maps with Basin Flow Calculations**

C1 – Hooper Slough

C2 – Howard Slough

C3 - 3300 South and Buttermilk Slough

C4 – Hooper Slough

**D. COST ESTIMATE**

**E. DEVELOPMENT PROJECTION AND IMPERVIOUS AREA ESTIMATE**

## I. Executive Summary

This Storm Drain Impact Fee Facilities Plan (IFFP) summarizes anticipated projects to be undertaken by the City during this impact fee collection period (a 6-year planning window). Projects include system improvements needed to support future growth (impact fee eligible) and improvements needed to address existing drainage deficiencies. Projects that need to address existing deficiencies will be identified as ineligible for funding by impact fees.

It is intended that this IFFP will be used in determining the location and size of system improvements. It is recognized that not all lands will be developed as densely as allowed by zoning, and some zoning may be changed to allow lower or higher densities. The variability of development density and location is accounted for by a regular review and update of the City's IFFP.

Public Facilities identified in this Plan have been sized to accommodate flows at buildout conditions; however, the impact fee will be proportioned to the amount of capacity anticipated to occur within the impact fee collection period in the Impact Fee Analysis (IFA). Proposed land use, population data, and estimated growth rates have been used to calculate the buildout population and year. This information is used for informational purposes and as a resource for prioritizing proposed projects. The estimated buildout population is 39,488. Using estimated growth rates, the estimated buildout year is approximately 2042. Using the US Census data of 3.22 people per household, it is estimated that 6,110 additional units will be developed in the City prior to buildout. Further, it is estimated that the undeveloped area within the City is approximately 1,981 Acres. An estimate of 100 acres of total development or 37.81 acres of impervious development per year, based on historic development data gathered from the Weber County Assessor and the existing development impervious areas sampled throughout the City, as detailed in *Appendix E- Development Projection and Impervious Area Estimate.*

West Haven City is unique in that it is divided into several isolated drainage basins. The basins are created by the various drainage sloughs and the Weber River along the north boundary of the City. Figure 2 – Drainage Basin Overview included in this plan identifies the geographic area of each basin. Historically, the drainage from the roads and fields was conveyed to the slough / river through roadside ditches and culverts. As development has occurred, many of the roadside ditches have been piped, along with additional storm drain infrastructure and detention facilities installed to serve individual subdivisions. The majority of the projects identified in this plan involve the installation of new storm drain infrastructure or the replacement of undersized culverts in ditches that run along the major roads throughout the City to accommodate new growth.

With the assistance of West Haven City Staff, a capital project list was developed to identify the anticipated projects needed to address existing drainage deficiencies and system improvements needed to serve future growth. Estimated peak flows were calculated to determine the size of future storm drainpipes. These projects are identified in Figure 4 – Capital Projects.

Figure 3 – Future Development Area highlights the areas of the City where future development is anticipated to occur. The City's General Plan was used to determine land use densities for these future development areas. City development standards require that, as development occurs, onsite detention basins are constructed as a Project Improvement. Stormwater detained in these basins was evaluated with 0.2 cubic feet per second detained release rates.

Some of the projects identified in this Plan will be necessitated by new development activity. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. Utah Code provides a mechanism for the City to collect from new development their proportionate share of the costs related to providing the Public Facilities needed within the City. This mechanism is the collection of an impact fee. The IFFP will then be analyzed by others to establish the maximum legal impact fee in a separate document called an Impact Fee Analysis (IFA).

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It is recommended that this plan be reevaluated and modified within six years or as growth within the City dictates.

[1] Refer to Appendix A- *Capital Projects* – Table 3. Dollar amount is shown in current value.

## A. CERTIFICATION of Compliance with Utah State Code (11-36a-306(1)):

To the extent the following items are addressed in the IFFP, Gardner Engineering certifies that the following impact fee facilities plan:

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a. allowed under the Impact Fees Act; and

b. actually incurred; or

c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;

2. Does not include:

a. costs of operation and maintenance of public facilities;

b. cost for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by the existing resident's;

c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal reimbursement; and

3. Complies in each and every relevant respect with the Impact Fee Act.

____________________________

Ryan Christensen, P.E.

## II. Introduction

West Haven City has retained Gardner Engineering to update its Storm Drain Impact Fee Facilities Plan (IFFP).

The IFFP is being updated using the City's current General Plan to estimate future development density.

The steps shown below have been followed in preparing this *West Haven City Storm Drain Impact Fee Facilities Plan.*

- Complete existing storm drain system inventory and capacity within the existing storm drain system to serve growth;
- Identify existing and future storm drain outfalls, then delineate drainage basins;
- Size future storm drain pipes using projected flows;
- Identify projects to address existing deficiencies and projects needed due to growth;
- Prepare cost estimates for future projects and identify the portion of the cost of these future projects that are impact fee eligible.

The IFFP update is to estimate future storm water runoff in order to size future storm drainpipes and prepare cost estimates for proposed projects to be used for Impact Fee Analysis (IFA). The Impact Fee Act requires that an impact fee be imposed only when based on Impact Fee Facilities Plan (IFFP). An IFFP must document the following:

A. Identify the existing level of service (LOS).

B. Establish a proposed level of service (LOS).

C. Identify any excess capacity to accommodate future growth at the proposed level of service.

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E. Identify the means by which the political subdivision will meet those growth demands identified in D, above, through new growth, "Buying-In" to excess capacity in C, or the construction of a new Public Facility, which may be financed through grants, bonds, interfund loans, impact fees, and anticipated or accepted dedication of system improvements.

## III. Demographics

Current and buildout population estimates have been prepared to assist in evaluating future infrastructure needs. To prioritize Public Facilities projects, it is necessary to estimate the buildout population and project the buildout year. Population data and estimated growth rates were used to determine the buildout population and year. This data is presented below.

### A. Projected Population at Buildout

The West Haven City General Plan (*Figure 1*) was used to estimate buildout population. See *Table 1 – Projected Total Population by Land Use.*

*The densities (units/ac) used are based on the City's General Plan zoning, with adjustments made to account for existing development densities and conservative estimates of population from multi-family residential areas.*

**Table 1 – Projected Total Population by Land Use at Buildout**

| Average Land Use Density | Total Acres | Units/Acre | Units at Buildout | Population at Buildout | Undeveloped acres |
|---|---|---|---|---|---|
| R-1 Zoning (20,000 ft² Lots) | 770.69 | 1 | 771 | 2,697 | 181.8 |
| R-2 Zoning (12,500 ft² Lots) | 1024.06 | 2 | 2,048 | 7,168 | 541.0 |
| R-2.5 Zoning (10,000 ft² Lots) | 353.71 | 2.5 | 884 | 3,095 | 180.4 |
| R-3 Multi-Family | 96.92 | 12 | 1,163 | 4,070 | 36.6 |
| R-4 (8,000 ft² Per Acre) | 18.23 | 4 | 73 | 255 | 0.0 |
| AGRICULTURE (A-1) | 1337.77 | 1 | 1,338 | 4,682 | 6.6 |
| AGRICULTURE (A-2) | 212.08 | 1 | 212 | 742 | 174.5 |
| COMMERCIAL (C-1) | 90.96 | 0 | 0 | 0 | 23.4 |
| COMMERCIAL (C-2) | 299.92 | 0 | 0 | 0 | 138.0 |
| COMMERCIAL (C-3) | 613.01 | 0 | 0 | 0 | 226.5 |
| HEAVY INDUSTRIAL (M-2) | 131.86 | 0 | 0 | 0 | 0.0 |
| LIGHT INDUSTRIAL (M-1) | 83.09 | 0 | 0 | 0 | 0.0 |
| MIXED USE ZC HIGH / MEDIUM / LOW DENSITY | 1058.35 | 4 | 4,233 | 14,817 | 156.3 |
| PARKS / PUBLIC OPEN SPACES/ SCHOOLS | 526.00 | 0 | 0 | 0 | 94.2 |
| DRINKING WATER TREATMENT FACILITY | 193.68 | 2 | 387 | 1,356 | 191.6 |
| PH ZONE | 34.55 | 5 | 173 | 605 | 6.2 |
| TOTAL | 6844.87 | - | - | 39,488 | 1957.0 |

**Table 2 - Population Projections 2010-2043**

| Year | % Increase | Population | |
|---|---|---|---|
| **2010** | | **10,272** | **US Census Data** |
| 2011 | 5.0% | 10,790 | |
| 2012 | 5.0% | 11,334 | |
| 2013 | 5.0% | 11,905 | |
| 2014 | 5.0% | 12,505 | |
| 2015 | 5.0% | 13,136 | |
| 2016 | 5.0% | 13,798 | |
| 2017 | 5.0% | 14,493 | |
| 2018 | 5.0% | 15,223 | |
| 2019 | 5.0% | 15,991 | |
| **2020** | 5.0% | **16,802** | **US Census Data** |
| 2021 | 8.8% | 18,281 | |
| **2022** | 8.8% | **19,880** | **Census Estimate** |
| 2023 | 3.5% | 20,576 | |
| 2024 | 3.5% | 21,296 | |
| 2025 | 3.5% | 22,041 | |
| 2026 | 3.5% | 22,813 | |
| 2027 | 3.5% | 23,611 | |
| 2028 | 3.5% | 24,438 | |
| 2029 | 3.5% | 25,293 | |
| 2030 | 3.5% | 26,178 | |
| 2031 | 3.5% | 27,094 | |
| 2032 | 3.5% | 28,043 | |
| 2033 | 3.5% | 29,024 | |
| 2034 | 3.5% | 30,040 | |
| 2035 | 3.5% | 31,091 | |
| 2036 | 3.5% | 32,180 | |
| 2037 | 3.5% | 33,306 | |
| 2038 | 3.5% | 34,472 | |
| 2039 | 3.5% | 35,678 | |
| 2040 | 3.5% | 36,927 | |
| 2041 | 3.5% | 38,219 | |
| **2042** | 3.3% | **39,488** | **Estimated Buildout** |

### C. Service Area and Projected Land Use

The service area boundary of this Impact Fee Facilities Plan includes the West Haven City boundary, and as amended through annexations. The General Plan indicates several areas for future annexations.

## IV. Impact Fee Facility Plan

### A. Design Standards for Planning

*The West Haven storm drain system is comprised of major and minor systems.* The minor system consists of the components, including curbs, gutters, ditches, inlets, pipes, open channels, etc. The minor system is designed to carry runoff from the 10-year storm event.

The major system provides overland relief for stormwater flows exceeding the capacity of the minor system. This usually happens during more infrequent storm events, such as the 50 and 100-year storms. The major storm drainage system consists of a combination of storm drainpipes and channelizing surface flows, including the streets and frontages within the right of way. The roadways in newly developed areas should be constructed lower than the adjacent lots, which allows roadways to convey the runoff exceeding the capacity of the minor system.

This IFFP analyzes the minor storm drainage system designed to handle the 10-year storm event. Applying the 100-year storm event to the major storm drainage system is a more complex issue and is not addressed in this Plan. Detailed topography citywide would be necessary to model the flow patterns of a 100-year storm event. It is recommended that the City require that the major storm system in new development be designed to meet the design criteria of the 100-year storm event, specifically the detention facilities. In addition, the City has adopted a Low Impact Development (LID) Standard to address water quality requirements. The LID standard can be accessed on the City's website. The following design criteria are used in this Plan:

**Pipe – Size:** New storm drainpipes shall be a minimum of 15" as required by West Haven City. It is recommended that the maximum pipe size be based on necessary cover and water table elevations.

**Pipe – Slope:** Pipes slopes that were evaluated were taken from the data gathered as part of the field survey. Future pipes were sized using an estimated 0.50% slope.

**Flow Calculations:** The Manning's Equation was used for flow calculations to analyze pipe capacity. For future concrete pipe flow calculations, a Manning's Coefficient (n) of 0.013 was used.

### B. Storm Drainage Evaluation

The Rational method was used to approximate the 10-year peak flow for each subbasin. For subbasins that had detention ponds, the release rate of 0.2 cfs/acre was used for the peak flow. Undeveloped areas are anticipated to detain stormwater flows at a rate of 0.2 cfs / acre.

### C. Inventory of Existing System

An inventory of the existing storm drain system was initially compiled to create a GIS mapping system. The original mapping was prepared using available plans, survey data, and a visual survey. Ongoing coordination with City staff has been used to

identify unknown information in the existing system mapping. Gardner Engineering surveyed the location of manholes, inlets, and outfalls. Survey Data was to update the existing mapping.

The completed inventory of the storm drain system was used to delineate basins and evaluate flows. The existing storm drain mapping is maintained digitally on the City's online GIS mapping. Additionally, mapping sheets have been created and are included in *Appendix B – Existing Storm Drain System* Mapping.

## D. Level of Service Summary

The level of service for the West Haven Storm Drain system is summarized below. The proposed level of service is the same as the existing level of service. Therefore, only one level of service is listed in this Plan. Unlike many other utilities, there are few minimum State of Utah standards for storm drain. The level of service is established to provide the infrastructure needed to protect residents and property from flooding. Standards are set to find a balance between cost, feasibility, and acceptable water levels throughout the City during a storm event. The table below includes the existing and proposed level of service standards.

**Level of Service**

| Description | Standard |
|---|---|
| Allowable Runoff | Development within the City is required to detain stormwater with a release rate of 0.2 CFS / AC. This release rate is intended to maintain predevelopment runoff rates |
| Detention | Volume required to hold the 100 – year design storm with at least 1 ft of freeboard. Release rate per Allowable Runoff. |
| Storm Drain Conveyance | Pipes shall be designed to carry the minor 10-year storm. The major 100-year storm is planned to be conveyed in detention ponds, pipes, and within road right-of-ways. Minimum pipe size is 15" RCP with adequate slope to carry the necessary flows. |

## E. Excess Capacity

The existing storm drain system was evaluated to determine areas of future development that will be served by existing storm drain infrastructure. Figure 3 – Future Development Area shows areas where future development is anticipated. There are isolated areas of future development that may utilize existing storm drain infrastructure, but the majority of future development will be served by new Public Facilities or project-specific improvements. In addition to future Public Facilities, future development will largely utilize existing sloughs and the Weber River for stormwater conveyance. Buy-in for the use of excess capacity in the sloughs and river was not analyzed because the facilities were not constructed by the City with known costs.

## F. Collection System Analysis

**Drainage Basins:** The City is delineated into 6 different drainage basins A-F. The basins were delineated based on where the basin outfall is located. A map of the drainage basins is shown in *Figure 2 – Drainage Basins Overview.* The following is a description of each basin:

- Basin A – Hooper Slough

  The Hooper Slough drainage basin is the largest basin in the City. The Hooper Slough begins in the general area south of 1800 South and west for 1900 West. The slough runs out of the existing City boundary west of 3200 West, and then the recently annexed area of Staker Farm Subdivision, and then back into the City south of 3300 South at approximately 4100 West, where it remains within the City boundary until entering Hooper City at 5100 West and 4600 South. There are several outfalls from the storm drain system into the slough. The City has completed several slough culvert improvement projects for roadway widening projects. For long-term flood control, a master planned regional detention pond is planned as part of the Green Farms Subdivision near 4100 West and 3800 South. The Buttermilk Slough and the 3300 South basins both flow into the Hooper Slough. Basin descriptions for these are included below.

- Basin B – Buttermilk Slough

  The Buttermilk Slough begins within the City east of 2700 West and north of 3300 South, and begins as channelized flow west of the Layton Canal. The Buttermilk Slough flows into a piped section of the Hooper Slough in 3500 West at approximately 2700 South. There are several outfalls to the slough from the storm drain system. The slough runs through the future Windsor Farms Park. For long-term flood control, there is planned regional detention within the park area.

- Basin C – Howard Slough

  The Howard Slough begins near 3300 West and 3600 South and runs southwest through the City until entering Roy City near 4000 West and 4600 South. There are several outfalls to the slough from the storm drain system. The City has completed culvert upgrades on the Howard Slough for road projects in the past. There have also been isolated areas of the slough that have been piped through the development of adjacent properties.

- Basin D – Weber River

  The Weber River Basin is located along the City's north boundary, generally northeast of 1900 West and 1800 South. The area within the basin encompasses several industrial zones located east of I-15 and adjacent to 1900 West. There are also residential areas north of 1800 South and east of I-15. These areas drain to the river through various drainage ditches and storm drainpipes.

- Basin E – 3300 South

  The 3300 South Drainage Basin includes the area tributary to the Hooper Slough east of the Hooper Slough Basin and south of the Buttermilk Basin. The basin includes areas of roadside ditches and development-related storm drain improvements. Runoff from this basin leaves the City boundary and runs into an unincorporated area at 3300 South and 3500 West until eventually flowing into the Hooper Slough at 3300 South and 4200 West. There are planned improvements to enable long-term flood control through the use of a regional detention pond at West Haven Country Park.

➢ Basin F – 5100 West

Runoff from the 5100 West Basin flows north along 5100 West and west along 3300 South to the intersection of these streets, where it then leaves the City boundary and flows north along 5100 West. The runoff from this area eventually enters a ditch tributary to the Walker Slough.

**Developed and Undeveloped Area:** Figure 3 – Future Development Area includes the general area of future development. The undeveloped area identified was created using aerial imagery, county parcel data, and taking into account planned subdivisions. The Jordan Valley Water parcels were also identified.

The undeveloped areas of the City were evaluated based on the assumption that stormwater runoff would be detained with a maximum release rate of 0.2 cfs / acre.

**Storm Water Conveyance and Detention in Sloughs:** In most areas of West Haven City, runoff currently collects in storm drainpipes or roadside ditches and is then conveyed to sloughs, which generally flow southwesterly through the City. The existing sloughs serve as drainage channels and, in some areas, provide natural detention. Preserving and maintaining the sloughs for existing and future storm drainage is important because replacing the sloughs with a piped storm drainage system capable of conveying the 100-year storm event is unfeasible due to cost and topography. It is recommended that the City develop a recurring maintenance plan on the sloughs within the City to include dredging existing channels to maintain capacity. Preserving access and obtaining property or easements when development occurs along the sloughs is important to allow for needed maintenance and protection against decreasing slough capacity. The maintenance of sloughs is not an impact fee eligible activity.

**Capital Project List:** In order to create the capital projects list, evaluation of the existing storm drain system was completed with the assistance of the West Haven City Staff to identify existing issues requiring maintenance or improvements. Consideration of anticipated developments and future road reconstruction projects was also considered. Evaluation of contributing areas was completed to determine peak flows, which were then used to size future projects. *Appendix A – Capital Projects* includes a map (see Figure 4) of the proposed capital projects. Projects were grouped together as applicable and assigned project numbers for reference. The assigned project numbers do not correspond with project priority. Table 3 includes a list of capital projects, including total estimated cost and the costs eligible for funding by impact fees. The percentage eligible for impact fees is based on whether the proposed project is needed to serve future growth or just to address existing issues or deficiencies. After evaluation with City Staff, the proposed projects were prioritized into planning year windows. Brief descriptions of each project were created to clarify the intended scope and purpose of the project.

**Project Costs:** Cost estimates were developed using current construction costs. The costs are preliminary estimates of probable construction costs, including costs associated with materials, installation, engineering, construction management, and contingency. A cost per foot was developed for each size of storm drainpipe. This cost was applied to the proposed project lengths to determine total project costs. Estimates are shown under *Appendix D – Cost Estimates.* The total estimated cost of projects identified is included in Table 3 in *Appendix A- Capital Projects.*

As development progresses, the existing storm drain system will be required to accommodate increased flows. In some locations, existing storm drain conveyance will need to be improved to support the buildout demands. Some projects are not eligible to be funded entirely from Impact Fees collected. Each Capital Project was listed with a percentage of cost attributed to existing development, cost attributed to future development within the current planning window, and cost attributed to future development outside of the current planning window. *Table 3* in *Appendix A - Capital Projects* shows the project costs and the portions of costs attributed to existing and future development. The total amount of project costs eligible for impact fee funding within the current planning window is estimated at $2,137,856. The total project cost for the current planning window is $4,518,540.

## G. Suggested Capital Improvement Projects

The rate and location of new development will determine which projects the City actually undertakes. Upon reviewing the Capital Projects with City staff, the list was prioritized. The prioritized list was broken down in 6-year increments from 2022 to buildout. The prioritized list is presented in Table 3 of Appendix A, *Capital Projects*. This priority schedule is a suggested course of action only and should be adjusted periodically as future development occurs.

## H. Method of Financing Needed Facilities

Impact fees collected shall be used within 6 years of receipt in most cases, except as described in Utah Code Section 11-36-302 Impact fees. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. As such, the cost of Impact fee eligible projects will be financed through impact fees. If the rate of impact fee collection is insufficient to pay for the related project in cash, outside financing may be sought. Non-impact fee eligible projects will be financed from user fees and taxes, not from impact fees. Non-impact fee projects were recommended by City staff in order to improve or address existing issues or deficiencies in the system.

### Grants

The City is unaware of any potential grant sources for the stormwater collection system. However, should it be the recipient of any such grants, it will then look at the potential to reduce impact fees.

### Bonds

The City has no outstanding bonds for the stormwater collection system. While the City may issue bonds in the future to fund storm collection facilities, no bonds are currently being contemplated; therefore, no costs associated with bond issuance have been included in the calculation of impact fees.

### Interfund Loans

The City does not anticipate facilitating an interfund loan.

### Impact Fees

Due to the anticipated growth in the City, impact fees are a viable means of allowing new development to pay for its impacts on the existing system. The City finds that it is necessary to impose impact fees to maintain the proposed level of service for the

stormwater collection system. The City's plan for financing these system improvements relies upon impact fees. This IFFP is developed following legal guidelines, enabling the preparation of an Impact Fee Analysis for the stormwater collection system and allowing the City to charge impact fees for the system.

**Anticipated or Accepted Dedications of System Improvements**

Any item that a developer funds must be included in the IFFP if a credit against impact fees is to be issued and must be agreed upon with the City before construction of the improvements.

# WEST HAVEN CITY

## *STORM DRAIN*
## *IMPACT FEE FACILITIES PLAN*

SEPTEMBER 2022
REVISED SEPTEMBER 2025

Prepared by:
GARDNER ENGINEERING

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# APPENDICES


**A. CAPITAL PROJECTS**

Table 3 – Capital Projects

Figure 4 – Capital Projects Map

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**B. EXISTING STORM DRAIN SYSTEM MAPPING**

**C. Storm Drain Basin Maps with Basin Flow Calculations**

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C2 – Howard Slough

C3 - 3300 South and Buttermilk Slough

C4 – Hooper Slough

**D. COST ESTIMATE**

**E. DEVELOPMENT PROJECTION AND IMPERVIOUS AREA ESTIMATE**

## I. Executive Summary

This Storm Drain Impact Fee Facilities Plan (IFFP) summarizes anticipated projects to be undertaken by the City during this impact fee collection period (a 6-year planning window). Projects include system improvements needed to support future growth (impact fee eligible) and improvements needed to address existing drainage deficiencies. Projects that need to address existing deficiencies will be identified as ineligible for funding by impact fees.

It is intended that this IFFP will be used in determining the location and size of system improvements. It is recognized that not all lands will be developed as densely as allowed by zoning, and some zoning may be changed to allow lower or higher densities. The variability of development density and location is accounted for by a regular review and update of the City's IFFP.

Public Facilities identified in this Plan have been sized to accommodate flows at buildout conditions; however, the impact fee will be proportioned to the amount of capacity anticipated to occur within the impact fee collection period in the Impact Fee Analysis (IFA). Proposed land use, population data, and estimated growth rates have been used to calculate the buildout population and year. This information is used for informational purposes and as a resource for prioritizing proposed projects. The estimated buildout population is 39,488. Using estimated growth rates, the estimated buildout year is approximately 2042. Using the US Census data of 3.22 people per household, it is estimated that 6,110 additional units will be developed in the City prior to buildout. Further, it is estimated that the undeveloped area within the City is approximately 1,981 Acres. An estimate of 100 acres of total development or 37.81 acres of impervious development per year, based on historic development data gathered from the Weber County Assessor and the existing development impervious areas sampled throughout the City, as detailed in *Appendix E- Development Projection and Impervious Area Estimate.*

West Haven City is unique in that it is divided into several isolated drainage basins. The basins are created by the various drainage sloughs and the Weber River along the north boundary of the City. Figure 2 – Drainage Basin Overview included in this plan identifies the geographic area of each basin. Historically, the drainage from the roads and fields was conveyed to the slough / river through roadside ditches and culverts. As development has occurred, many of the roadside ditches have been piped, along with additional storm drain infrastructure and detention facilities installed to serve individual subdivisions. The majority of the projects identified in this plan involve the installation of new storm drain infrastructure or the replacement of undersized culverts in ditches that run along the major roads throughout the City to accommodate new growth.

With the assistance of West Haven City Staff, a capital project list was developed to identify the anticipated projects needed to address existing drainage deficiencies and system improvements needed to serve future growth. Estimated peak flows were calculated to determine the size of future storm drainpipes. These projects are identified in Figure 4 – Capital Projects.

Figure 3 – Future Development Area highlights the areas of the City where future development is anticipated to occur. The City's General Plan was used to determine land use densities for these future development areas. City development standards require that, as development occurs, onsite detention basins are constructed as a Project Improvement. Stormwater detained in these basins was evaluated with 0.2 cubic feet per second detained release rates.

Some of the projects identified in this Plan will be necessitated by new development activity. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. Utah Code provides a mechanism for the City to collect from new development their proportionate share of the costs related to providing the Public Facilities needed within the City. This mechanism is the collection of an impact fee. The IFFP will then be analyzed by others to establish the maximum legal impact fee in a separate document called an Impact Fee Analysis (IFA).

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It is recommended that this plan be reevaluated and modified within six years or as growth within the City dictates.

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*The densities (units/ac) used are based on the City's General Plan zoning, with adjustments made to account for existing development densities and conservative estimates of population from multi-family residential areas.*

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| R-2 Zoning (12,500 $ft^2$ Lots) | 1024.06 | 2 | 2,048 | 7,168 | 541.0 |
| R-2.5 Zoning (10,000 $ft^2$ Lots) | 353.71 | 2.5 | 884 | 3,095 | 180.4 |
| R-3 Multi-Family | 96.92 | 12 | 1,163 | 4,070 | 36.6 |
| R-4 (8,000 $ft^2$ Per Acre) | 18.23 | 4 | 73 | 255 | 0.0 |
| AGRICULTURE (A-1) | 1337.77 | 1 | 1,338 | 4,682 | 6.6 |
| AGRICULTURE (A-2) | 212.08 | 1 | 212 | 742 | 174.5 |
| COMMERCIAL (C-1) | 90.96 | 0 | 0 | 0 | 23.4 |
| COMMERCIAL (C-2) | 299.92 | 0 | 0 | 0 | 138.0 |
| COMMERCIAL (C-3) | 613.01 | 0 | 0 | 0 | 226.5 |
| HEAVY INDUSTRIAL (M-2) | 131.86 | 0 | 0 | 0 | 0.0 |
| LIGHT INDUSTRIAL (M-1) | 83.09 | 0 | 0 | 0 | 0.0 |
| MIXED USE ZC HIGH / MEDIUM / LOW DENSITY | 1058.35 | 4 | 4,233 | 14,817 | 156.3 |
| PARKS / PUBLIC OPEN SPACES/ SCHOOLS | 526.00 | 0 | 0 | 0 | 94.2 |
| DRINKING WATER TREATMENT FACILITY | 193.68 | 2 | 387 | 1,356 | 191.6 |
| PH ZONE | 34.55 | 5 | 173 | 605 | 6.2 |
| TOTAL | 6844.87 | - | - | 39,488 | 1957.0 |

## B. Current Population

West Haven was incorporated on July 1, 1991. The 2010 US Census counted the West Haven City population as 10,272. The 2020 US Census count for the City was 16,739. The average growth rate from 2010 to 2020 calculates to be about 5%. During this 10-year period, the City experienced varying rates of growth in a given year. The US Census estimated population for July 2022 as 19,880. This population estimate reflects a growth rate of just under 9% per year from 2020 to 2022. West Haven City, along with other areas of the Wasatch Front, has experienced unprecedented growth in the past few years. These various growth rates make it challenging to predict future growth rates. For the purpose of calculating the buildout year, a growth rate of 3.5% was used. This rate was used as a conservative approach, assuming that the average growth rate will decrease in the future as the undeveloped area in the city is developed. The assumptions and uncertainties involved in these population projections are acceptable because they are used only as a guide to prioritizing future project timelines. Future updates to the IFFP can adjust for updated growth rates and other growth in the service area.

**Table 2 - Population Projections 2010-2043**

| Year | % Increase | Population | |
|---|---|---|---|
| **2010** | | **10,272** | **US Census Data** |
| 2011 | 5.0% | 10,790 | |
| 2012 | 5.0% | 11,334 | |
| 2013 | 5.0% | 11,905 | |
| 2014 | 5.0% | 12,505 | |
| 2015 | 5.0% | 13,136 | |
| 2016 | 5.0% | 13,798 | |
| 2017 | 5.0% | 14,493 | |
| 2018 | 5.0% | 15,223 | |
| 2019 | 5.0% | 15,991 | |
| **2020** | 5.0% | **16,802** | **US Census Data** |
| 2021 | 8.8% | 18,281 | |
| **2022** | 8.8% | **19,880** | **Census Estimate** |
| 2023 | 3.5% | 20,576 | |
| 2024 | 3.5% | 21,296 | |
| 2025 | 3.5% | 22,041 | |
| 2026 | 3.5% | 22,813 | |
| 2027 | 3.5% | 23,611 | |
| 2028 | 3.5% | 24,438 | |
| 2029 | 3.5% | 25,293 | |
| 2030 | 3.5% | 26,178 | |
| 2031 | 3.5% | 27,094 | |
| 2032 | 3.5% | 28,043 | |
| 2033 | 3.5% | 29,024 | |
| 2034 | 3.5% | 30,040 | |
| 2035 | 3.5% | 31,091 | |
| 2036 | 3.5% | 32,180 | |
| 2037 | 3.5% | 33,306 | |
| 2038 | 3.5% | 34,472 | |
| 2039 | 3.5% | 35,678 | |
| 2040 | 3.5% | 36,927 | |
| 2041 | 3.5% | 38,219 | |
| **2042** | 3.3% | **39,488** | **Estimated Buildout** |

### C. Service Area and Projected Land Use

The service area boundary of this Impact Fee Facilities Plan includes the West Haven City boundary, and as amended through annexations. The General Plan indicates several areas for future annexations.

## IV. Impact Fee Facility Plan

### A. Design Standards for Planning

*The West Haven storm drain system is comprised of major and minor systems.* The minor system consists of the components, including curbs, gutters, ditches, inlets, pipes, open channels, etc. The minor system is designed to carry runoff from the 10-year storm event.

The major system provides overland relief for stormwater flows exceeding the capacity of the minor system. This usually happens during more infrequent storm events, such as the 50 and 100-year storms. The major storm drainage system consists of a combination of storm drainpipes and channelizing surface flows, including the streets and frontages within the right of way. The roadways in newly developed areas should be constructed lower than the adjacent lots, which allows roadways to convey the runoff exceeding the capacity of the minor system.

This IFFP analyzes the minor storm drainage system designed to handle the 10-year storm event. Applying the 100-year storm event to the major storm drainage system is a more complex issue and is not addressed in this Plan. Detailed topography citywide would be necessary to model the flow patterns of a 100-year storm event. It is recommended that the City require that the major storm system in new development be designed to meet the design criteria of the 100-year storm event, specifically the detention facilities. In addition, the City has adopted a Low Impact Development (LID) Standard to address water quality requirements. The LID standard can be accessed on the City's website. The following design criteria are used in this Plan:

**Pipe – Size:** New storm drainpipes shall be a minimum of 15" as required by West Haven City. It is recommended that the maximum pipe size be based on necessary cover and water table elevations.

**Pipe – Slope:** Pipes slopes that were evaluated were taken from the data gathered as part of the field survey. Future pipes were sized using an estimated 0.50% slope.

**Flow Calculations:** The Manning's Equation was used for flow calculations to analyze pipe capacity. For future concrete pipe flow calculations, a Manning's Coefficient (n) of 0.013 was used.

### B. Storm Drainage Evaluation

The Rational method was used to approximate the 10-year peak flow for each subbasin. For subbasins that had detention ponds, the release rate of 0.2 cfs/acre was used for the peak flow. Undeveloped areas are anticipated to detain stormwater flows at a rate of 0.2 cfs / acre.

### C. Inventory of Existing System

An inventory of the existing storm drain system was initially compiled to create a GIS mapping system. The original mapping was prepared using available plans, survey data, and a visual survey. Ongoing coordination with City staff has been used to

identify unknown information in the existing system mapping. Gardner Engineering surveyed the location of manholes, inlets, and outfalls. Survey Data was to update the existing mapping.

The completed inventory of the storm drain system was used to delineate basins and evaluate flows. The existing storm drain mapping is maintained digitally on the City's online GIS mapping. Additionally, mapping sheets have been created and are included in *Appendix B – Existing Storm Drain System* Mapping.

## D. Level of Service Summary

The level of service for the West Haven Storm Drain system is summarized below. The proposed level of service is the same as the existing level of service. Therefore, only one level of service is listed in this Plan. Unlike many other utilities, there are few minimum State of Utah standards for storm drain. The level of service is established to provide the infrastructure needed to protect residents and property from flooding. Standards are set to find a balance between cost, feasibility, and acceptable water levels throughout the City during a storm event. The table below includes the existing and proposed level of service standards.

**Level of Service**

| Description | Standard |
|---|---|
| Allowable Runoff | Development within the City is required to detain stormwater with a release rate of 0.2 CFS / AC. This release rate is intended to maintain predevelopment runoff rates |
| Detention | Volume required to hold the 100 – year design storm with at least 1 ft of freeboard. Release rate per Allowable Runoff. |
| Storm Drain Conveyance | Pipes shall be designed to carry the minor 10-year storm. The major 100-year storm is planned to be conveyed in detention ponds, pipes, and within road right-of-ways. Minimum pipe size is 15" RCP with adequate slope to carry the necessary flows. |

## E. Excess Capacity

The existing storm drain system was evaluated to determine areas of future development that will be served by existing storm drain infrastructure. Figure 3 – Future Development Area shows areas where future development is anticipated. There are isolated areas of future development that may utilize existing storm drain infrastructure, but the majority of future development will be served by new Public Facilities or project-specific improvements. In addition to future Public Facilities, future development will largely utilize existing sloughs and the Weber River for stormwater conveyance. Buy-in for the use of excess capacity in the sloughs and river was not analyzed because the facilities were not constructed by the City with known costs.

## F. Collection System Analysis

**Drainage Basins:** The City is delineated into 6 different drainage basins A-F. The basins were delineated based on where the basin outfall is located. A map of the drainage basins is shown in *Figure 2 – Drainage Basins Overview*. The following is a description of each basin:

- Basin A – Hooper Slough

  The Hooper Slough drainage basin is the largest basin in the City. The Hooper Slough begins in the general area south of 1800 South and west for 1900 West. The slough runs out of the existing City boundary west of 3200 West, and then the recently annexed area of Staker Farm Subdivision, and then back into the City south of 3300 South at approximately 4100 West, where it remains within the City boundary until entering Hooper City at 5100 West and 4600 South. There are several outfalls from the storm drain system into the slough. The City has completed several slough culvert improvement projects for roadway widening projects. For long-term flood control, a master planned regional detention pond is planned as part of the Green Farms Subdivision near 4100 West and 3800 South. The Buttermilk Slough and the 3300 South basins both flow into the Hooper Slough. Basin descriptions for these are included below.

- Basin B – Buttermilk Slough

  The Buttermilk Slough begins within the City east of 2700 West and north of 3300 South, and begins as channelized flow west of the Layton Canal. The Buttermilk Slough flows into a piped section of the Hooper Slough in 3500 West at approximately 2700 South. There are several outfalls to the slough from the storm drain system. The slough runs through the future Windsor Farms Park. For long-term flood control, there is planned regional detention within the park area.

- Basin C – Howard Slough

  The Howard Slough begins near 3300 West and 3600 South and runs southwest through the City until entering Roy City near 4000 West and 4600 South. There are several outfalls to the slough from the storm drain system. The City has completed culvert upgrades on the Howard Slough for road projects in the past. There have also been isolated areas of the slough that have been piped through the development of adjacent properties.

- Basin D – Weber River

  The Weber River Basin is located along the City's north boundary, generally northeast of 1900 West and 1800 South. The area within the basin encompasses several industrial zones located east of I-15 and adjacent to 1900 West. There are also residential areas north of 1800 South and east of I-15. These areas drain to the river through various drainage ditches and storm drainpipes.

- Basin E – 3300 South

  The 3300 South Drainage Basin includes the area tributary to the Hooper Slough east of the Hooper Slough Basin and south of the Buttermilk Basin. The basin includes areas of roadside ditches and development-related storm drain improvements. Runoff from this basin leaves the City boundary and runs into an unincorporated area at 3300 South and 3500 West until eventually flowing into the Hooper Slough at 3300 South and 4200 West. There are planned improvements to enable long-term flood control through the use of a regional detention pond at West Haven Country Park.

➢ <u>Basin F – 5100 West</u>

Runoff from the 5100 West Basin flows north along 5100 West and west along 3300 South to the intersection of these streets, where it then leaves the City boundary and flows north along 5100 West. The runoff from this area eventually enters a ditch tributary to the Walker Slough.

**Developed and Undeveloped Area:** Figure 3 – Future Development Area includes the general area of future development. The undeveloped area identified was created using aerial imagery, county parcel data, and taking into account planned subdivisions. The Jordan Valley Water parcels were also identified.

The undeveloped areas of the City were evaluated based on the assumption that stormwater runoff would be detained with a maximum release rate of 0.2 cfs / acre.

**Storm Water Conveyance and Detention in Sloughs:** In most areas of West Haven City, runoff currently collects in storm drainpipes or roadside ditches and is then conveyed to sloughs, which generally flow southwesterly through the City. The existing sloughs serve as drainage channels and, in some areas, provide natural detention. Preserving and maintaining the sloughs for existing and future storm drainage is important because replacing the sloughs with a piped storm drainage system capable of conveying the 100-year storm event is unfeasible due to cost and topography. It is recommended that the City develop a recurring maintenance plan on the sloughs within the City to include dredging existing channels to maintain capacity. Preserving access and obtaining property or easements when development occurs along the sloughs is important to allow for needed maintenance and protection against decreasing slough capacity. The maintenance of sloughs is not an impact fee eligible activity.

**Capital Project List:** In order to create the capital projects list, evaluation of the existing storm drain system was completed with the assistance of the West Haven City Staff to identify existing issues requiring maintenance or improvements. Consideration of anticipated developments and future road reconstruction projects was also considered. Evaluation of contributing areas was completed to determine peak flows, which were then used to size future projects. *Appendix A – Capital Projects* includes a map (see Figure 4) of the proposed capital projects. Projects were grouped together as applicable and assigned project numbers for reference. The assigned project numbers do not correspond with project priority. Table 3 includes a list of capital projects, including total estimated cost and the costs eligible for funding by impact fees. The percentage eligible for impact fees is based on whether the proposed project is needed to serve future growth or just to address existing issues or deficiencies. After evaluation with City Staff, the proposed projects were prioritized into planning year windows. Brief descriptions of each project were created to clarify the intended scope and purpose of the project.

**Project Costs:** Cost estimates were developed using current construction costs. The costs are preliminary estimates of probable construction costs, including costs associated with materials, installation, engineering, construction management, and contingency. A cost per foot was developed for each size of storm drainpipe. This cost was applied to the proposed project lengths to determine total project costs. Estimates are shown under *Appendix D – Cost Estimates.* The total estimated cost of projects identified is included in Table 3 in *Appendix A- Capital Projects.*

As development progresses, the existing storm drain system will be required to accommodate increased flows. In some locations, existing storm drain conveyance will need to be improved to support the buildout demands. Some projects are not eligible to be funded entirely from Impact Fees collected. Each Capital Project was listed with a percentage of cost attributed to existing development, cost attributed to future development within the current planning window, and cost attributed to future development outside of the current planning window. *Table 3* in *Appendix A - Capital Projects* shows the project costs and the portions of costs attributed to existing and future development. The total amount of project costs eligible for impact fee funding within the current planning window is estimated at $2,137,856. The total project cost for the current planning window is $4,518,540.

## G. Suggested Capital Improvement Projects

The rate and location of new development will determine which projects the City actually undertakes. Upon reviewing the Capital Projects with City staff, the list was prioritized. The prioritized list was broken down in 6-year increments from 2022 to buildout. The prioritized list is presented in Table 3 of Appendix A, *Capital Projects*. This priority schedule is a suggested course of action only and should be adjusted periodically as future development occurs.

## H. Method of Financing Needed Facilities

Impact fees collected shall be used within 6 years of receipt in most cases, except as described in Utah Code Section 11-36-302 Impact fees. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. As such, the cost of Impact fee eligible projects will be financed through impact fees. If the rate of impact fee collection is insufficient to pay for the related project in cash, outside financing may be sought. Non-impact fee eligible projects will be financed from user fees and taxes, not from impact fees. Non-impact fee projects were recommended by City staff in order to improve or address existing issues or deficiencies in the system.

### Grants

The City is unaware of any potential grant sources for the stormwater collection system. However, should it be the recipient of any such grants, it will then look at the potential to reduce impact fees.

### Bonds

The City has no outstanding bonds for the stormwater collection system. While the City may issue bonds in the future to fund storm collection facilities, no bonds are currently being contemplated; therefore, no costs associated with bond issuance have been included in the calculation of impact fees.

### Interfund Loans

The City does not anticipate facilitating an interfund loan.

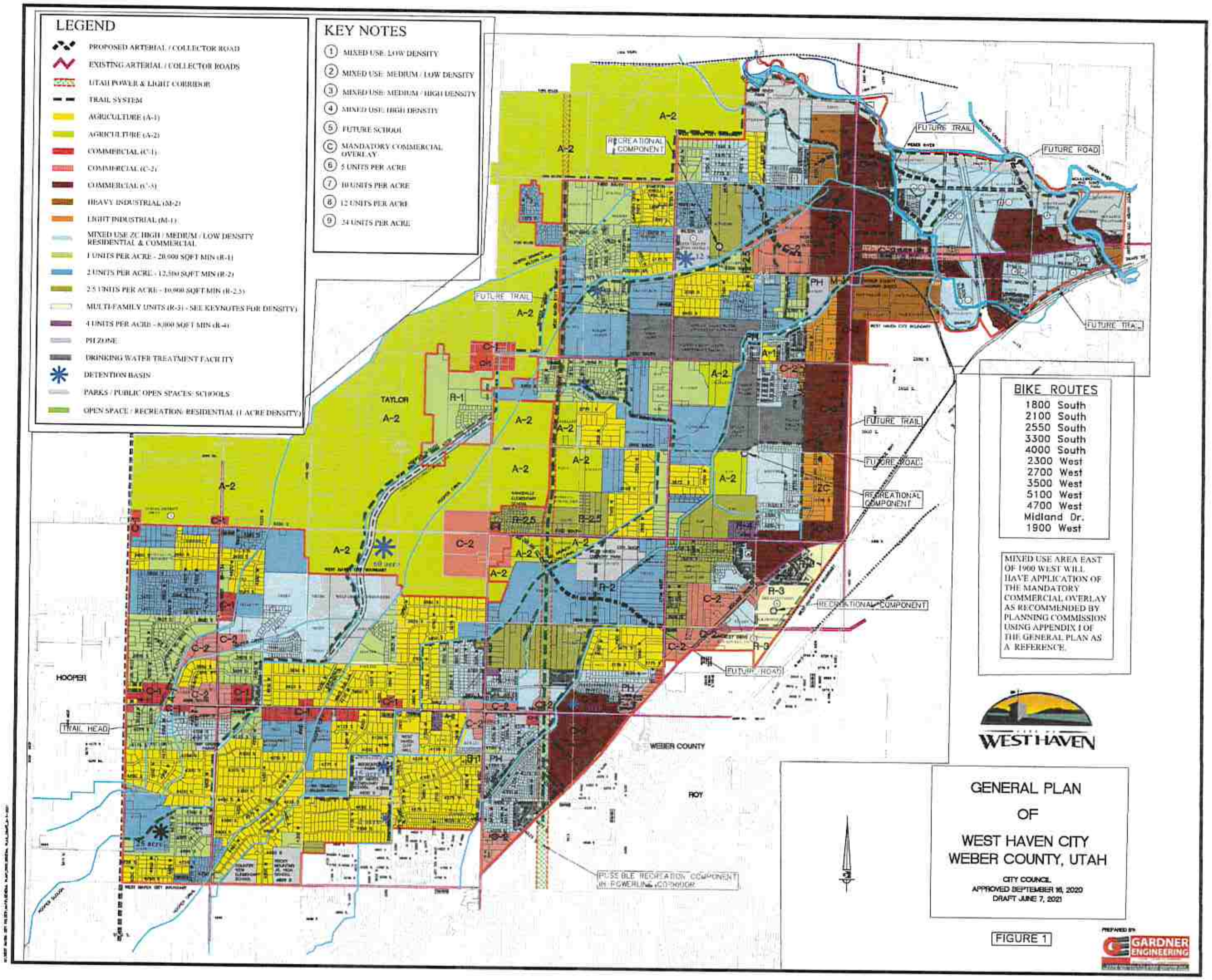
### Impact Fees

Due to the anticipated growth in the City, impact fees are a viable means of allowing new development to pay for its impacts on the existing system. The City finds that it is necessary to impose impact fees to maintain the proposed level of service for the

stormwater collection system. The City's plan for financing these system improvements relies upon impact fees. This IFFP is developed following legal guidelines, enabling the preparation of an Impact Fee Analysis for the stormwater collection system and allowing the City to charge impact fees for the system.

**Anticipated or Accepted Dedications of System Improvements**

Any item that a developer funds must be included in the IFFP if a credit against impact fees is to be issued and must be agreed upon with the City before construction of the improvements.


LEGEND
PROPOSED ARTERIAL / COLLECTOR ROAD
EXISTING ARTERIAL / COLLECTOR ROADS
UTAH POWER & LIGHT CORRIDOR
TRAIL SYSTEM
AGRICULTURE (A-1)
AGRICULTURE (A-2)
COMMERCIAL (C-1)
COMMERCIAL (C-2)
COMMERCIAL (C-3)
HEAVY INDUSTRIAL (M-2)
LIGHT INDUSTRIAL (M-1)
MIXED USE ZC HIGH / MEDIUM / LOW DENSITY RESIDENTIAL & COMMERCIAL
1 UNITS PER ACRE - 20,000 SQFT MIN (R-1)
2 UNITS PER ACRE - 12,500 SQFT MIN (R-2)
2.5 UNITS PER ACRE - 10,000 SQFT MIN (R-2.5)
MULTI-FAMILY UNITS (R-3) - SEE KEYNOTES FOR DENSITY)
4 UNITS PER ACRE - 8,000 SQFT MIN (R-4)
PH ZONE
DRINKING WATER TREATMENT FACILITY
DETENTION BASIN
PARKS / PUBLIC OPEN SPACES/ SCHOOLS
OPEN SPACE / RECREATION: RESIDENTIAL (1 ACRE DENSITY)
KEY NOTES
1 MIXED USE: LOW DENSITY
2 MIXED USE: MEDIUM / LOW DENSITY
3 MIXED USE: MEDIUM / HIGH DENSITY
4 MIXED USE: HIGH DENSITY
5 FUTURE SCHOOL
C MANDATORY COMMERCIAL OVERLAY
6 5 UNITS PER ACRE
7 10 UNITS PER ACRE
8 12 UNITS PER ACRE
9 24 UNITS PER ACRE
A-2
A-1
C-1
C-2
R-1
R-2
R-2.5
R-3
R-4
PH
ZC
TAYLOR
HOOPER
ROY
WEBER COUNTY
TRAIL HEAD
FUTURE TRAIL
FUTURE ROAD
RECREATIONAL COMPONENT
POSSIBLE RECREATION COMPONENT IN POWERLINE CORRIDOR
BIKE ROUTES
1800 South
2100 South
2550 South
3300 South
4000 South
2300 West
2700 West
3500 West
5100 West
4700 West
Midland Dr.
1900 West
MIXED USE AREA EAST OF 1900 WEST WILL HAVE APPLICATION OF THE MANDATORY COMMERCIAL OVERLAY AS RECOMMENDED BY PLANNING COMMISSION USING APPENDIX I OF THE GENERAL PLAN AS A REFERENCE.
WEST HAVEN
GENERAL PLAN
OF
WEST HAVEN CITY
WEBER COUNTY, UTAH
CITY COUNCIL
APPROVED SEPTEMBER 16, 2020
DRAFT JUNE 7, 2021
FIGURE 1
PREPARED BY
GARDNER ENGINEERING

# DRAINAGE BASINS OVERVIEW

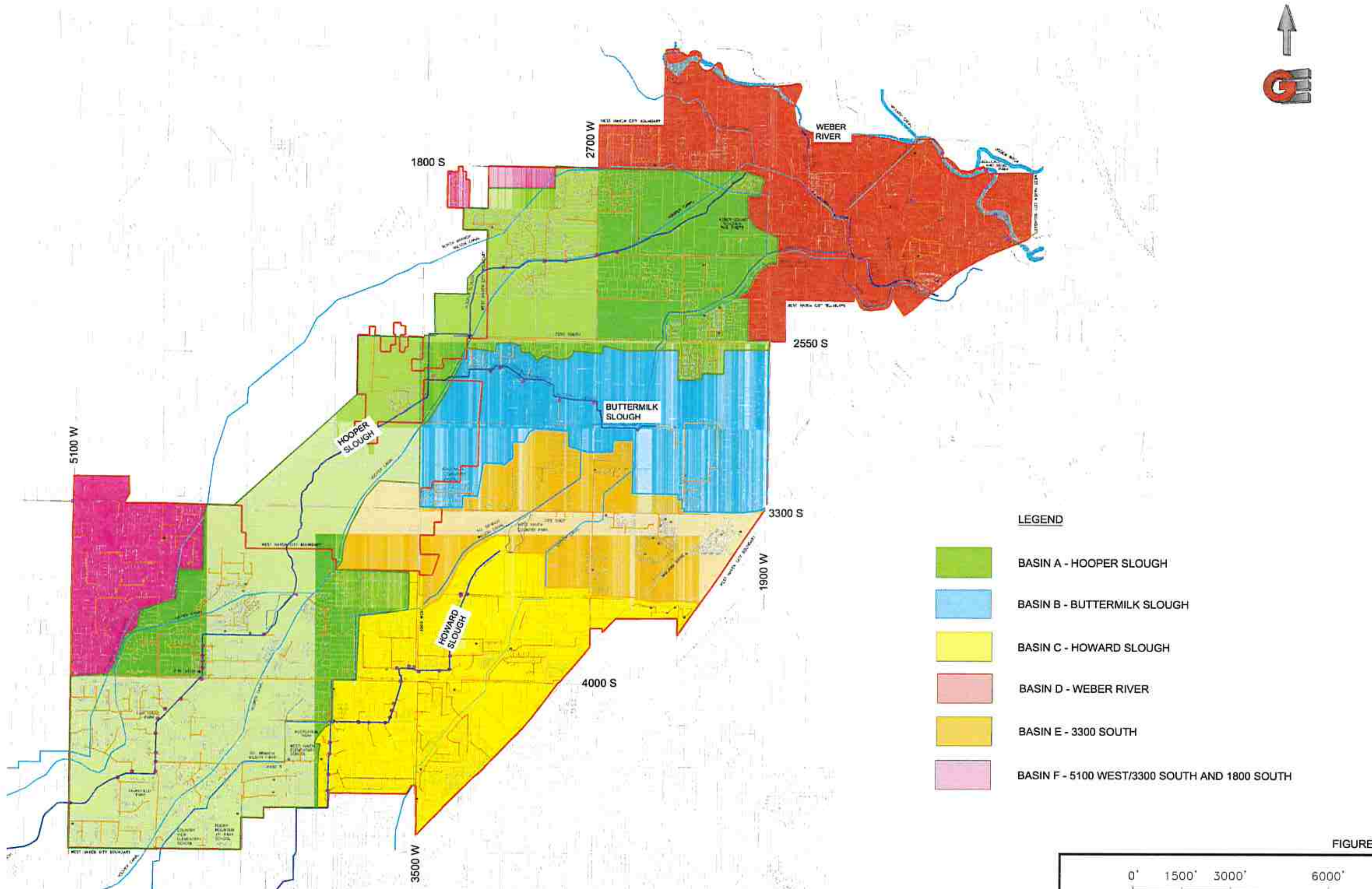



FIGURE 2

0' 1500' 3000' 6000'

Scale in Feet

Custom

| Date | Revisions Description | |
|---|---|---|
| | | Date: 08-10-22 |
| | | Scale: Custom |
| | | Designed: KAN |
| | | Drafted: KAN |
| | | Checked: RC |

DRAINAGE BASINS OVERVIEW

WEST HAVEN - IFFP

PROJECT ADDRESS

WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F2

G:\WEST HAVEN CITY FOLDER\CAPITAL IMPACT\STORM DRAIN\2022\DESIGN\WEST HAVEN EXISTING STORM DRAIN.DWG

# FUTURE DEVELOPMENT AREA

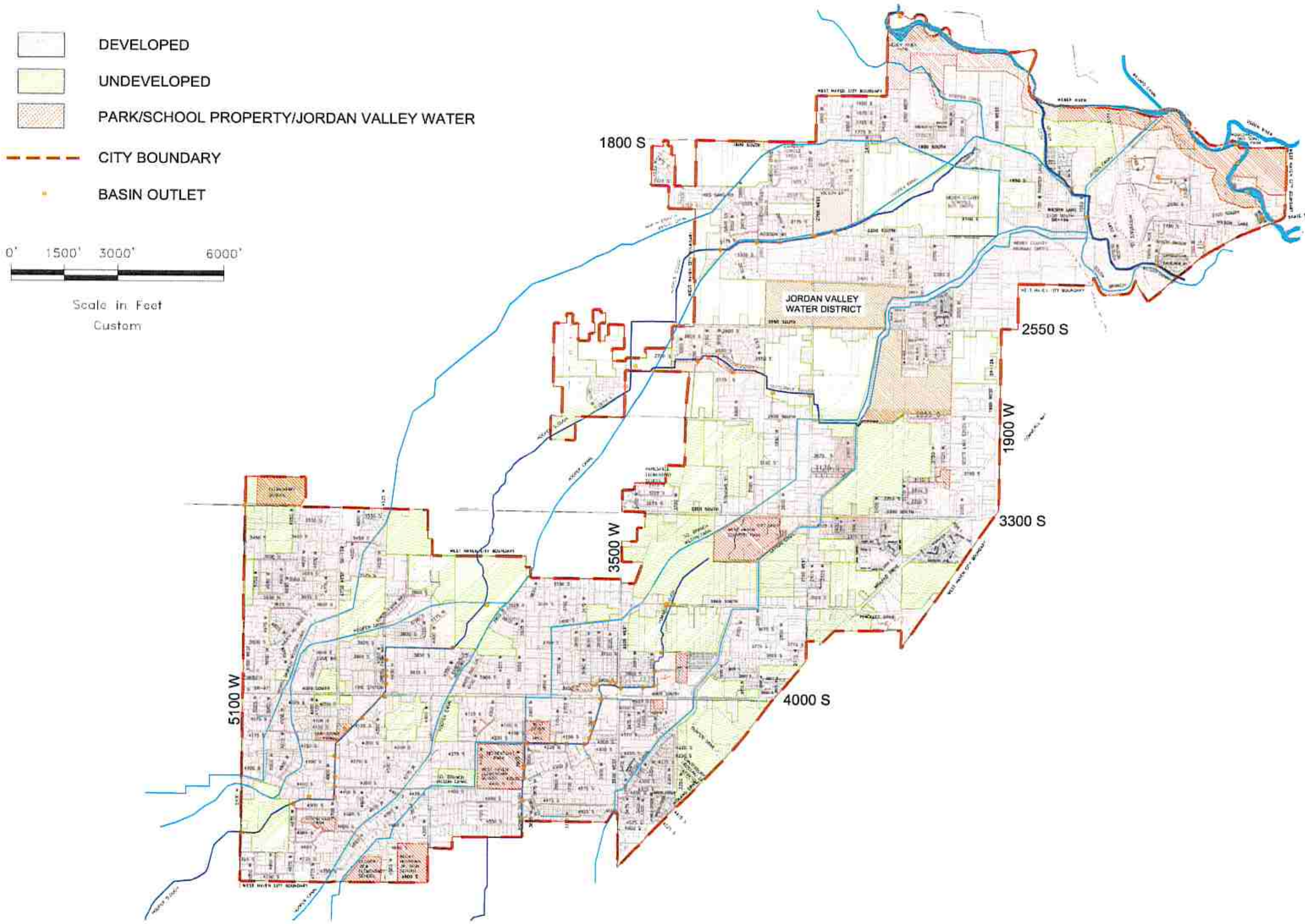



FIGURE 3

| | |
|---|---|
| Date | 8-3-22 |
| Scale | Custom |
| Designed | KAN |
| Drafted | KAN |
| Checked | RC |

Revisions: Date | Description

FUTURE DEVELOPMENT AREA
WEST HAVEN SD IFFP
OVERALL STORM DRAIN
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F3

# APPENDIX A

## Capital Projects

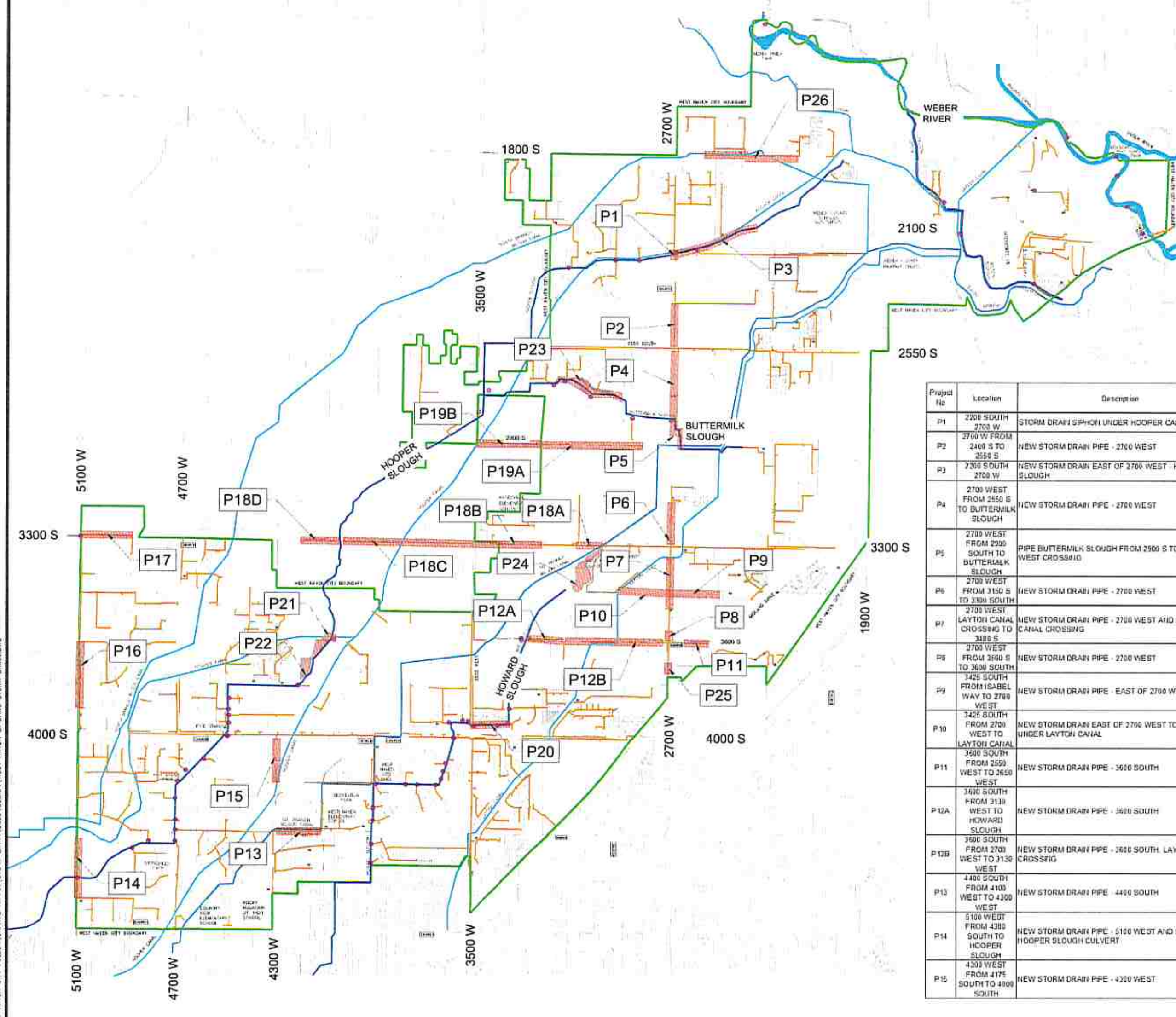
TABLE 3

## CAPITAL PROJECTS 2022

| Project No. | Location | Description | % of Project Cost Attributed to Existing Development | % of Project Cost Attributed to Future Development Current Planning Window (2023-2028) | % of Project Cost Attributed to Future Development (AFTER 2028) | Total Estimated Project Cost: 2023-2028 | Total Estimated Project Cost: 2029-2034 | Total Estimated Project Cost: 2035-2040 | Total Estimated Project Cost: 2041-2046 | Project Cost Attributed to Future Development During Planning Window | Total Planning Window Impact Fee Eligible Costs | Project Cost Attributed to Existing Development | Total Planning Window Cost Attributed to Existing Development |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 | 2200 SOUTH 2700 W | STORM DRAIN SIPHON UNDER HOOPER CANAL | 75% | 25% | 0% | $106,473.70 | | | | $26,618.43 | | $79,855.28 | |
| P2 | 2700 W FROM 2400 S TO 2550 S | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 60% | 40% | $307,150.80 | | | | $184,290.48 | | $0.00 | |
| P3 | 2200 SOUTH 2700 W | NEW STORM DRAIN EAST OF 2700 WEST - HOOPER SLOUGH | 0% | 60% | 40% | $797,221.12 | | | | $478,332.67 | | $0.00 | |
| P10 | 3425 SOUTH FROM 2700 WEST TO LAYTON CANAL | NEW STORM DRAIN WEST OF 2700 WEST TO SIPHON UNDER LAYTON CANAL | 0% | 60% | 40% | $363,593.04 | | | | $218,155.82 | | $0.00 | |
| P16 | 5100 WEST FROM 3720 SOUTH TO 3500 SOUTH | NEW STORM DRAIN PIPE - 5100 WEST | 0% | 60% | 40% | $638,783.91 | | | | $383,270.35 | | $0.00 | |
| P17 | 3300 SOUTH FROM 4950 WEST TO 5100 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $290,925.13 | | | | $174,555.08 | | $0.00 | |
| P18A | 3300 SOUTH FROM 2985 WEST TO STRAIGHT ST. | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $186,390.66 | | | | $111,834.39 | | $0.00 | |
| P18B | 3300 SOUTH FROM 3450 WEST TO CITY BOUNDARY | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $382,666.14 | | | | $229,599.68 | | $0.00 | |
| P20 | 3950 SOUTH FROM 3300 WEST TO 3500 WEST | PIPE THE HOWARD SLOUGH BEHIND ELLIES LANDING | 100% | 0% | 0% | $367,357.58 | | | | $0.00 | | $367,357.58 | |
| P22 | GREEN FARMS 3700 SOUTH AND 4200 WEST | HOOPER SLOUGH REGIONAL DETENTION | 0% | 60% | 40% | $552,000.00 | | | | $331,200.00 | | $0.00 | |
| P26 | 1800 S FROM 2600 W TO 2200 W | REPLACE STORM DRAIN PIPE - 1800 SOUTH | 100% | 0% | 0% | $525,978.03 | | | | $0.00 | $2,137,856.90 | $525,978.03 | $973,190.86 |
| P8 | 2700 WEST FROM 3560 S TO 3600 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | $51,400.87 | | | $51,400.87 | | $0.00 | |
| P9 | 3425 SOUTH FROM ISABEL WAY TO 2700 WEST | NEW STORM DRAIN PIPE - EAST OF 2700 WEST | 30% | 0% | 70% | | $243,898.46 | | | $170,728.93 | | $73,169.54 | |
| P11 | 3600 SOUTH FROM 2550 WEST TO 2650 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH | 0% | 0% | 100% | | $128,987.08 | | | $128,987.08 | | $0.00 | |
| P12A | 3600 SOUTH FROM 3130 WEST TO HOWARD SLOUGH | NEW STORM DRAIN PIPE - 3600 SOUTH | 0% | 0% | 100% | | $340,995.24 | | | $340,995.24 | | $0.00 | |
| P12B | 3600 SOUTH FROM 2700 WEST TO 3130 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH, LAYTON CANAL CROSSING | 0% | 0% | 100% | | $611,956.12 | | | $611,956.12 | | $0.00 | |
| P24 | COUNTRY PARK | REGIONAL DETENTION | 0% | 0% | 100% | | $448,800.00 | | | $448,800.00 | $1,752,868.24 | $0.00 | $73,169.54 |
| P4 | 2700 WEST FROM 2550 S TO BUTTERMILK SLOUGH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | $309,535.78 | | $309,535.78 | | $0.00 | |
| P5 | 2700 WEST FROM 2900 SOUTH TO BUTTERMILK SLOUGH | PIPE BUTTERMILK SLOUGH FROM 2900 S TO 2700 WEST CROSSING | 10% | 0% | 90% | | | $335,672.05 | | $302,104.85 | | $33,567.21 | |
| P6 | 2700 WEST FROM 3150 S TO 3300 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | $218,599.16 | | $218,599.16 | | $0.00 | |
| P7 | 2700 WEST LAYTON CANAL CROSSING TO 3480 S | NEW STORM DRAIN PIPE - 2700 WEST AND LAYTON CANAL CROSSING | 30% | 0% | 70% | | | $328,146.58 | | $229,702.61 | | $98,443.97 | |
| P21 | HOOPER SLOUGH 3600 SOUTH | DIVERSION STRUCTURE AND NEW CROSSING UNDER WILSON CANAL | 50% | 0% | 50% | | | $250,000.00 | | $125,000.00 | | $125,000.00 | |
| P23 | WINDSOR FARM PARK | BUTTERMILK REGIONAL DETENTION | 0% | 0% | 100% | | | $468,000.00 | | $468,000.00 | $1,652,942.40 | $0.00 | $257,011.18 |
| P13 | 4400 SOUTH FROM 4100 WEST TO 4300 WEST | NEW STORM DRAIN PIPE - 4400 SOUTH | 0% | 0% | 100% | | | | $229,655.20 | $229,655.20 | | $0.00 | |
| P14 | 5100 WEST FROM 4360 SOUTH TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 5100 WEST AND NEW HOOPER SLOUGH CULVERT | 30% | 0% | 70% | | | | $395,780.77 | $277,046.54 | | $118,734.23 | |
| P15 | 4300 WEST FROM 4175 SOUTH TO 4000 SOUTH | NEW STORM DRAIN PIPE - 4300 WEST | 30% | 0% | 70% | | | | $253,489.91 | $177,442.94 | | $76,046.97 | |
| P18C | 3300 SOUTH FROM WEST HAVEN BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH AND HOOPER CANAL CROSSING | 0% | 0% | 100% | | | | $1,461,500.97 | $1,461,500.97 | | $0.00 | |
| P18D | 3300 SOUTH FROM 4250 WEST TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 0% | 100% | | | | $199,784.50 | $199,784.50 | | $0.00 | |
| P19A | 2900 SOUTH FROM 2850 WEST TO WH BOUNDARY | NEW STORM DRAIN PIPE - 2900 SOUTH | 0% | 0% | 100% | | | | $532,435.40 | $532,435.40 | | $0.00 | |
| P19B | 2900 SOUTH FROM WH BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 2900 SOUTH | 0% | 0% | 100% | | | | $532,435.40 | $532,435.40 | | $0.00 | |
| P25 | 2700 W FROM 3700 S TO 3750 S | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | | $59,159.49 | $59,159.49 | $3,469,460.44 | $0.00 | $194,781.20 |
| | | | | | | $4,518,540.10 | $1,826,037.78 | $1,909,953.57 | $3,664,241.64 | | | | |

| Total Project Costs | Total Cost Attributed to Existing Development | Total Impact Fee Eligible Costs |
|---|---|---|
| $11,918,773.10 | $1,498,152.81 | $10,420,620.29 |

# CAPITAL PROJECTS




WEST HAVEN BOUNDARY

PROJECTS

0' 1500' 3000' 6000'

Scale in Feet
Custom

| Project No | Location | Description | PIPE SIZE |
|---|---|---|---|
| P1 | 2200 SOUTH 2700 W | STORM DRAIN SIPHON UNDER HOOPER CANAL | 24" |
| P2 | 2700 W FROM 2400 S TO 2550 S | NEW STORM DRAIN PIPE - 2700 WEST | 30" |
| P3 | 2200 SOUTH 2700 W | NEW STORM DRAIN EAST OF 2700 WEST - HOOPER SLOUGH | 36" |
| P4 | 2700 WEST FROM 2550 S TO BUTTERMILK SLOUGH | NEW STORM DRAIN PIPE - 2700 WEST | 24" |
| P5 | 2700 WEST FROM 2900 SOUTH TO BUTTERMILK SLOUGH | PIPE BUTTERMILK SLOUGH FROM 2900 S TO 2700 WEST CROSSING | 36" |
| P6 | 2700 WEST FROM 3150 S TO 3300 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P7 | 2700 WEST LAYTON CANAL CROSSING TO 3480 S | NEW STORM DRAIN PIPE - 2700 WEST AND LAYTON CANAL CROSSING | 18" |
| P8 | 2700 WEST FROM 3560 S TO 3600 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P9 | 3425 SOUTH FROM ISABEL WAY TO 2700 WEST | NEW STORM DRAIN PIPE - EAST OF 2700 WEST | 15" |
| P10 | 3425 SOUTH FROM 2700 WEST TO LAYTON CANAL | NEW STORM DRAIN EAST OF 2700 WEST TO SIPHON UNDER LAYTON CANAL | 30" |
| P11 | 3600 SOUTH FROM 2550 WEST TO 2650 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH | 18" |
| P12A | 3600 SOUTH FROM 3130 WEST TO HOWARD SLOUGH | NEW STORM DRAIN PIPE - 3600 SOUTH | 30" |
| P12B | 3600 SOUTH FROM 2700 WEST TO 3130 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH, LAYTON CANAL CROSSING | 24" |
| P13 | 4400 SOUTH FROM 4100 WEST TO 4300 WEST | NEW STORM DRAIN PIPE - 4400 SOUTH | 18" |
| P14 | 5100 WEST FROM 4300 SOUTH TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 5100 WEST AND NEW HOOPER SLOUGH CULVERT | 18"/36" |
| P15 | 4300 WEST FROM 4175 SOUTH TO 4000 SOUTH | NEW STORM DRAIN PIPE - 4300 WEST | 24" |

| | | | |
|---|---|---|---|
| P16 | 5100 WEST FROM 3720 SOUTH TO 3500 SOUTH | NEW STORM DRAIN PIPE - 5100 WEST | 36" |
| P17 | 3300 SOUTH FROM 4950 WEST TO 5100 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 24" |
| P18A | 3300 SOUTH FROM 4250 WEST TO 3600 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 30" |
| P18B | 3300 SOUTH FROM 3450 WEST TO CITY BOUNDARY | NEW STORM DRAIN PIPE - 3300 SOUTH | 36" |
| P18C | 3300 SOUTH FROM WEST HAVEN BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH AND HOOPER CANAL CROSSING | 30" |
| P18D | 3300 SOUTH FROM 4250 WEST TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH | 18" |
| P19A | 2900 SOUTH FROM 2850 WEST TO WH BOUNDARY | NEW STORM DRAIN PIPE - 2900 SOUTH | 24" |
| P19B | 2900 SOUTH FROM WH BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 2900 SOUTH | 30" |
| P20 | 3550 SOUTH FROM 3300 WEST TO 3500 WEST | PIPE THE HOWARD SLOUGH BEHIND ELLIES LANDING | 48" |
| P21 | HOOPER SLOUGH 3600 SOUTH | DIVERSION STRUCTURE AND NEW CROSSING UNDER WILSON CANAL | 0 |
| P22 | GREEN FARMS 3705 SOUTH AND 4200 WEST | HOOPER SLOUGH REGIONAL DETENTION | 5.2 |
| P23 | WINDSOR FARM PARK | BUTTERMILK REGIONAL DETENTION | 9.2 |
| P24 | COUNTRY PARK | REGIONAL DETENTION | 7.48 |
| P25 | 2700 W FROM 3700 S TO 3750 S | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P26 | 1800 S FROM 2600 W TO 2200 W | REPLACE STORM DRAIN PIPE - 1800 SOUTH | 18" |

| Date | Description |
|---|---|
| Revisions | |
| | |

Date: 08-10-22
Scale: Custom
Designed: KAN
Drafted: KAN
Checked: RC

CAPITAL PROJECTS
WEST HAVEN - IFFP
VARIOUS LOCATIONS
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F4

FIGURE 4

G:\WEST HAVEN CITY FOLDER\CAPITAL IMPACT\STORM DRAIN\2022\DESIGN\WEST HAVEN EXISTING STORM DRAIN.DWG

## PROPOSED PROJECT SIZING

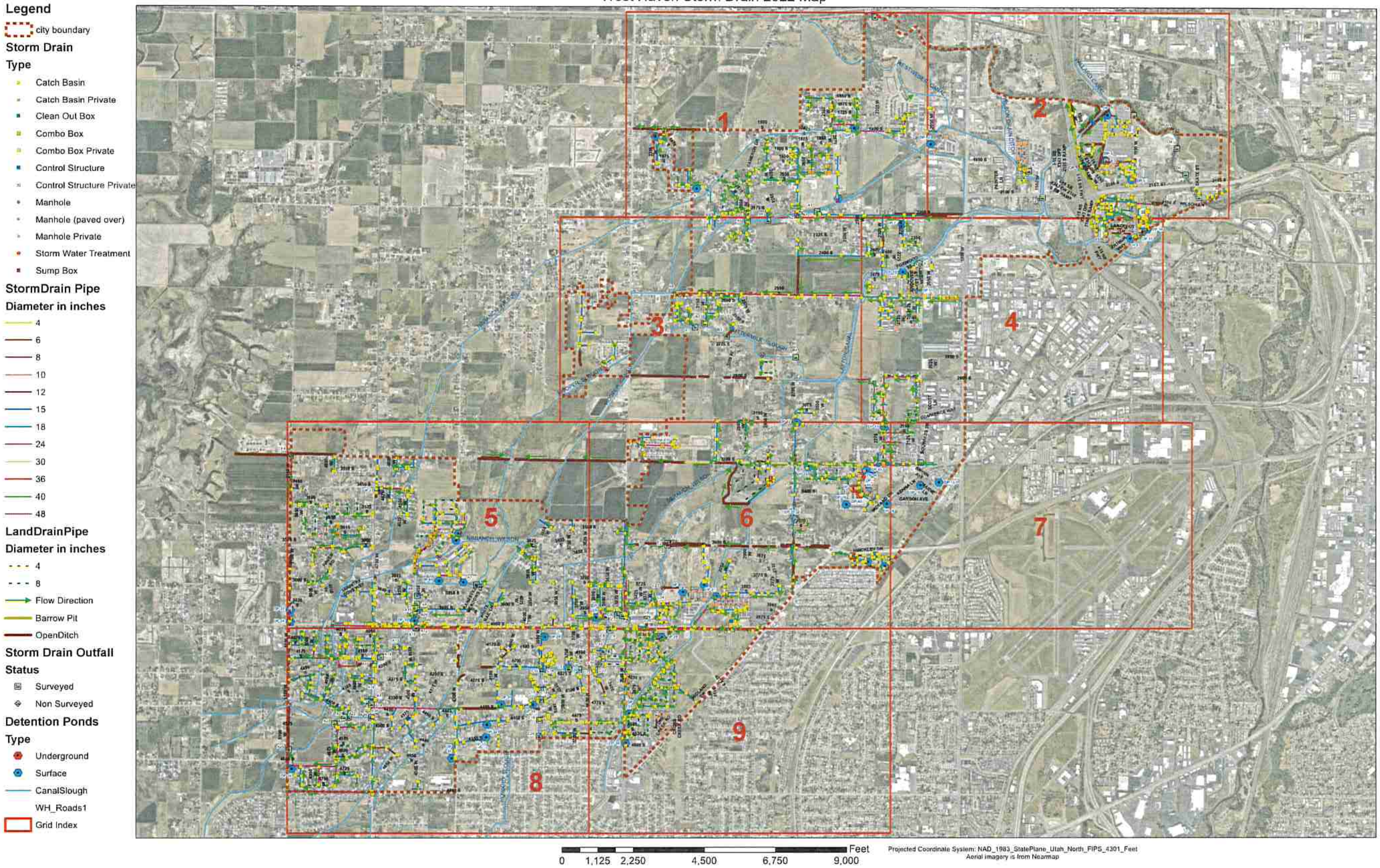
Table 4

| PROJECT | BASIN AREA | C | i | Q cfs | Q Detained cfs | COMMENTS | RECOMMENDED PIPE SIZE | PROPOSED CAPCITY Q cfs | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| P1 | | | | | | EXISTING 24" TO BE PIPED UNDER HOOPER SLOUGH | 24" RCP | | |
| P2 | 53.56 | 0.3 | 1.38 | 22.17 | | FUTURE 57.3 ACRES FROM JVW @ 0.1 CFS/ACRE 5.73 CFS | 30" RCP 27.9 CFS @ 0.7% SLOPE | 15.63 | STUBBED FROM 2550 SOUTH 24" @ 0.50% |
| P3 | 121.3 | | | | 24.26 | RELEASE RATE OF 0.2 cfs/acre | 36" RCP @ 0.2% SLOPE | 29.15 | |
| P4 | 83.89 | | | | 16.78 | RELEASE RATE OF 0.2 cfs/acre mostly undeveloped land | 24" RCP @ 0.6% SLOPE | 17.13 | |
| P5 | | | | | | PIPE EXISTING DITCH | 18" RCP SLOPE 0.50% | 7.25 | |
| P6 | 52.58 | | | | 10.52 | FILL IN GAP CONNECTING TO 18" DOWNSTREAM | 18" RCP SLOPE 0.50% | 7.25 | |
| P7 | 6.36 | 0.3 | 2.06 | 3.93 | | EXISTING 18" UPSTREAM PIPE ACROSS LAYTON CANAL | 18" RCP SLOPE 0.50% | 7.25 | |
| P8 | | | | | 4.16 | DOWN STREAM EXISTING PIPE IS 15" Q=4.16 | 15" RCP | 4.16 | |
| P9 | 27.31 | | | | 8.03 | DETAINED FLOWS FROM KNUDSON CORNER ESTATES (2.57) AND FUTURE FLOWS UNDEVELOPED | 18" RCP @0.8% SLOPE | 9.18 | |
| P10 | 45.73 | | | | 21.34 | COMBINE FLOW WITH P9 AND P8 | 30" RCP SLOPE 0.40% | 25.35 | |
| P11 | 38.68 | | | | 7.74 | 28.22 ACRES WING SPAN APARTMENTS AND 10.46 ACRES HISTORIC FLOW | 18" RCP @ 1.0% | 10.27 | |
| P12A | 97.19 | | | | 27.17 | RELEASE RATE OF 0.2 cfs/acre | 30" RCP @ 0.6% SLOPE | 31.05 | |
| P12B | 42.01 | | | | 16.14 | RELEASE RATE OF 0.2 cfs/acre | 24" RCP @ 1.0% SLOPE | 22.11 | |
| P13 | | | | | | UPSTREAM AND DOWN STREAM EXISTING PIPE IS 18" | 18" RCP | | |
| P14 | 48.35 | | | | 9.67 | UNDEVELOPED RELEASE RATE OF 0.2 cfs/acre | 18" RCP @1% SLOPE | 10.27 | |
| P15 | | | | | | EXISTING PIPE UPSTREAM IS 18" DOWN STREAM CONNECTION IS A 24" | 24" RCP | | |
| P16 | | | | | | 4975 W AND 3625 S STUB 36" RCP | 36" RCP | | |
| P17 | 19.46 | 0.3 | 2.06 | 12.03 | | | 24" RCP SLOPE 0.50% | 15.63 | |
| P18A | | | | | 41.16 | Filling in Gap between upsteam and down stream 30" RCP 710' | 30" RCP SLOPE 1.10% | 42.04 | Basin E3,E6,E7 and EB1 |
| P18B | | | | | 52.72 | | 36" RCP SLOPE 0.70% | 54.54 | Basin E3,E6,E7,E9 and EB1 |
| P18C | | | | | 68.22 | 155.09 additional acres @ 0.1 cfs/acre 15.5 cfs | 36" RCP | 68.37 | Basin E3,E6,E7,E9 and EB1 |
| P18D | 44 | | | | 8.80 | | 18" RCP SLOPE 0.75% | 8.89 | |
| P19A | 72.09 | | | | 14.42 | 2745' of 24" to West Boundary | 24" RCP SLOPE 0.50% | 15.63 | |
| P19B | 52.09 | | | | 24.84 | 2786' of 30" to Hooper slough includes siphon under the Hooper Canal | 30" RCP SLOPE 0.50% | 28.35 | |
| P20 | | | | | 60.50 | Pipe 1033' of Slough BASIN C18-C21 BOX CULVERT CROSSING 3500 WEST IS 3X8 Upstream pipe is a 48" | 48" RCP SLOPE 0.20% | 62.78 | |
| P21 | | | | | | Diversion structure and pipe Hooper Slough | | | |
| P22 | | | | | | Regional Detention 5.2 acres | | | |
| P23 | | | | | | Regional Detention 9.2 acres | | | |
| P24 | | | | | | Regional Detention 7.48 acres | | | |
| P25 | | | | | | | | | |
| P26 | | | | | | | | | |

# APPENDIX B

## Existing Storm Drain System Mapping

# West Haven Storm Drain 2022 Map




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map

## Legend

- city boundary

**Storm Drain**

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

**StormDrain Pipe**

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

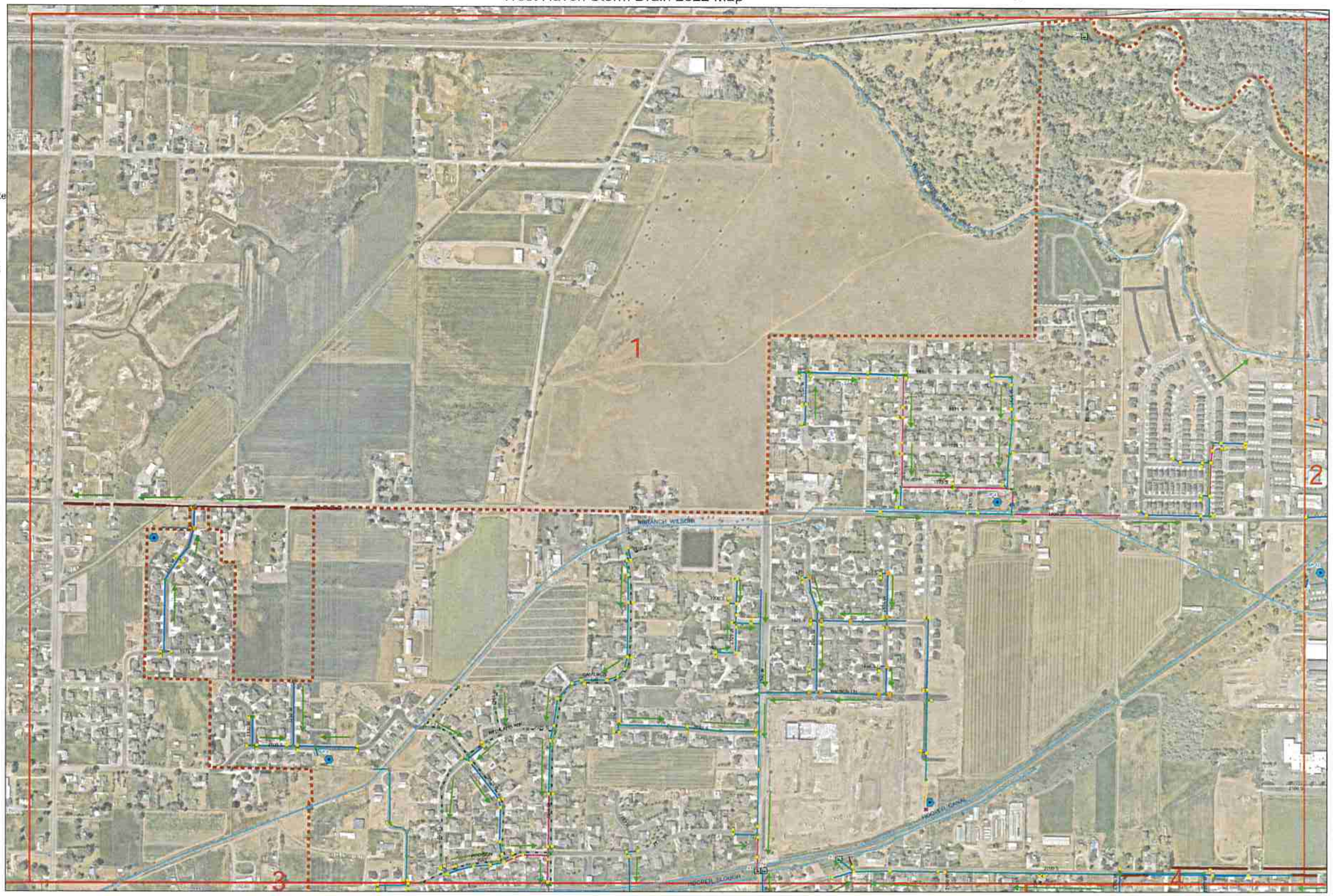
Status

- Surveyed
- Non Surveyed

**Detention Ponds**

Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map


## Legend

- city boundary

**Storm Drain**

Type

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- Catch Basin Private
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- Combo Box
- Combo Box Private
- Control Structure
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- Manhole Private
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- Sump Box

**StormDrain Pipe**

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

Status

- Surveyed
- Non Surveyed

**Detention Ponds**

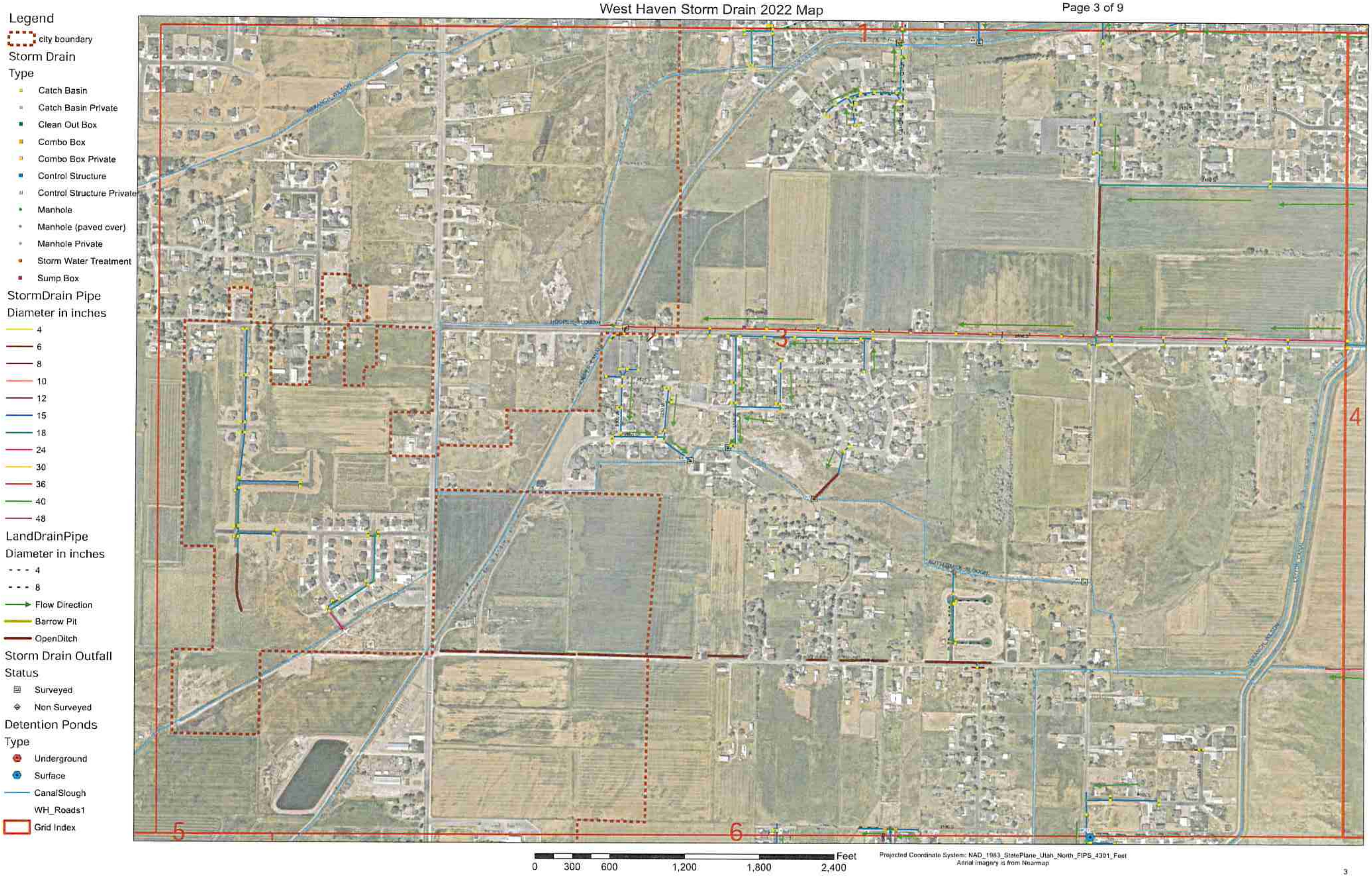
Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index

0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map

## Legend

- city boundary

**Storm Drain**

Type
- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

**StormDrain Pipe**

Diameter in inches
- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

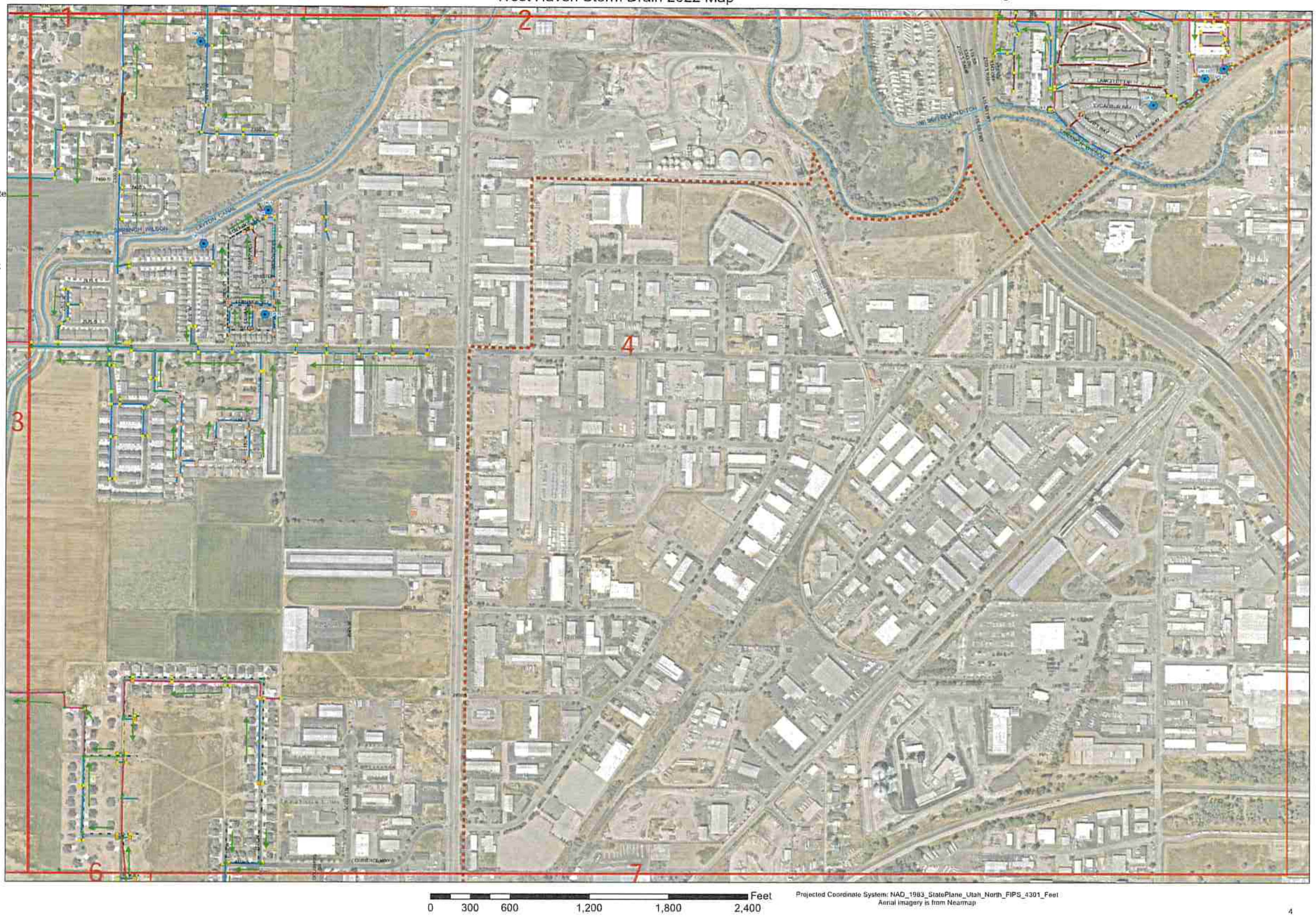
Diameter in inches
- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

Status
- Surveyed
- Non Surveyed

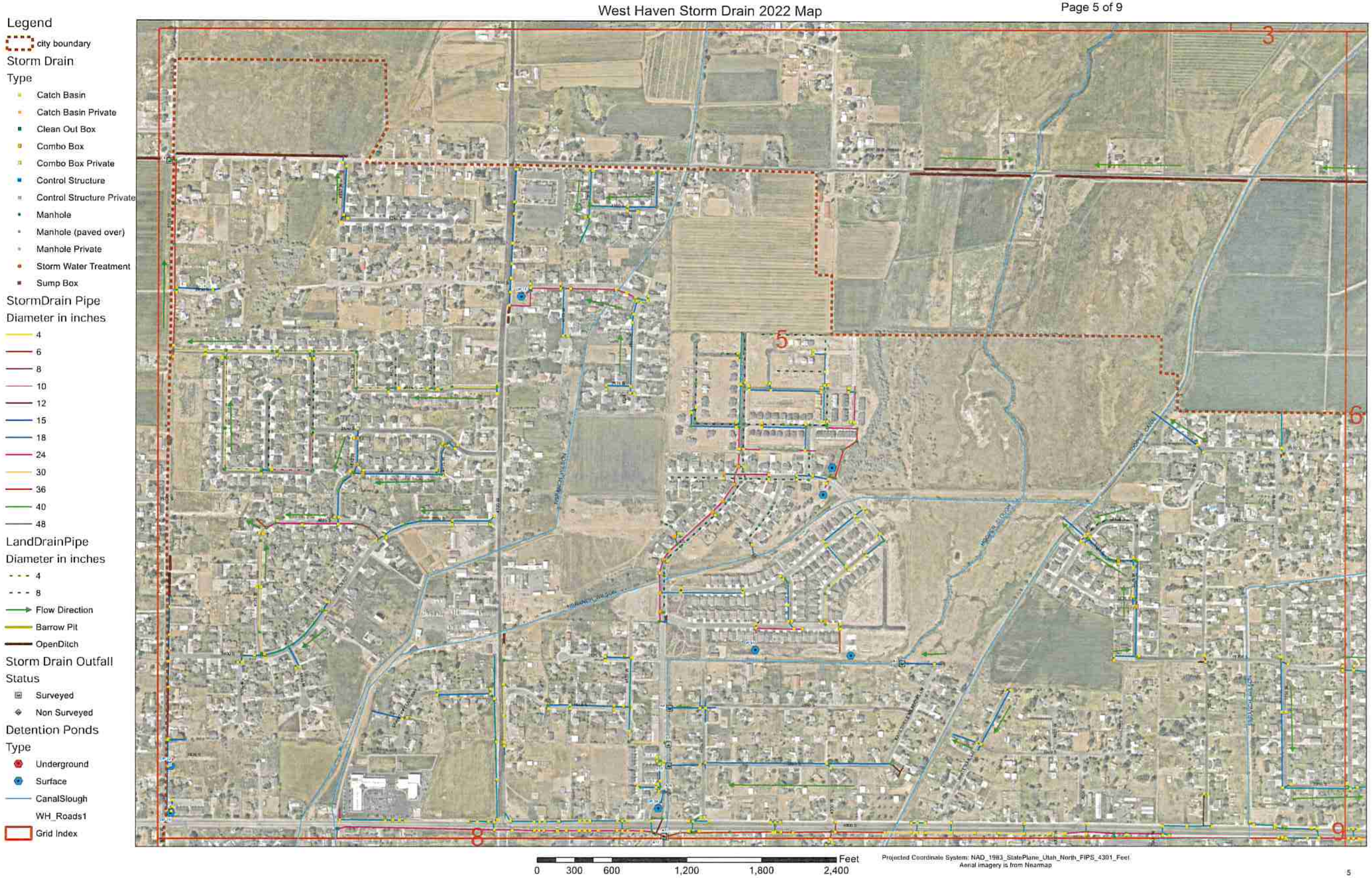
**Detention Ponds**

Type
- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

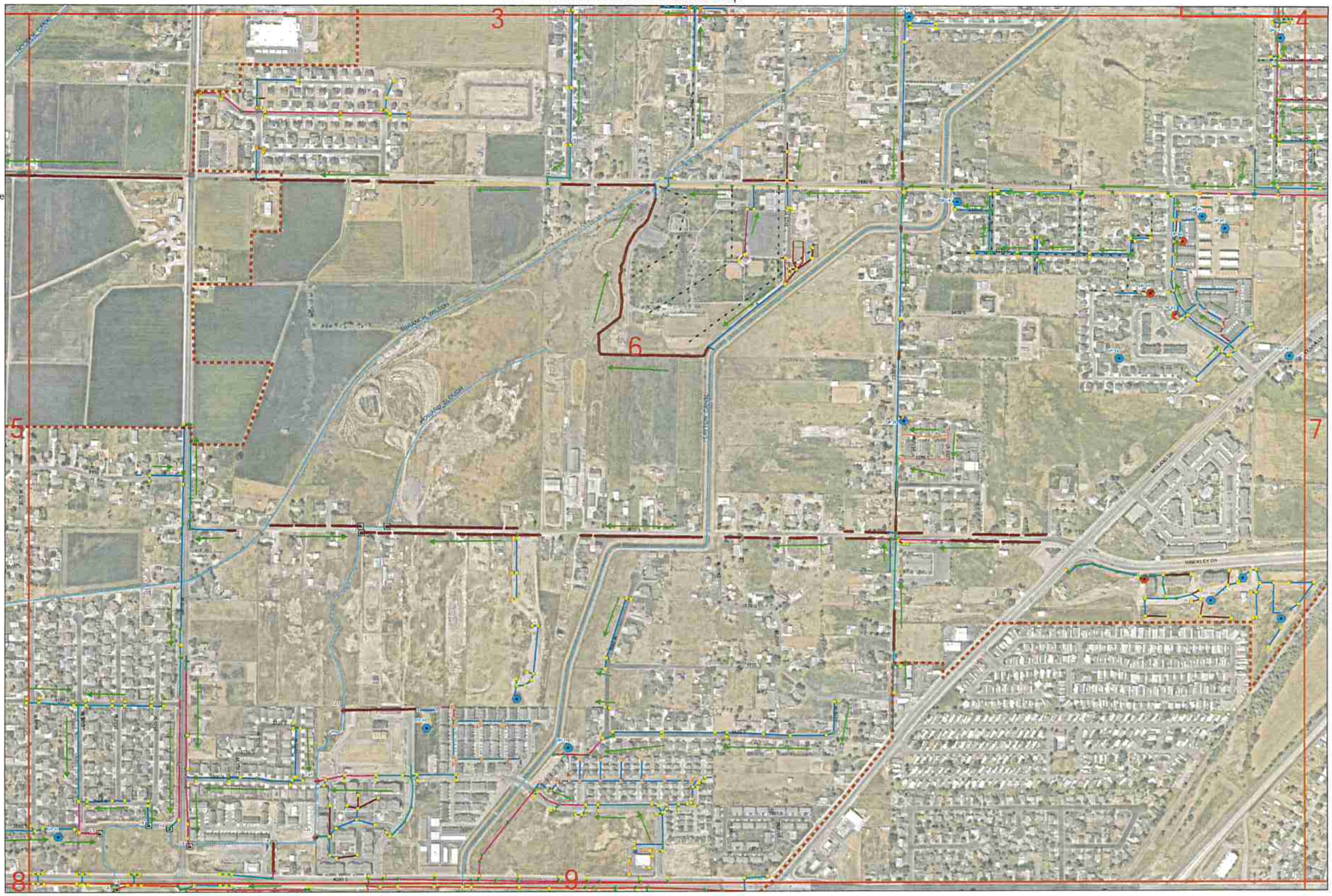
# West Haven Storm Drain 2022 Map




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map






Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

## Legend

city boundary

**Storm Drain**

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

**StormDrain Pipe**

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

Status

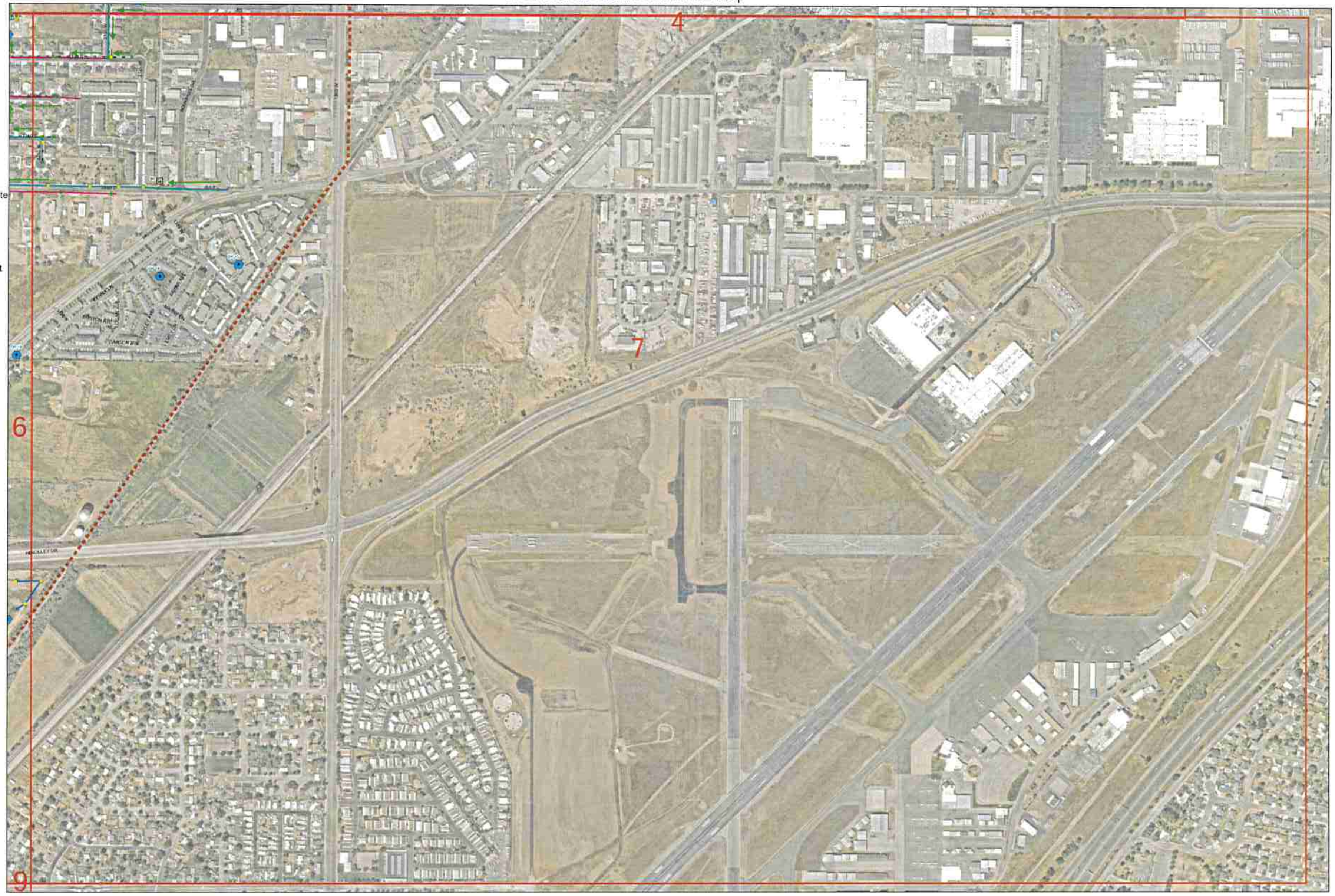
- Surveyed
- Non Surveyed

**Detention Ponds**

Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index

# West Haven Storm Drain 2022 Map




Legend

city boundary

Storm Drain

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

StormDrain Pipe

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

LandDrainPipe

Diameter in inches

- 4
- 8

Flow Direction

Barrow Pit

OpenDitch

Storm Drain Outfall

Status

- Surveyed
- Non Surveyed

Detention Ponds

Type

- Underground
- Surface

CanalSlough

WH_Roads1

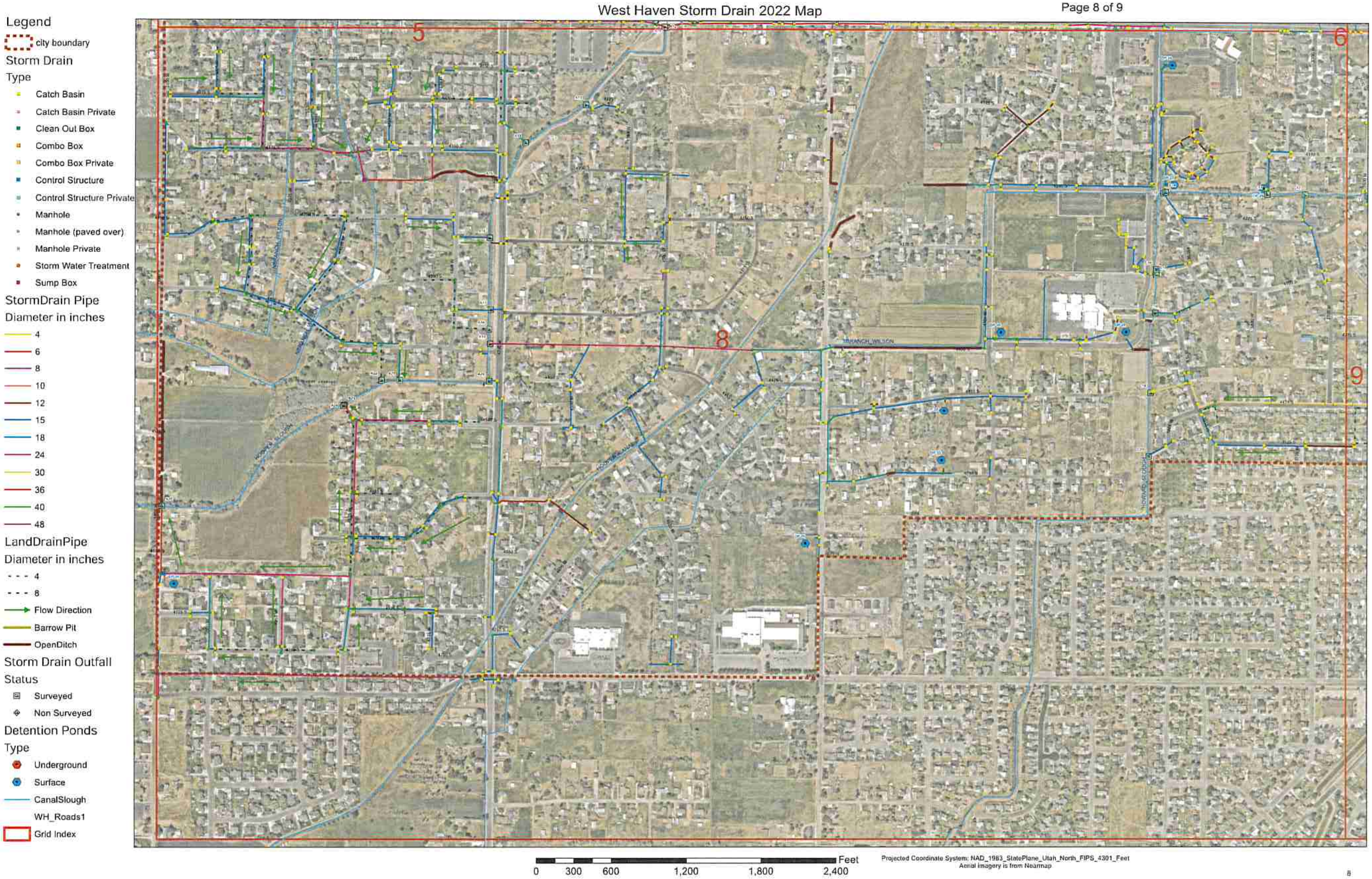
Grid Index

0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map






Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map



Legend

- city boundary

Storm Drain

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
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- Manhole Private
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- Sump Box

StormDrain Pipe

Diameter in inches

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- 40
- 48

LandDrainPipe

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

Storm Drain Outfall

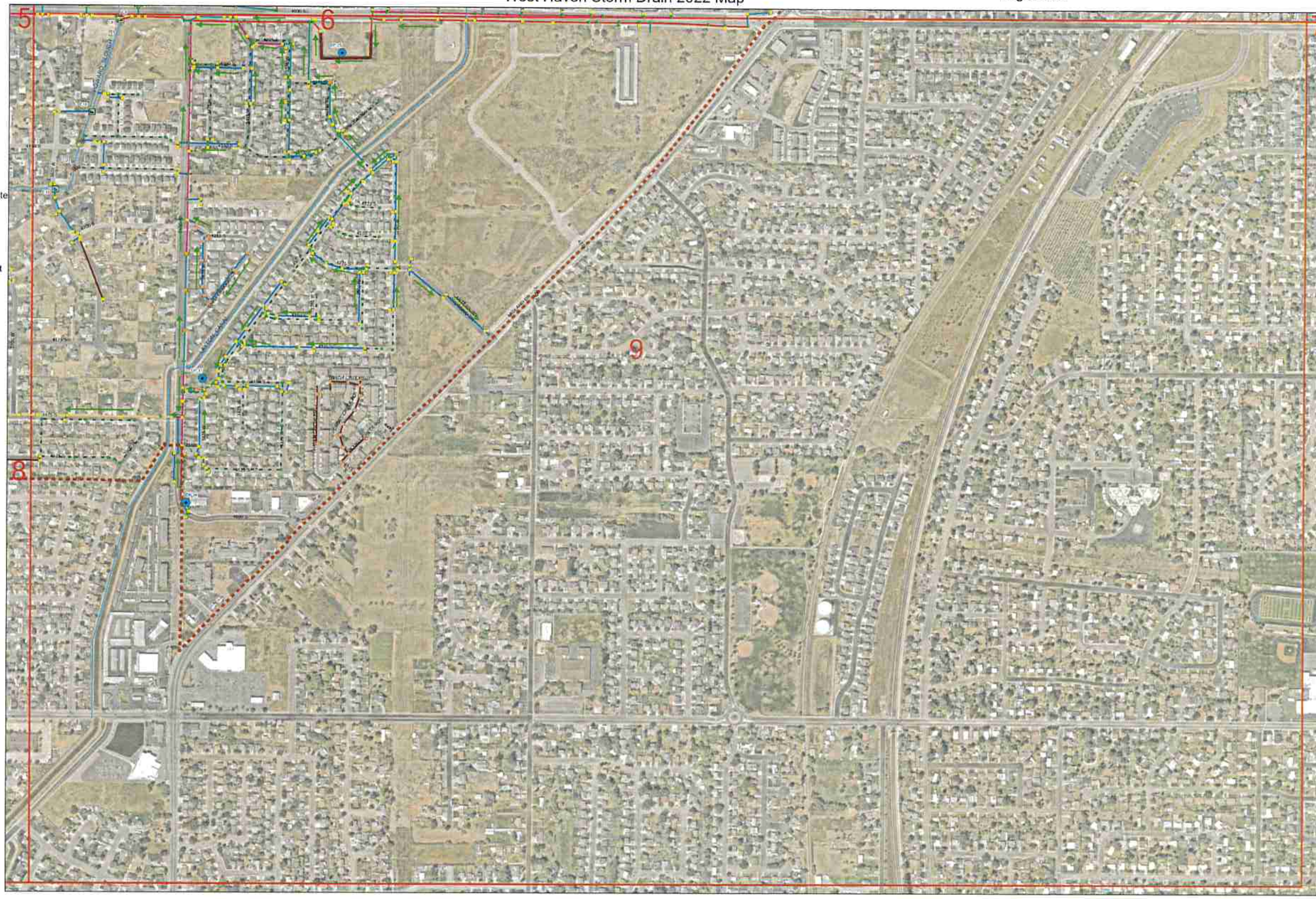
Status

- Surveyed
- Non Surveyed

Detention Ponds

Type

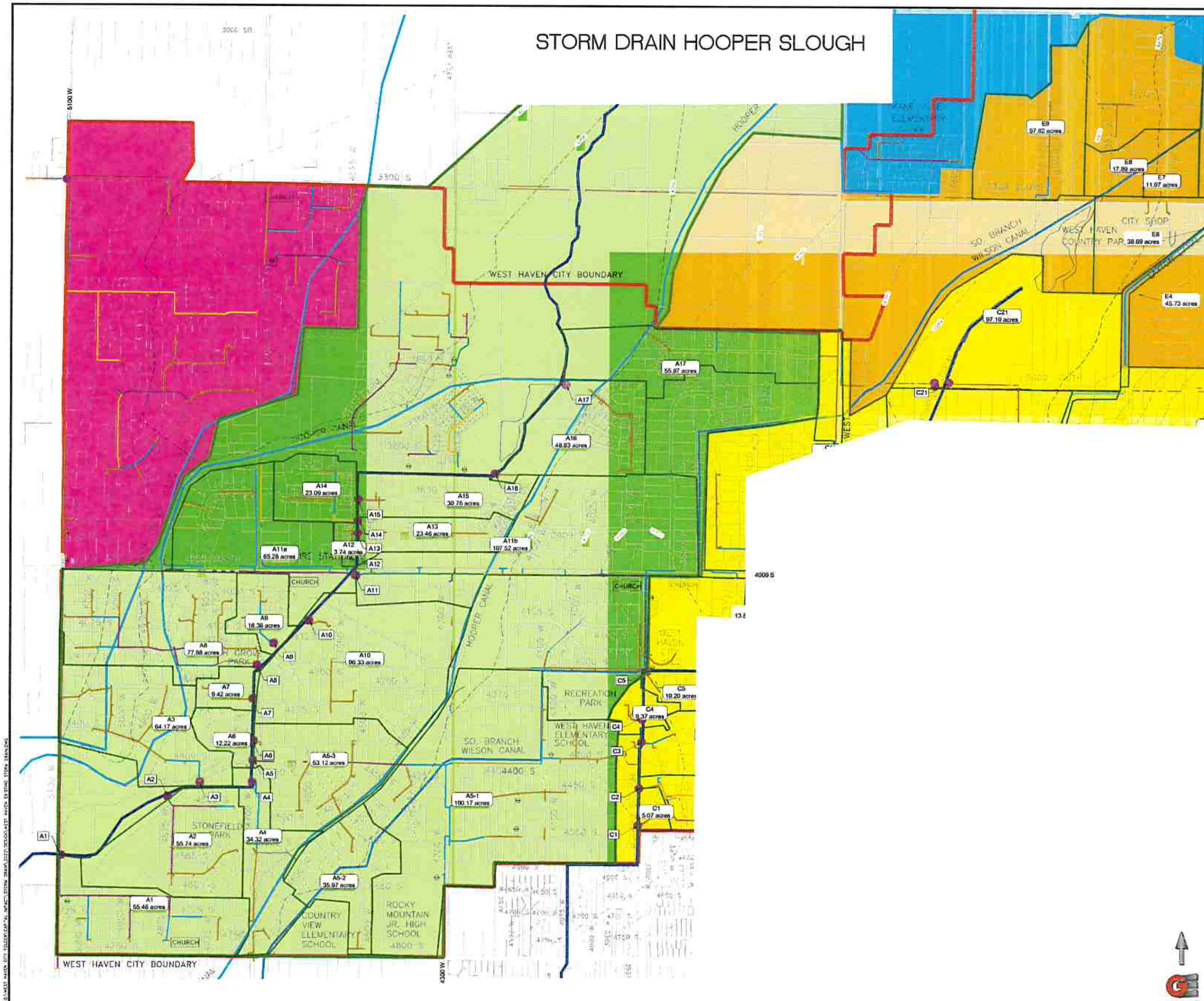
- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# APPENDIX C

## Storm Drain Basin Maps with Basin Flow Calculations




Basin A - Hooper Slough

| Sub Basin | Area | C | I | Q |
|---|---|---|---|---|
| A1 | 55.46 | | | 11.09 |
| A2 | 55.74 | 0.35 | 1.71 | 33.33 |
| A3 | 64.17 | 0.2 | 1.79 | 22.98 |
| A4 | 34.32 | 0.3 | 1.69 | 17.39 |
| A5-1 | 190.17 | | | 38.03 |
| A5-2 | 35.97 | 0.2 | 1.83 | 13.19 |
| A5-3 | 53.12 | 0.2 | 1.79 | 18.97 |
| A6 | 12.22 | 0.2 | 2.24 | 5.48 |
| A7 | 9.42 | 0.2 | 2.32 | 4.37 |
| A8 | 77.88 | 0.4 | 1.76 | 54.70 |
| A9 | 16.39 | 0.6 | 2.24 | 22.01 |
| A10 | 96.46 | 0.3 | 1.51 | 43.73 |
| A11 | 172.72 | 0.3 | 0.86 | 44.35 |
| A12 | 3.74 | | | 0.75 |
| A13 | 23.46 | 0.2 | 1.02 | 4.79 |
| A14 | 23.09 | 0.3 | 1.51 | 10.44 |
| A15 | 30.75 | 0.2 | 1.38 | 8.49 |
| A16 | 48.83 | 0.25 | 2.10 | 25.69 |
| A17 | 55.87 | 0.2 | 1.37 | 15.28 |

15" STORM DRAIN
18" STORM DRAIN
24" STORM DRAIN
30" STORM DRAIN
36" STORM DRAIN
OUTLET TO SLOUGH

0' 300' 600' 1200' 1800'
Scale in Feet
Custom

STORM DRAIN HOOPER SLOUGH
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH

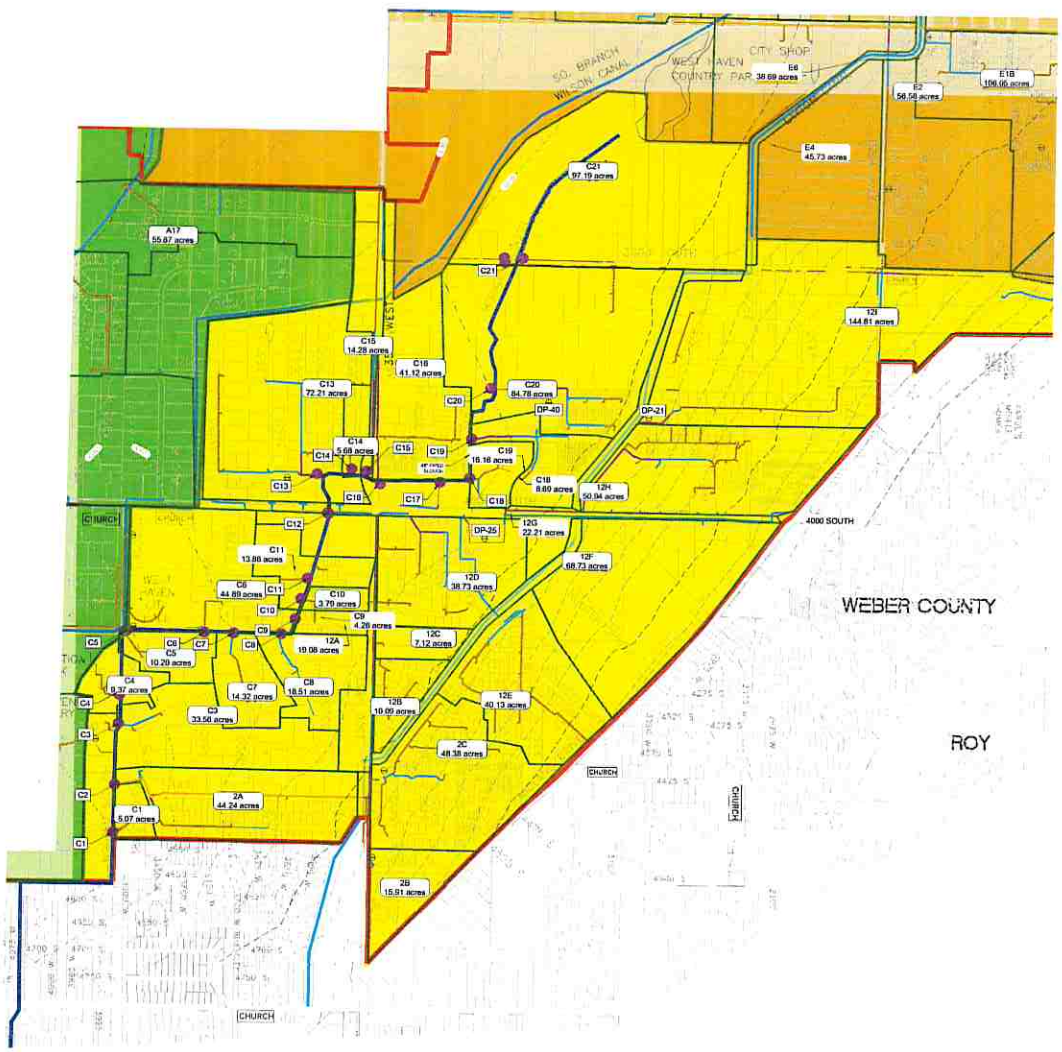
GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
968 S CHAMBER ST, SUITE #5, OGDEN UT 84405
P 801.476.0202 F 801.476.0066

| DATE | DESCRIPTION |
|---|---|
| REVISIONS | |

SCALE: Custom
DATE: 08-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC
DWG:

C1

# STORM DRAIN MAP - HOWARD SLOUGH




| Basin C - Howard Slough | | | | |
|---|---|---|---|---|
| Sub Basin | Area | C | I | Q |
| C1 | 5.07 | 0.2 | 2.45 | 2.49 |
| C2A | 44.24 | 0.2 | 1.77 | 15.66 |
| C2B | 15.91 | | | 3.18 |
| C2C | 48.38 | | | 9.68 |
| C3 | 33.56 | 0.2 | 1.74 | 11.68 |
| C4 | 9.37 | 0.18 | 2.30 | 3.88 |
| C5 | 10.2 | 0.2 | 2.16 | 4.40 |
| C6 | 44.69 | 0.24 | 1.95 | 20.89 |
| C7 | 14.32 | 0.2 | 1.94 | 5.57 |
| C8 | 18.51 | 0.2 | 1.84 | 6.82 |
| C9 | 4.26 | 0.4 | 2.34 | 3.99 |
| C10 | 3.79 | 0.4 | 2.33 | 3.53 |
| C11 | 13.86 | 0.2 | 2.05 | 5.69 |
| C12A | 19.08 | 0.6 | 1.89 | 21.61 |
| C12B | 10.09 | 0.5 | 2.33 | 11.77 |
| C12C | 7.12 | 0.55 | 2.27 | 8.91 |
| C12D | 38.71 | 0.3 | 2.00 | 23.20 |
| C12E | 40.13 | 0.45 | 2.27 | 40.95 |
| C12F | 68.73 | | | 13.75 |
| C12G | 15.19 | 0.6 | 1.65 | 15.01 |
| C12H | 50.94 | 0.7 | 2.40 | 85.50 |
| C12I | 144.81 | | | 28.96 |
| C13 | 72.21 | | | 14.44 |
| C14 | 5.69 | 0.4 | 2.13 | 4.85 |
| C15 | 14.28 | 0.4 | 0.86 | 4.89 |
| C16 | 41.12 | 0.5 | 1.13 | 23.21 |
| C17 | 6.89 | 0.7 | 2.23 | 10.78 |
| C18 | 8.69 | 0.4 | 2.18 | 7.58 |
| C19 | 16.16 | 0.5 | 2.05 | 16.53 |
| C20 | 84.78 | | | 16.96 |
| C21 | 97.19 | 0.4 | 1.38 | 19.44 |

15" STORM DRAIN
18" STORM DRAIN
24" STORM DRAIN
30" STORM DRAIN
36" STORM DRAIN
OUTLET TO SLOUGH

0' 300' 600' 1200' 1800'
Scale In Feet
Custom

STORM DRAIN MAP - HOWARD SLOUGH
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH

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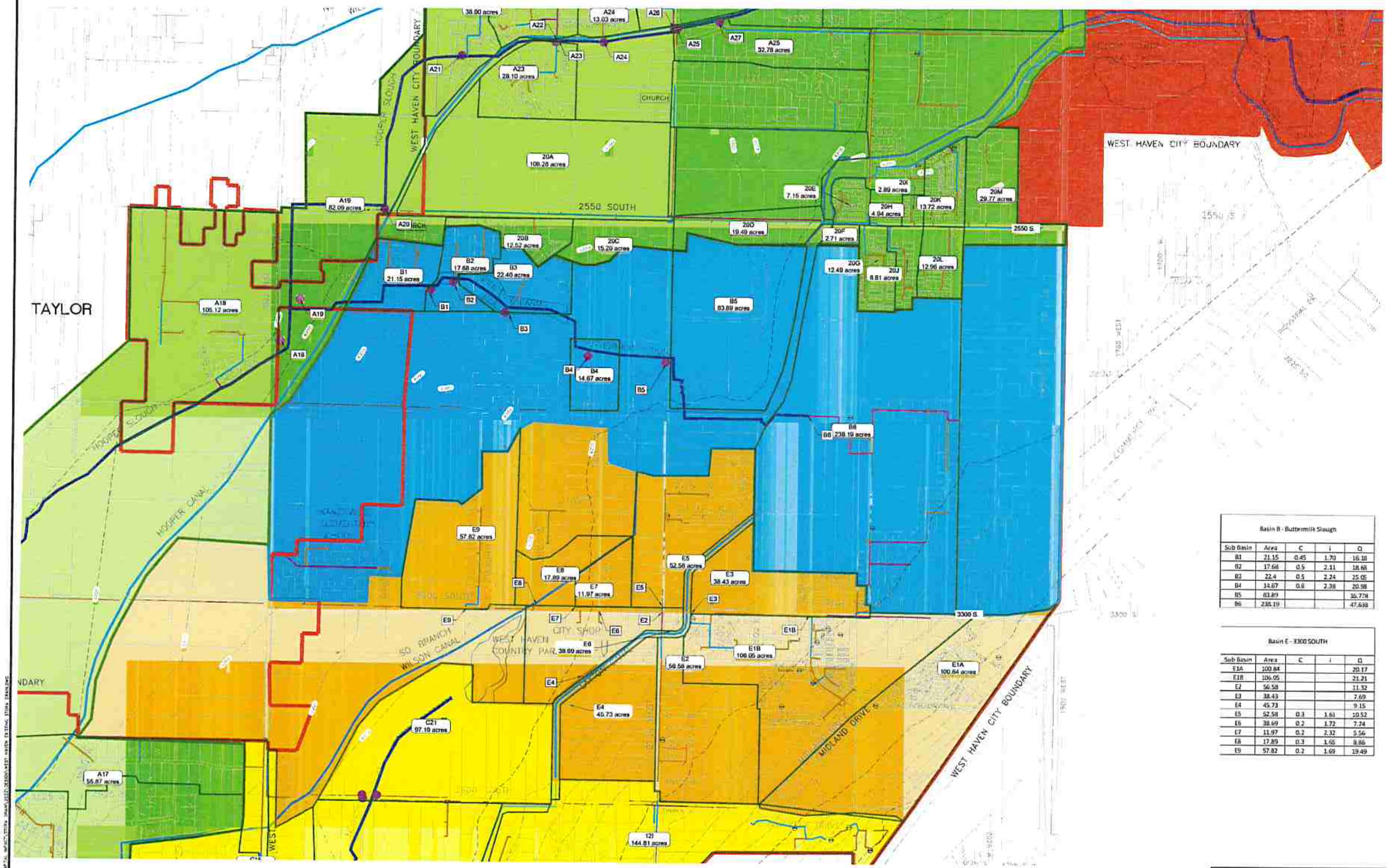
REVISIONS
| DATE | DESCRIPTION |
|---|---|

SCALE: Custom
DATE: 08-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC
DWG:

C2

# STORM DRAIN BASINS 3300 S AND BUTTERMILK SLOUGH




| Basin B - Buttermilk Slough | | | | |
|---|---|---|---|---|
| Sub Basin | Area | C | i | Q |
| B1 | 21.15 | 0.45 | 1.70 | 16.18 |
| B2 | 17.66 | 0.5 | 2.11 | 18.68 |
| B3 | 22.4 | 0.5 | 2.24 | 25.05 |
| B4 | 14.67 | 0.6 | 2.38 | 20.98 |
| B5 | 83.89 | | | 16.778 |
| B6 | 238.19 | | | 47.638 |

| Basin E - 3300 SOUTH | | | | |
|---|---|---|---|---|
| Sub Basin | Area | C | i | Q |
| E1A | 100.84 | | | 20.17 |
| E1B | 106.05 | | | 21.21 |
| E2 | 56.58 | | | 11.32 |
| E3 | 38.43 | | | 7.69 |
| E4 | 45.73 | | | 9.15 |
| E5 | 52.58 | 0.3 | 1.61 | 10.52 |
| E6 | 38.69 | 0.2 | 1.72 | 7.74 |
| E7 | 11.97 | 0.2 | 2.32 | 5.56 |
| E8 | 17.89 | 0.3 | 1.65 | 8.86 |
| E9 | 57.82 | 0.2 | 1.69 | 19.49 |

15" STORM DRAIN
18" STORM DRAIN
24" STORM DRAIN
30" STORM DRAIN
36" STORM DRAIN

0' 300' 600' 1200' 1800'
Scale In Feet
Custom

STORM DRAIN BASINS 3300 S AND BUTTERMILK SLOUGH
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH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| REVISIONS | |
|---|---|
| DATE | DESCRIPTION |

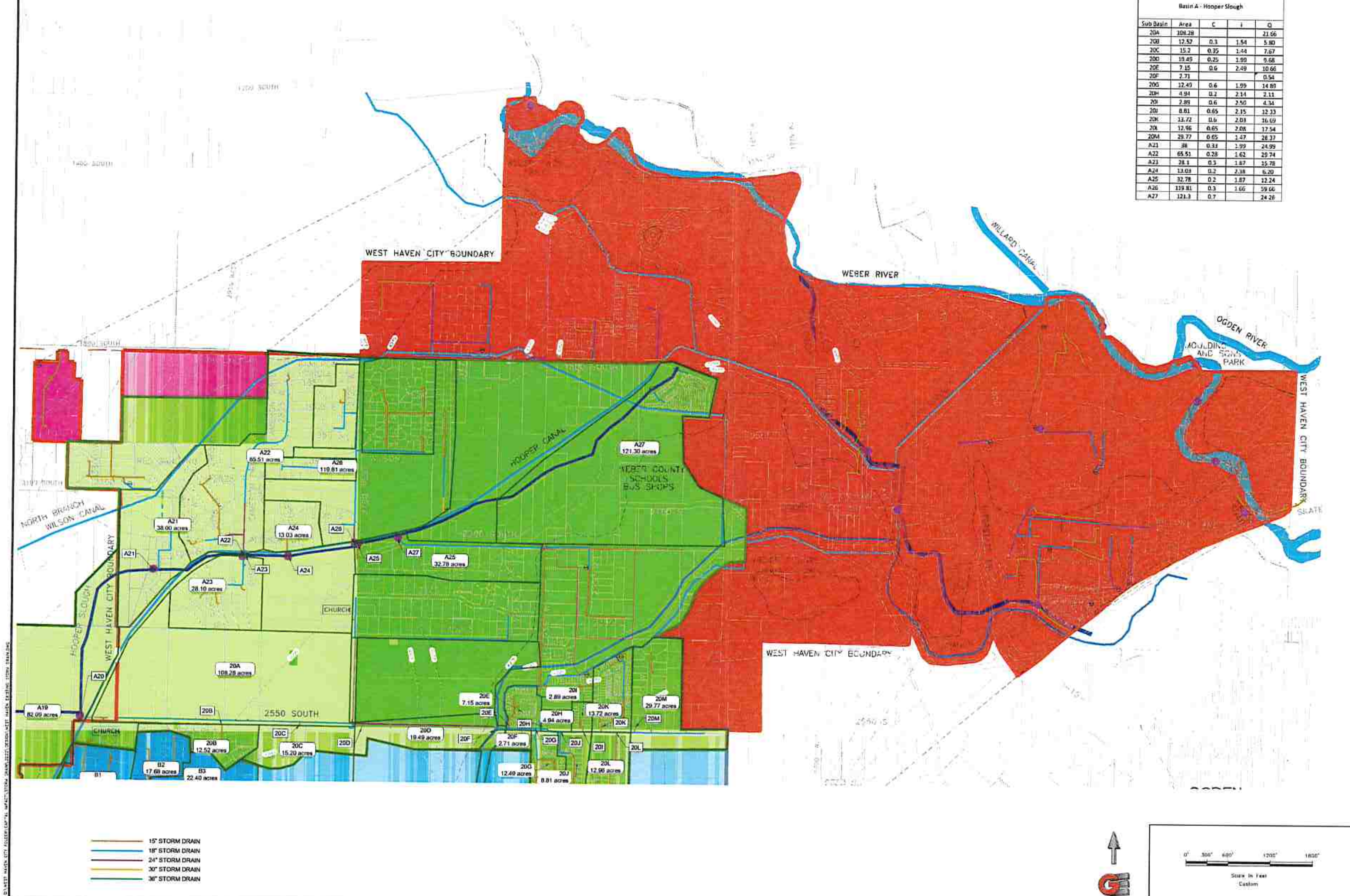
SCALE: Custom
DATE: 08-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC
DWG:

C3

# STORM DRAIN MAP

Basin A - Hooper Slough

| Sub Basin | Area | C | I | Q |
|---|---|---|---|---|
| 20A | 108.28 | | | 21.66 |
| 20B | 12.52 | 0.3 | 1.54 | 5.80 |
| 20C | 15.2 | 0.35 | 1.44 | 7.67 |
| 20D | 19.49 | 0.25 | 1.99 | 9.68 |
| 20E | 7.15 | 0.6 | 2.49 | 10.66 |
| 20F | 2.71 | | | 0.54 |
| 20G | 12.49 | 0.6 | 1.99 | 14.89 |
| 20H | 4.94 | 0.2 | 2.14 | 2.11 |
| 20I | 2.89 | 0.6 | 2.50 | 4.34 |
| 20J | 8.81 | 0.65 | 2.15 | 12.33 |
| 20K | 13.72 | 0.6 | 2.03 | 16.69 |
| 20L | 12.96 | 0.65 | 2.08 | 17.54 |
| 20M | 29.77 | 0.65 | 1.47 | 28.37 |
| A21 | 38 | 0.33 | 1.99 | 24.99 |
| A22 | 65.51 | 0.28 | 1.62 | 29.74 |
| A23 | 28.1 | 0.3 | 1.87 | 15.78 |
| A24 | 13.03 | 0.2 | 2.38 | 6.20 |
| A25 | 32.78 | 0.2 | 1.87 | 12.24 |
| A26 | 119.81 | 0.3 | 1.66 | 59.66 |
| A27 | 121.3 | 0.7 | | 24.28 |




SCALE: Custom
DATE: 18-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC

REVISIONS

| DATE | DESCRIPTION |
|---|---|
| | |

DWG:

STORM DRAIN MAP
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH

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C4

# APPENDIX D

## Cost Estimate

# Per Foot Cost Estimate - Storm Drain

9/2/2022

**15" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 15" RCP | | 1 | $ 85.00 | LF | $ 85.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 10.87 |
| Construction Management | 5% | | | | $ 6.79 |
| Contingency | 20% | | | | $ 27.17 |
| **Total** | | | | | **$ 180.67** |

**18" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 18" RCP | | 1 | $ 95.00 | LF | $ 95.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 11.67 |
| Construction Management | 5% | | | | $ 7.29 |
| Contingency | 20% | | | | $ 29.17 |
| **Total** | | | | | **$ 193.97** |

| 24" RCP | | | | | |
|---|---|---|---|---|---|
| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
| 24" RCP | | 1 | $ 110.00 | LF | $ 110.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 12.87 |
| Construction Management | 5% | | | | $ 8.04 |
| Contingency | 20% | | | | $ 32.17 |
| | | | | | |
| Total | | | | | $ 213.92 |

| 30" RCP | | | | | |
|---|---|---|---|---|---|
| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
| 30" RCP | | 1 | $ 140.00 | LF | $ 140.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 15.79 |
| Construction Management | 5% | | | | $ 9.87 |
| Contingency | 20% | | | | $ 39.48 |
| | | | | | |
| Total | | | | | $ 262.52 |

| 36" RCP | | | | | |
|---|---|---|---|---|---|
| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
| 36" RCP | | 1 | $ 165.00 | LF | $ 165.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 17.79 |
| Construction Management | 5% | | | | $ 11.12 |
| Contingency | 20% | | | | $ 44.48 |
| | | | | | |
| Total | | | | | $ 295.77 |

| 42" RCP | | | | | |
|---|---|---|---|---|---|
| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
| 42" RCP | | 1 | $ 195.00 | LF | $ 195.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 20.19 |
| Construction Management | 5% | | | | $ 12.62 |
| Contingency | 20% | | | | $ 50.48 |
| Total | | | | | $ 335.67 |

| 48" RCP | | | | | |
|---|---|---|---|---|---|
| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
| 48" RCP | | 1 | $ 210.00 | LF | $ 210.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 21.39 |
| Construction Management | 5% | | | | $ 13.37 |
| Contingency | 20% | | | | $ 53.48 |
| Total | | | | | $ 355.62 |

# APPENDIX E

## Development Projection and Impervious Area Estimate

# Appendix E

## Development Projection and Impervious Area Estimate

**Average Impervious Area:**
Existing Single-Family Residential Development within the City was sampled to determine the average impervious area on various single-family lot sizes. The sampling process consisted of measuring impervious area and total lot sizes on existing lots throughout the City using aerial imagery. The total lot count per size was determined by utilizing parcel data from Weber County sorted by area to create a total lot count for each size group. The total lots sampled listed indicates how many lots were analyzed to measure total impervious area and lot size. The goal was to sample enough lots to achieve a 95% confidence interval with a 5% margin of error. This goal was achieved on smaller lot size groups. The goal was not achieved on lot sizes of 2 AC – 3 AC and above because of the lack of developed parcels of these larger sizes. The data is summarized in Table 1:

**TABLE 1**

| Single Family Lot Sizes | Min (sf) | Max (sf) | Average Impervious Area (sf) | Average Impervious Area (%) | Lot Count | Lots Sampled |
|---|---|---|---|---|---|---|
| ¼ AC or Less- Single Family Residential | 5,000 | 12,499 | 4,281 | 44.6% | 1,518 | 307 |
| Greater than ¼ AC up to ½ AC - Single Family Residential | 12,500 | 21,780 | 6,108 | 38.3% | 1,264 | 294 |
| Greater than ½ AC up to 1 AC - Single Family Residential | 21,780 | 43,560 | 7,626 | 21.0% | 1,403 | 304 |
| Greater than 1 AC up to 2 AC - Single Family Residential | 43,560 | 87,120 | 8,962 | 16.3% | 646 | 241 |
| Greater than 2 AC up to 3 AC - Single Family Residential | 87,121 | 130,680 | 9,563 | 9.5% | 150 | 91 |
| Greater than 3 AC up to- 4 AC - Single Family Residential | 130,681 | 174,240 | 11,454 | 7.9% | 78 | 22 |
| Greater than 4 AC or More - Single Family Residential | 174,241 | + | 13,027 | 3.6% | 150 | 47 |
| | | | | | | |
| 2 AC or Less - Single Family Residential | 5,000 | 87,120 | 6,621 | 23.8% | - | - |

**The average impervious area of all single-family lots sampled was 7,134 square feet.

**Projected Development:**
Data from the Weber County Assessor indicates that an average of 100 acres per year are developed within the City. Table 2 includes developed acres per year.

**TABLE 2**

| Year | Developed Acres (AC) |
|---|---|
| **2017** | 100.6 |
| **2018** | 75.3 |
| **2019** | 93.7 |
| **2020** | 113.4 |
| **2021** | 100.0 |
| **2022** | 116.3 |
| **Total** | 599.35 (average **99.9**) |

Table 3 includes estimates for each development type during the impact fee collection period. The percentages were estimated using data from the Weber County Assessor from 2017 – 2022 for single family and multi-family residential. Out of 100 acres developed, the following includes yearly average area and percentages of each type.

**TABLE 3**

| Type | Yearly Average Developed Acres | Yearly Average Developed by % |
|---|---|---|
| Single Family Residential | 73 Acres | 73% |
| Multi-Family Residential | 13 Acres | 13% |
| Non Residential | 14 Acres | 14% |

To estimate the projected impervious area developed per year during impact fee collection period, the following assumptions have been used:

- Single Family Residential will be developed at lot sizes of 2 Acres or less, and it is estimated that 23.8% of developed lots will be impervious area. This range of lot sizes was selected as a conservative estimate assuming that the majority of lots developed within the City will be within this range. Note that this percentage of imperviousness is based on data sampled from existing residential development in the above-noted lot size range.

- Multi-Family Residential will be developed at an average of 71.1% impervious area. This percentage of imperviousness is based on the data sampled from existing multi-family residential development within the City. Each of the existing multi-family developments throughout the city were sampled by measuring the total area and impervious area. The ratio of impervious to total area was calculated.

- Non-Residential will be developed at an estimate of 80.0% impervious area. The estimate is based on recent residential development. It is anticipated that future commercial development will include impervious area in the range of 70-90%.

**Summary:**
Using the estimated developed area and impervious area percentages above; of the projected 100 developed acres per year, it is estimated that 37.81 acres or 1,646,836 square feet will be impervious.

**Exhibit C – Storm Water Impact Fee Facilities Plan**

# WEST HAVEN CITY

## *STORM DRAIN*
## *IMPACT FEE FACILITIES PLAN*

**SEPTEMBER 2022**
**REVISED SEPTEMBER 2025**

Prepared by:
**GARDNER ENGINEERING**

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# APPENDICES

**A. CAPITAL PROJECTS**

Table 3 – Capital Projects

Figure 4 – Capital Projects Map

Table 4 – Proposed Project sizing

**B. EXISTING STORM DRAIN SYSTEM MAPPING**

**C. Storm Drain Basin Maps with Basin Flow Calculations**

C1 – Hooper Slough

C2 – Howard Slough

C3 - 3300 South and Buttermilk Slough

C4 – Hooper Slough

**D. COST ESTIMATE**

**E. DEVELOPMENT PROJECTION AND IMPERVIOUS AREA ESTIMATE**

## I. Executive Summary

This Storm Drain Impact Fee Facilities Plan (IFFP) summarizes anticipated projects to be undertaken by the City during this impact fee collection period (a 6-year planning window). Projects include system improvements needed to support future growth (impact fee eligible) and improvements needed to address existing drainage deficiencies. Projects that need to address existing deficiencies will be identified as ineligible for funding by impact fees.

It is intended that this IFFP will be used in determining the location and size of system improvements. It is recognized that not all lands will be developed as densely as allowed by zoning, and some zoning may be changed to allow lower or higher densities. The variability of development density and location is accounted for by a regular review and update of the City's IFFP.

Public Facilities identified in this Plan have been sized to accommodate flows at buildout conditions; however, the impact fee will be proportioned to the amount of capacity anticipated to occur within the impact fee collection period in the Impact Fee Analysis (IFA). Proposed land use, population data, and estimated growth rates have been used to calculate the buildout population and year. This information is used for informational purposes and as a resource for prioritizing proposed projects. The estimated buildout population is 39,488. Using estimated growth rates, the estimated buildout year is approximately 2042. Using the US Census data of 3.22 people per household, it is estimated that 6,110 additional units will be developed in the City prior to buildout. Further, it is estimated that the undeveloped area within the City is approximately 1,981 Acres. An estimate of 100 acres of total development or 37.81 acres of impervious development per year, based on historic development data gathered from the Weber County Assessor and the existing development impervious areas sampled throughout the City, as detailed in *Appendix E- Development Projection and Impervious Area Estimate.*

West Haven City is unique in that it is divided into several isolated drainage basins. The basins are created by the various drainage sloughs and the Weber River along the north boundary of the City. Figure 2 – Drainage Basin Overview included in this plan identifies the geographic area of each basin. Historically, the drainage from the roads and fields was conveyed to the slough / river through roadside ditches and culverts. As development has occurred, many of the roadside ditches have been piped, along with additional storm drain infrastructure and detention facilities installed to serve individual subdivisions. The majority of the projects identified in this plan involve the installation of new storm drain infrastructure or the replacement of undersized culverts in ditches that run along the major roads throughout the City to accommodate new growth.

With the assistance of West Haven City Staff, a capital project list was developed to identify the anticipated projects needed to address existing drainage deficiencies and system improvements needed to serve future growth. Estimated peak flows were calculated to determine the size of future storm drainpipes. These projects are identified in Figure 4 – Capital Projects.

Figure 3 – Future Development Area highlights the areas of the City where future development is anticipated to occur. The City's General Plan was used to determine land use densities for these future development areas. City development standards require that, as development occurs, onsite detention basins are constructed as a Project Improvement. Stormwater detained in these basins was evaluated with 0.2 cubic feet per second detained release rates.

Some of the projects identified in this Plan will be necessitated by new development activity. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. Utah Code provides a mechanism for the City to collect from new development their proportionate share of the costs related to providing the Public Facilities needed within the City. This mechanism is the collection of an impact fee. The IFFP will then be analyzed by others to establish the maximum legal impact fee in a separate document called an Impact Fee Analysis (IFA).

The preliminary estimate of the probable cost of all the capital improvements (including both impact fee eligible and ineligible projects) projected for buildout is $11,918,773[1]. These improvements will occur over the course of time it takes for the projected buildout growth to materialize. The estimated cost of capital improvements (including both impact fee-eligible and ineligible projects) for the current 6-year planning window is $4,518,540.

It is recommended that this plan be reevaluated and modified within six years or as growth within the City dictates.

[1] Refer to Appendix A- *Capital Projects* – Table 3. Dollar amount is shown in current value.

## A. CERTIFICATION of Compliance with Utah State Code (11-36a-306(1)):

To the extent the following items are addressed in the IFFP, Gardner Engineering certifies that the following impact fee facilities plan:

1. Includes only costs of public facilities that are:

a. allowed under the Impact Fees Act; and

b. actually incurred; or

c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;

2. Does not include:

a. costs of operation and maintenance of public facilities;

b. cost for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by the existing resident's;

c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal reimbursement; and

3. Complies in each and every relevant respect with the Impact Fee Act.

____________________________

Ryan Christensen, P.E.

## II. Introduction

West Haven City has retained Gardner Engineering to update its Storm Drain Impact Fee Facilities Plan (IFFP).

The IFFP is being updated using the City's current General Plan to estimate future development density.

The steps shown below have been followed in preparing this *West Haven City Storm Drain Impact Fee Facilities Plan.*

- Complete existing storm drain system inventory and capacity within the existing storm drain system to serve growth;
- Identify existing and future storm drain outfalls, then delineate drainage basins;
- Size future storm drain pipes using projected flows;
- Identify projects to address existing deficiencies and projects needed due to growth;
- Prepare cost estimates for future projects and identify the portion of the cost of these future projects that are impact fee eligible.

The IFFP update is to estimate future storm water runoff in order to size future storm drainpipes and prepare cost estimates for proposed projects to be used for Impact Fee Analysis (IFA). The Impact Fee Act requires that an impact fee be imposed only when based on Impact Fee Facilities Plan (IFFP). An IFFP must document the following:

A. Identify the existing level of service (LOS).

B. Establish a proposed level of service (LOS).

C. Identify any excess capacity to accommodate future growth at the proposed level of service.

D. Identify demands placed upon existing Public Facilities by new Development Activity at the proposed level of service.

E. Identify the means by which the political subdivision will meet those growth demands identified in D, above, through new growth, "Buying-In" to excess capacity in C, or the construction of a new Public Facility, which may be financed through grants, bonds, interfund loans, impact fees, and anticipated or accepted dedication of system improvements.

## III. Demographics

Current and buildout population estimates have been prepared to assist in evaluating future infrastructure needs. To prioritize Public Facilities projects, it is necessary to estimate the buildout population and project the buildout year. Population data and estimated growth rates were used to determine the buildout population and year. This data is presented below.

### A. Projected Population at Buildout

The West Haven City General Plan (*Figure 1*) was used to estimate buildout population. See *Table 1 – Projected Total Population by Land Use.*

*The densities (units/ac) used are based on the City's General Plan zoning, with adjustments made to account for existing development densities and conservative estimates of population from multi-family residential areas.*

**Table 1 – Projected Total Population by Land Use at Buildout**

| Average Land Use Density | Total Acres | Units/Acre | Units at Buildout | Population at Buildout | Undeveloped acres |
|---|---|---|---|---|---|
| R-1 Zoning (20,000 ft$^2$ Lots) | 770.69 | 1 | 771 | 2,697 | 181.8 |
| R-2 Zoning (12,500 ft$^2$ Lots) | 1024.06 | 2 | 2,048 | 7,168 | 541.0 |
| R-2.5 Zoning (10,000 ft$^2$ Lots) | 353.71 | 2.5 | 884 | 3,095 | 180.4 |
| R-3 Multi-Family | 96.92 | 12 | 1,163 | 4,070 | 36.6 |
| R-4 (8,000 ft$^2$ Per Acre) | 18.23 | 4 | 73 | 255 | 0.0 |
| AGRICULTURE (A-1) | 1337.77 | 1 | 1,338 | 4,682 | 6.6 |
| AGRICULTURE (A-2) | 212.08 | 1 | 212 | 742 | 174.5 |
| COMMERCIAL (C-1) | 90.96 | 0 | 0 | 0 | 23.4 |
| COMMERCIAL (C-2) | 299.92 | 0 | 0 | 0 | 138.0 |
| COMMERCIAL (C-3) | 613.01 | 0 | 0 | 0 | 226.5 |
| HEAVY INDUSTRIAL (M-2) | 131.86 | 0 | 0 | 0 | 0.0 |
| LIGHT INDUSTRIAL (M-1) | 83.09 | 0 | 0 | 0 | 0.0 |
| MIXED USE ZC HIGH / MEDIUM / LOW DENSITY | 1058.35 | 4 | 4,233 | 14,817 | 156.3 |
| PARKS / PUBLIC OPEN SPACES/ SCHOOLS | 526.00 | 0 | 0 | 0 | 94.2 |
| DRINKING WATER TREATMENT FACILITY | 193.68 | 2 | 387 | 1,356 | 191.6 |
| PH ZONE | 34.55 | 5 | 173 | 605 | 6.2 |
| TOTAL | 6844.87 | - | - | 39,488 | 1957.0 |

## B. Current Population

West Haven was incorporated on July 1, 1991. The 2010 US Census counted the West Haven City population as 10,272. The 2020 US Census count for the City was 16,739. The average growth rate from 2010 to 2020 calculates to be about 5%. During this 10-year period, the City experienced varying rates of growth in a given year. The US Census estimated population for July 2022 as 19,880. This population estimate reflects a growth rate of just under 9% per year from 2020 to 2022. West Haven City, along with other areas of the Wasatch Front, has experienced unprecedented growth in the past few years. These various growth rates make it challenging to predict future growth rates. For the purpose of calculating the buildout year, a growth rate of 3.5% was used. This rate was used as a conservative approach, assuming that the average growth rate will decrease in the future as the undeveloped area in the city is developed. The assumptions and uncertainties involved in these population projections are acceptable because they are used only as a guide to prioritizing future project timelines. Future updates to the IFFP can adjust for updated growth rates and other growth in the service area.

**Table 2 - Population Projections 2010-2043**

| Year | % Increase | Population | |
|---|---|---|---|
| **2010** | | **10,272** | **US Census Data** |
| 2011 | 5.0% | 10,790 | |
| 2012 | 5.0% | 11,334 | |
| 2013 | 5.0% | 11,905 | |
| 2014 | 5.0% | 12,505 | |
| 2015 | 5.0% | 13,136 | |
| 2016 | 5.0% | 13,798 | |
| 2017 | 5.0% | 14,493 | |
| 2018 | 5.0% | 15,223 | |
| 2019 | 5.0% | 15,991 | |
| **2020** | 5.0% | **16,802** | **US Census Data** |
| 2021 | 8.8% | 18,281 | |
| **2022** | 8.8% | **19,880** | **Census Estimate** |
| 2023 | 3.5% | 20,576 | |
| 2024 | 3.5% | 21,296 | |
| 2025 | 3.5% | 22,041 | |
| 2026 | 3.5% | 22,813 | |
| 2027 | 3.5% | 23,611 | |
| 2028 | 3.5% | 24,438 | |
| 2029 | 3.5% | 25,293 | |
| 2030 | 3.5% | 26,178 | |
| 2031 | 3.5% | 27,094 | |
| 2032 | 3.5% | 28,043 | |
| 2033 | 3.5% | 29,024 | |
| 2034 | 3.5% | 30,040 | |
| 2035 | 3.5% | 31,091 | |
| 2036 | 3.5% | 32,180 | |
| 2037 | 3.5% | 33,306 | |
| 2038 | 3.5% | 34,472 | |
| 2039 | 3.5% | 35,678 | |
| 2040 | 3.5% | 36,927 | |
| 2041 | 3.5% | 38,219 | |
| **2042** | 3.3% | **39,488** | **Estimated Buildout** |

### C. Service Area and Projected Land Use

The service area boundary of this Impact Fee Facilities Plan includes the West Haven City boundary, and as amended through annexations. The General Plan indicates several areas for future annexations.

## IV. Impact Fee Facility Plan

### A. Design Standards for Planning

*The West Haven storm drain system is comprised of major and minor systems.* The minor system consists of the components, including curbs, gutters, ditches, inlets, pipes, open channels, etc. The minor system is designed to carry runoff from the 10-year storm event.

The major system provides overland relief for stormwater flows exceeding the capacity of the minor system. This usually happens during more infrequent storm events, such as the 50 and 100-year storms. The major storm drainage system consists of a combination of storm drainpipes and channelizing surface flows, including the streets and frontages within the right of way. The roadways in newly developed areas should be constructed lower than the adjacent lots, which allows roadways to convey the runoff exceeding the capacity of the minor system.

This IFFP analyzes the minor storm drainage system designed to handle the 10-year storm event. Applying the 100-year storm event to the major storm drainage system is a more complex issue and is not addressed in this Plan. Detailed topography citywide would be necessary to model the flow patterns of a 100-year storm event. It is recommended that the City require that the major storm system in new development be designed to meet the design criteria of the 100-year storm event, specifically the detention facilities. In addition, the City has adopted a Low Impact Development (LID) Standard to address water quality requirements. The LID standard can be accessed on the City's website. The following design criteria are used in this Plan:

**Pipe – Size:** New storm drainpipes shall be a minimum of 15" as required by West Haven City. It is recommended that the maximum pipe size be based on necessary cover and water table elevations.

**Pipe – Slope:** Pipes slopes that were evaluated were taken from the data gathered as part of the field survey. Future pipes were sized using an estimated 0.50% slope.

**Flow Calculations:** The Manning's Equation was used for flow calculations to analyze pipe capacity. For future concrete pipe flow calculations, a Manning's Coefficient (n) of 0.013 was used.

### B. Storm Drainage Evaluation

The Rational method was used to approximate the 10-year peak flow for each subbasin. For subbasins that had detention ponds, the release rate of 0.2 cfs/acre was used for the peak flow. Undeveloped areas are anticipated to detain stormwater flows at a rate of 0.2 cfs / acre.

### C. Inventory of Existing System

An inventory of the existing storm drain system was initially compiled to create a GIS mapping system. The original mapping was prepared using available plans, survey data, and a visual survey. Ongoing coordination with City staff has been used to

identify unknown information in the existing system mapping. Gardner Engineering surveyed the location of manholes, inlets, and outfalls. Survey Data was to update the existing mapping.

The completed inventory of the storm drain system was used to delineate basins and evaluate flows. The existing storm drain mapping is maintained digitally on the City's online GIS mapping. Additionally, mapping sheets have been created and are included in *Appendix B – Existing Storm Drain System* Mapping.

## D. Level of Service Summary

The level of service for the West Haven Storm Drain system is summarized below. The proposed level of service is the same as the existing level of service. Therefore, only one level of service is listed in this Plan. Unlike many other utilities, there are few minimum State of Utah standards for storm drain. The level of service is established to provide the infrastructure needed to protect residents and property from flooding. Standards are set to find a balance between cost, feasibility, and acceptable water levels throughout the City during a storm event. The table below includes the existing and proposed level of service standards.

**Level of Service**

| Description | Standard |
|---|---|
| Allowable Runoff | Development within the City is required to detain stormwater with a release rate of 0.2 CFS / AC. This release rate is intended to maintain predevelopment runoff rates |
| Detention | Volume required to hold the 100 – year design storm with at least 1 ft of freeboard. Release rate per Allowable Runoff. |
| Storm Drain Conveyance | Pipes shall be designed to carry the minor 10-year storm. The major 100-year storm is planned to be conveyed in detention ponds, pipes, and within road right-of-ways. Minimum pipe size is 15" RCP with adequate slope to carry the necessary flows. |

## E. Excess Capacity

The existing storm drain system was evaluated to determine areas of future development that will be served by existing storm drain infrastructure. Figure 3 – Future Development Area shows areas where future development is anticipated. There are isolated areas of future development that may utilize existing storm drain infrastructure, but the majority of future development will be served by new Public Facilities or project-specific improvements. In addition to future Public Facilities, future development will largely utilize existing sloughs and the Weber River for stormwater conveyance. Buy-in for the use of excess capacity in the sloughs and river was not analyzed because the facilities were not constructed by the City with known costs.

## F. Collection System Analysis

**Drainage Basins:** The City is delineated into 6 different drainage basins A-F. The basins were delineated based on where the basin outfall is located. A map of the drainage basins is shown in *Figure 2 – Drainage Basins Overview.* The following is a description of each basin:

- <u>Basin A – Hooper Slough</u>

  The Hooper Slough drainage basin is the largest basin in the City. The Hooper Slough begins in the general area south of 1800 South and west for 1900 West. The slough runs out of the existing City boundary west of 3200 West, and then the recently annexed area of Staker Farm Subdivision, and then back into the City south of 3300 South at approximately 4100 West, where it remains within the City boundary until entering Hooper City at 5100 West and 4600 South. There are several outfalls from the storm drain system into the slough. The City has completed several slough culvert improvement projects for roadway widening projects. For long-term flood control, a master planned regional detention pond is planned as part of the Green Farms Subdivision near 4100 West and 3800 South. The Buttermilk Slough and the 3300 South basins both flow into the Hooper Slough. Basin descriptions for these are included below.

- <u>Basin B – Buttermilk Slough</u>

  The Buttermilk Slough begins within the City east of 2700 West and north of 3300 South, and begins as channelized flow west of the Layton Canal. The Buttermilk Slough flows into a piped section of the Hooper Slough in 3500 West at approximately 2700 South. There are several outfalls to the slough from the storm drain system. The slough runs through the future Windsor Farms Park. For long-term flood control, there is planned regional detention within the park area.

- <u>Basin C – Howard Slough</u>

  The Howard Slough begins near 3300 West and 3600 South and runs southwest through the City until entering Roy City near 4000 West and 4600 South. There are several outfalls to the slough from the storm drain system. The City has completed culvert upgrades on the Howard Slough for road projects in the past. There have also been isolated areas of the slough that have been piped through the development of adjacent properties.

- <u>Basin D – Weber River</u>

  The Weber River Basin is located along the City's north boundary, generally northeast of 1900 West and 1800 South. The area within the basin encompasses several industrial zones located east of I-15 and adjacent to 1900 West. There are also residential areas north of 1800 South and east of I-15. These areas drain to the river through various drainage ditches and storm drainpipes.

- <u>Basin E – 3300 South</u>

  The 3300 South Drainage Basin includes the area tributary to the Hooper Slough east of the Hooper Slough Basin and south of the Buttermilk Basin. The basin includes areas of roadside ditches and development-related storm drain improvements. Runoff from this basin leaves the City boundary and runs into an unincorporated area at 3300 South and 3500 West until eventually flowing into the Hooper Slough at 3300 South and 4200 West. There are planned improvements to enable long-term flood control through the use of a regional detention pond at West Haven Country Park.

- <u>Basin F – 5100 West</u>

  Runoff from the 5100 West Basin flows north along 5100 West and west along 3300 South to the intersection of these streets, where it then leaves the City boundary and flows north along 5100 West. The runoff from this area eventually enters a ditch tributary to the Walker Slough.

**Developed and Undeveloped Area:** Figure 3 – Future Development Area includes the general area of future development. The undeveloped area identified was created using aerial imagery, county parcel data, and taking into account planned subdivisions. The Jordan Valley Water parcels were also identified.

The undeveloped areas of the City were evaluated based on the assumption that stormwater runoff would be detained with a maximum release rate of 0.2 cfs / acre.

**Storm Water Conveyance and Detention in Sloughs:** In most areas of West Haven City, runoff currently collects in storm drainpipes or roadside ditches and is then conveyed to sloughs, which generally flow southwesterly through the City. The existing sloughs serve as drainage channels and, in some areas, provide natural detention. Preserving and maintaining the sloughs for existing and future storm drainage is important because replacing the sloughs with a piped storm drainage system capable of conveying the 100-year storm event is unfeasible due to cost and topography. It is recommended that the City develop a recurring maintenance plan on the sloughs within the City to include dredging existing channels to maintain capacity. Preserving access and obtaining property or easements when development occurs along the sloughs is important to allow for needed maintenance and protection against decreasing slough capacity. The maintenance of sloughs is not an impact fee eligible activity.

**Capital Project List:** In order to create the capital projects list, evaluation of the existing storm drain system was completed with the assistance of the West Haven City Staff to identify existing issues requiring maintenance or improvements. Consideration of anticipated developments and future road reconstruction projects was also considered. Evaluation of contributing areas was completed to determine peak flows, which were then used to size future projects. *Appendix A – Capital Projects* includes a map (see Figure 4) of the proposed capital projects. Projects were grouped together as applicable and assigned project numbers for reference. The assigned project numbers do not correspond with project priority. Table 3 includes a list of capital projects, including total estimated cost and the costs eligible for funding by impact fees. The percentage eligible for impact fees is based on whether the proposed project is needed to serve future growth or just to address existing issues or deficiencies. After evaluation with City Staff, the proposed projects were prioritized into planning year windows. Brief descriptions of each project were created to clarify the intended scope and purpose of the project.

**Project Costs:** Cost estimates were developed using current construction costs. The costs are preliminary estimates of probable construction costs, including costs associated with materials, installation, engineering, construction management, and contingency. A cost per foot was developed for each size of storm drainpipe. This cost was applied to the proposed project lengths to determine total project costs. Estimates are shown under *Appendix D – Cost Estimates.* The total estimated cost of projects identified is included in Table 3 in *Appendix A- Capital Projects.*

As development progresses, the existing storm drain system will be required to accommodate increased flows. In some locations, existing storm drain conveyance will need to be improved to support the buildout demands. Some projects are not eligible to be funded entirely from Impact Fees collected. Each Capital Project was listed with a percentage of cost attributed to existing development, cost attributed to future development within the current planning window, and cost attributed to future development outside of the current planning window. *Table 3* in *Appendix A - Capital Projects* shows the project costs and the portions of costs attributed to existing and future development. The total amount of project costs eligible for impact fee funding within the current planning window is estimated at $2,137,856. The total project cost for the current planning window is $4,518,540.

## G. Suggested Capital Improvement Projects

The rate and location of new development will determine which projects the City actually undertakes. Upon reviewing the Capital Projects with City staff, the list was prioritized. The prioritized list was broken down in 6-year increments from 2022 to buildout. The prioritized list is presented in Table 3 of Appendix A, *Capital Projects*. This priority schedule is a suggested course of action only and should be adjusted periodically as future development occurs.

## H. Method of Financing Needed Facilities

Impact fees collected shall be used within 6 years of receipt in most cases, except as described in Utah Code Section 11-36-302 Impact fees. The City's plan for financing system improvements requires that impact fees are necessary to maintain the existing Level of Service. As such, the cost of Impact fee eligible projects will be financed through impact fees. If the rate of impact fee collection is insufficient to pay for the related project in cash, outside financing may be sought. Non-impact fee eligible projects will be financed from user fees and taxes, not from impact fees. Non-impact fee projects were recommended by City staff in order to improve or address existing issues or deficiencies in the system.

### Grants

The City is unaware of any potential grant sources for the stormwater collection system. However, should it be the recipient of any such grants, it will then look at the potential to reduce impact fees.

### Bonds

The City has no outstanding bonds for the stormwater collection system. While the City may issue bonds in the future to fund storm collection facilities, no bonds are currently being contemplated; therefore, no costs associated with bond issuance have been included in the calculation of impact fees.

### Interfund Loans

The City does not anticipate facilitating an interfund loan.

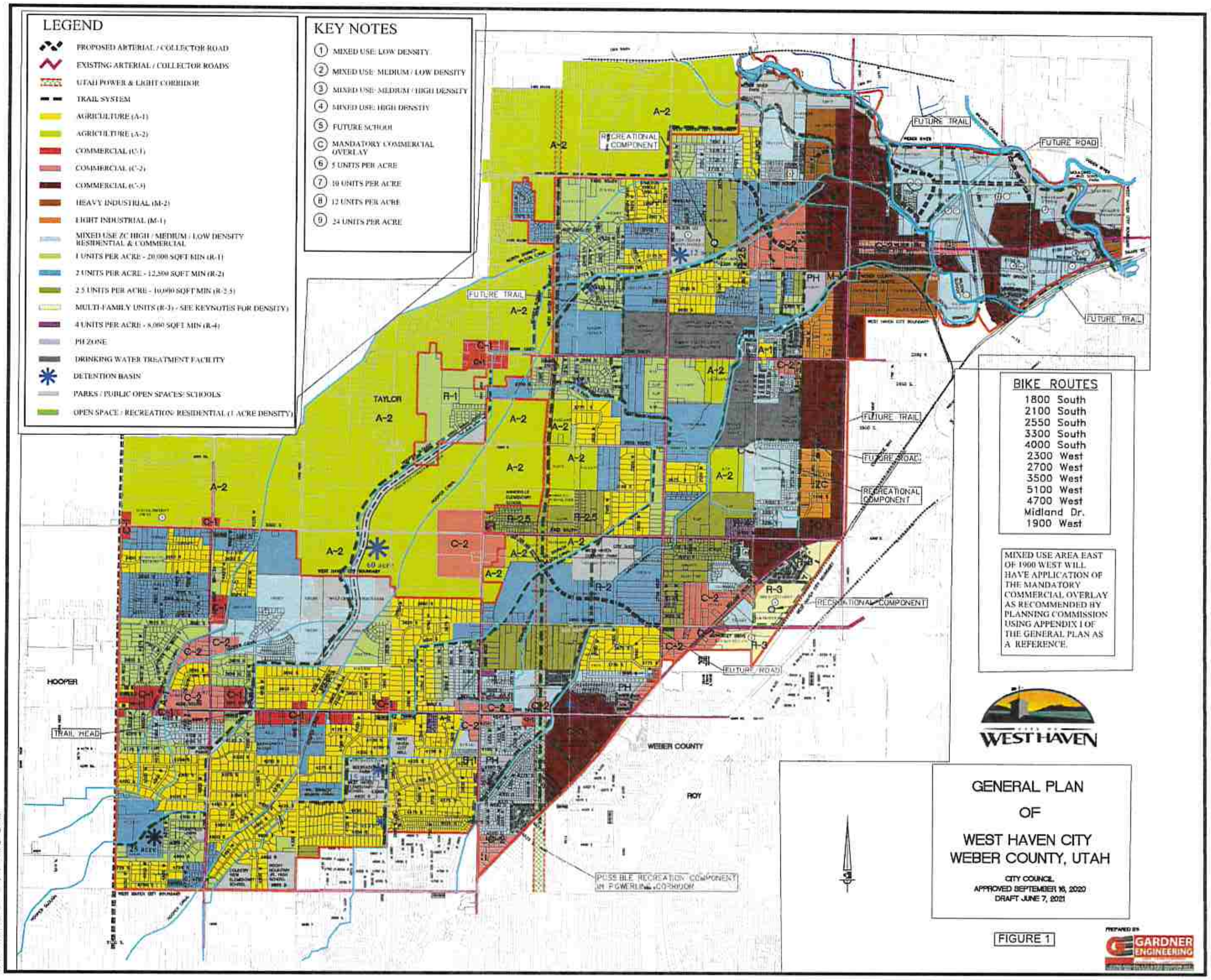
### Impact Fees

Due to the anticipated growth in the City, impact fees are a viable means of allowing new development to pay for its impacts on the existing system. The City finds that it is necessary to impose impact fees to maintain the proposed level of service for the

stormwater collection system. The City's plan for financing these system improvements relies upon impact fees. This IFFP is developed following legal guidelines, enabling the preparation of an Impact Fee Analysis for the stormwater collection system and allowing the City to charge impact fees for the system.

**Anticipated or Accepted Dedications of System Improvements**

Any item that a developer funds must be included in the IFFP if a credit against impact fees is to be issued and must be agreed upon with the City before construction of the improvements.



LEGEND
PROPOSED ARTERIAL / COLLECTOR ROAD
EXISTING ARTERIAL / COLLECTOR ROADS
UTAH POWER & LIGHT CORRIDOR
TRAIL SYSTEM
AGRICULTURE (A-1)
AGRICULTURE (A-2)
COMMERCIAL (C-1)
COMMERCIAL (C-2)
COMMERCIAL (C-3)
HEAVY INDUSTRIAL (M-2)
LIGHT INDUSTRIAL (M-1)
MIXED USE ZC HIGH / MEDIUM / LOW DENSITY RESIDENTIAL & COMMERCIAL
1 UNITS PER ACRE - 20,000 SQFT MIN (R-1)
2 UNITS PER ACRE - 12,500 SQFT MIN (R-2)
2.5 UNITS PER ACRE - 10,000 SQFT MIN (R-2.5)
MULTI-FAMILY UNITS (R-3) - SEE KEYNOTES FOR DENSITY)
4 UNITS PER ACRE - 8,000 SQFT MIN (R-4)
PH ZONE
DRINKING WATER TREATMENT FACILITY
DETENTION BASIN
PARKS / PUBLIC OPEN SPACES/ SCHOOLS
OPEN SPACE / RECREATION/ RESIDENTIAL (1 ACRE DENSITY)
KEY NOTES
1 MIXED USE: LOW DENSITY
2 MIXED USE: MEDIUM / LOW DENSITY
3 MIXED USE: MEDIUM / HIGH DENSITY
4 MIXED USE: HIGH DENSITY
5 FUTURE SCHOOL
C MANDATORY COMMERCIAL OVERLAY
6 5 UNITS PER ACRE
7 10 UNITS PER ACRE
8 12 UNITS PER ACRE
9 24 UNITS PER ACRE
BIKE ROUTES
1800 South
2100 South
2550 South
3300 South
4000 South
2300 West
2700 West
3500 West
5100 West
4700 West
Midland Dr.
1900 West
MIXED USE AREA EAST OF 1900 WEST WILL HAVE APPLICATION OF THE MANDATORY COMMERCIAL OVERLAY AS RECOMMENDED BY PLANNING COMMISSION USING APPENDIX I OF THE GENERAL PLAN AS A REFERENCE.
FUTURE TRAIL
FUTURE ROAD
RECREATIONAL COMPONENT
POSSIBLE RECREATION COMPONENT IN POWERLINE CORRIDOR
TRAIL HEAD
TAYLOR
HOOPER
WEBER COUNTY
ROY
WEST HAVEN
GENERAL PLAN
OF
WEST HAVEN CITY
WEBER COUNTY, UTAH
CITY COUNCIL
APPROVED SEPTEMBER 16, 2020
DRAFT JUNE 7, 2021
FIGURE 1
PREPARED BY
GARDNER ENGINEERING

# DRAINAGE BASINS OVERVIEW

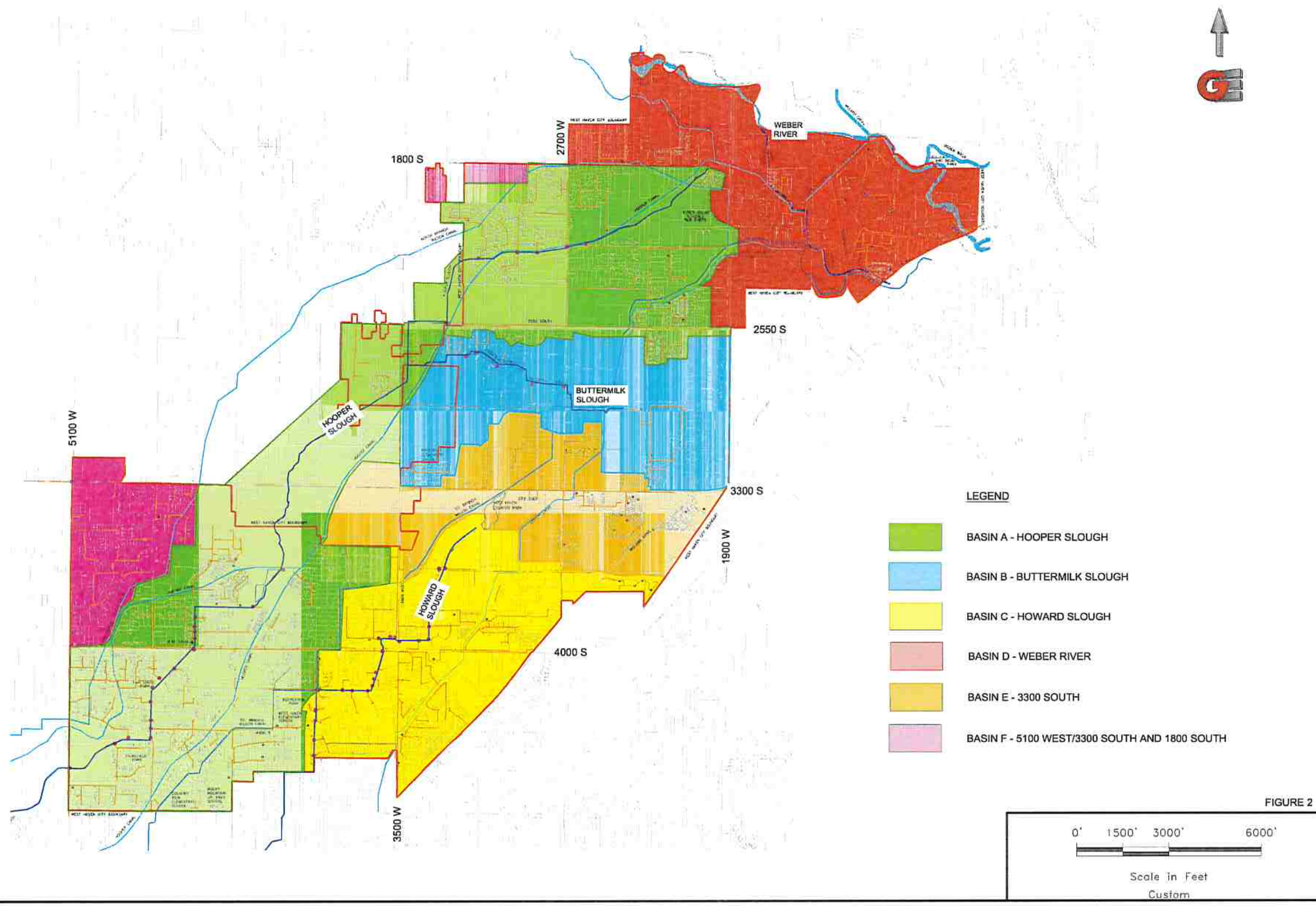



FIGURE 2

| Date | Revisions Description | |
|---|---|---|
| | | Date: 08-10-22 |
| | | Scale: Custom |
| | | Designed: KAN |
| | | Drafted: KAN |
| | | Checked: RC |

DRAINAGE BASINS OVERVIEW
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F2

G:\WEST HAVEN CITY FOLDER\CAPITAL IMPACT\STORM DRAIN\2022\DESIGN\WEST HAVEN EXISTING STORM DRAIN.DWG

# FUTURE DEVELOPMENT AREA

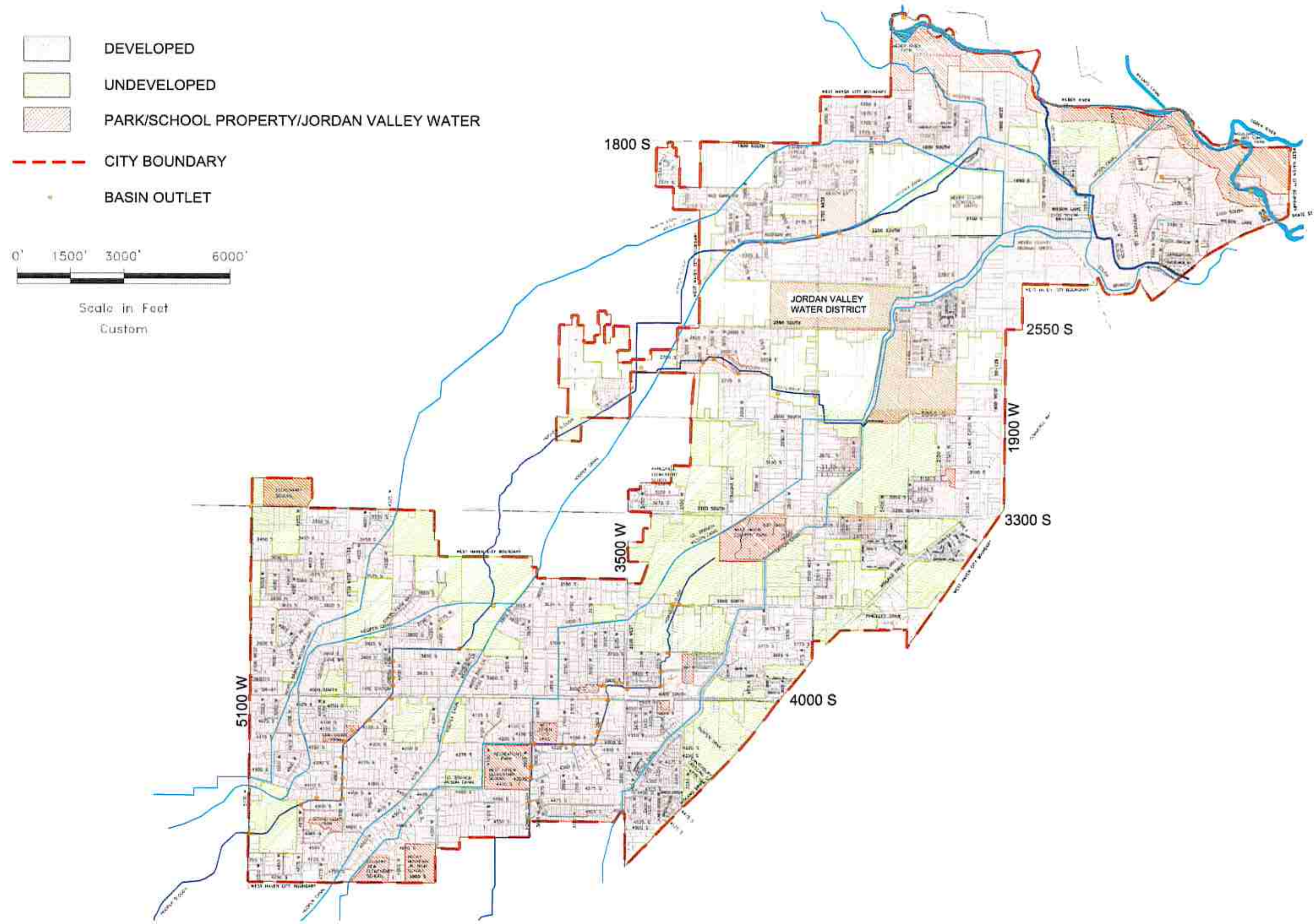



FIGURE 3

| Date | Revisions Description | Date: 8-3-22 |
|---|---|---|
| | | Scale: Custom |
| | | Designed: KAN |
| | | Drafted: KAN |
| | | Checked: RC |

FUTURE DEVELOPMENT AREA
WEST HAVEN SD IFFP
OVERALL STORM DRAIN
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F3

G:\WEST HAVEN CITY FOLDER\CAPITAL IMPACT\STORM DRAIN\2022\DESIGN\WEST HAVEN DEVELOPED VS UNDEVELOPED REV.DWG

# APPENDIX A

## Capital Projects

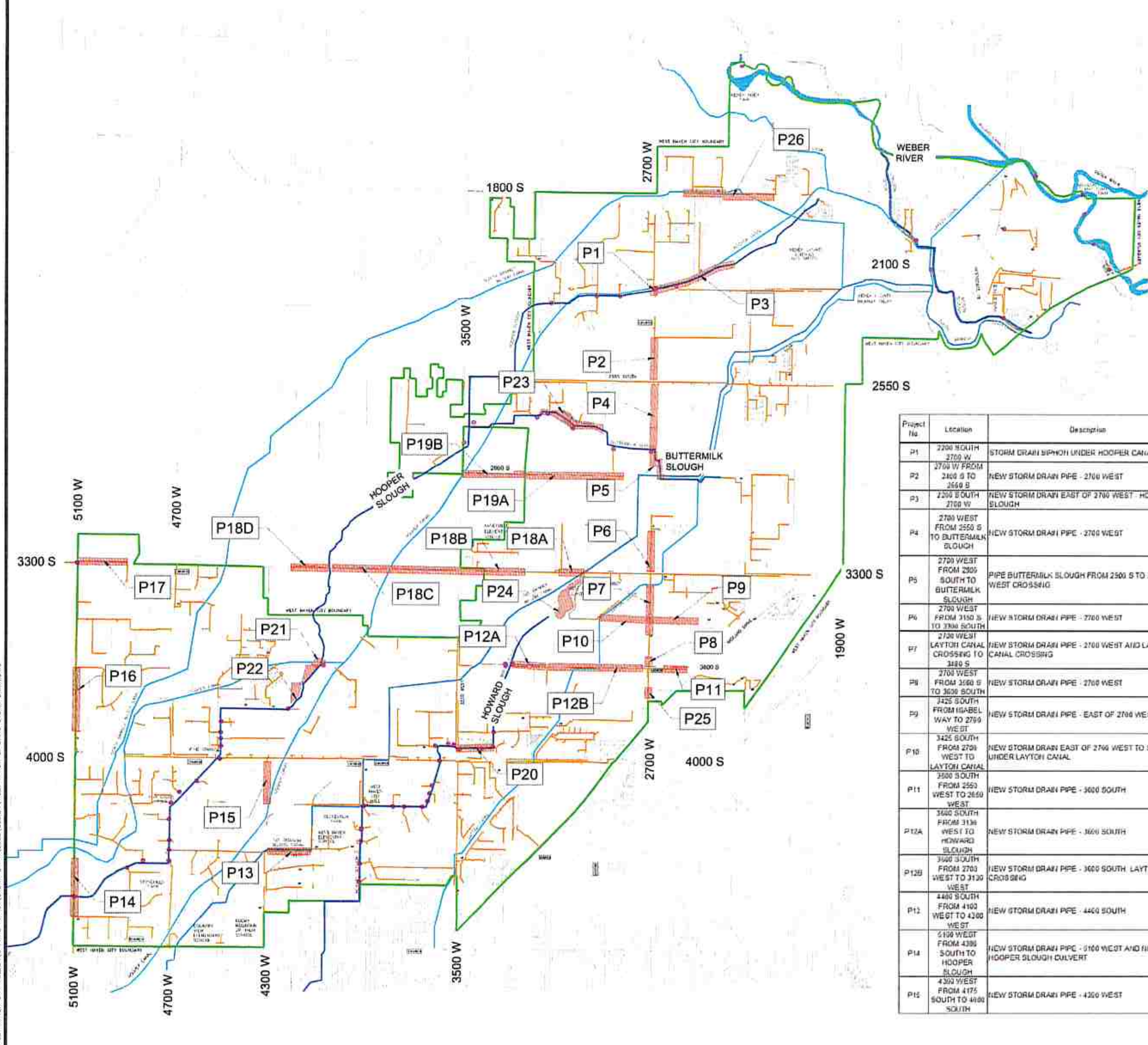
## CAPITAL PROJECTS 2022

TABLE 3

| Project No. | Location | Description | % of Project Cost Attributed to Existing Development | % of Project Cost Attributed to Future Development Current Planning Window (2023-2028) | % of Project Cost Attributed to Future Development (AFTER 2028) | Total Estimated Project Cost 2023-2028 | 2029-2034 | 2035-2040 | 2041-2046 | Project Cost Attributed to Future Development During Planning Window | Total Planning Window Impact Fee Eligible Costs | Project Cost Attributed to Existing Development | Total Planning Window Cost Attributed to Existing Development |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 | 2200 SOUTH 2700 W | STORM DRAIN SIPHON UNDER HOOPER CANAL | 75% | 25% | 0% | $106,473.70 | | | | $26,618.43 | | $79,855.28 | |
| P2 | 2700 W FROM 2400 S TO 2550 S | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 60% | 40% | $307,150.80 | | | | $184,290.48 | | $0.00 | |
| P3 | 2200 SOUTH 2700 W | NEW STORM DRAIN EAST OF 2700 WEST - HOOPER SLOUGH | 0% | 60% | 40% | $797,221.12 | | | | $478,332.67 | | $0.00 | |
| P10 | 3425 SOUTH FROM 2700 WEST TO LAYTON CANAL | NEW STORM DRAIN WEST OF 2700 WEST TO SIPHON UNDER LAYTON CANAL | 0% | 60% | 40% | $363,593.04 | | | | $218,155.82 | | $0.00 | |
| P16 | 5100 WEST FROM 3720 SOUTH TO 3500 SOUTH | NEW STORM DRAIN PIPE - 5100 WEST | 0% | 60% | 40% | $638,783.91 | | | | $383,270.35 | | $0.00 | |
| P17 | 3300 SOUTH FROM 4950 WEST TO 5100 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $290,925.13 | | | | $174,555.08 | | $0.00 | |
| P18A | 3300 SOUTH FROM 2985 WEST TO STRAIGHT ST. | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $186,390.65 | | | | $111,834.39 | | $0.00 | |
| P18B | 3300 SOUTH FROM 3450 WEST TO CITY BOUNDARY | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 60% | 40% | $382,666.14 | | | | $229,599.68 | | $0.00 | |
| P20 | 3950 SOUTH FROM 3300 WEST TO 3500 WEST | PIPE THE HOWARD SLOUGH BEHIND ELLIES LANDING | 100% | 0% | 0% | $367,357.58 | | | | $0.00 | | $367,357.58 | |
| P22 | GREEN FARMS 3700 SOUTH AND 4200 WEST | HOOPER SLOUGH REGIONAL DETENTION | 0% | 60% | 40% | $552,000.00 | | | | $331,200.00 | | $0.00 | |
| P26 | 1800 S FROM 2600 W TO 2200 W | REPLACE STORM DRAIN PIPE - 1800 SOUTH | 100% | 0% | 0% | $525,978.03 | | | | $0.00 | $2,137,856.90 | $525,978.03 | $973,190.88 |
| P8 | 2700 WEST FROM 3560 S TO 3600 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | $51,400.87 | | | $51,400.87 | | $0.00 | |
| P9 | 3425 SOUTH FROM ISABEL WAY TO 2700 WEST | NEW STORM DRAIN PIPE - EAST OF 2700 WEST | 30% | 0% | 70% | | $243,898.48 | | | $170,728.93 | | $73,169.54 | |
| P11 | 3600 SOUTH FROM 2550 WEST TO 2650 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH | 0% | 0% | 100% | | $128,987.08 | | | $128,987.08 | | $0.00 | |
| P12A | 3600 SOUTH FROM 3130 WEST TO HOWARD SLOUGH | NEW STORM DRAIN PIPE - 3600 SOUTH | 0% | 0% | 100% | | $340,995.24 | | | $340,995.24 | | $0.00 | |
| P12B | 3600 SOUTH FROM 2700 WEST TO 3130 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH, LAYTON CANAL CROSSING | 0% | 0% | 100% | | $611,956.12 | | | $611,956.12 | | $0.00 | |
| P24 | COUNTRY PARK | REGIONAL DETENTION | 0% | 0% | 100% | | $448,800.00 | | | $448,800.00 | $1,752,868.24 | $0.00 | $73,169.54 |
| P4 | 2700 WEST FROM 2550 S TO BUTTERMILK SLOUGH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | $309,535.78 | | $309,535.78 | | $0.00 | |
| P5 | 2700 WEST FROM 2900 SOUTH TO BUTTERMILK SLOUGH | PIPE BUTTERMILK SLOUGH FROM 2900 S TO 2700 WEST CROSSING | 10% | 0% | 90% | | | $335,672.05 | | $302,104.85 | | $33,567.21 | |
| P6 | 2700 WEST FROM 3150 S TO 3300 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | $218,599.16 | | $218,599.16 | | $0.00 | |
| P7 | 2700 WEST LAYTON CANAL CROSSING TO 3480 S | NEW STORM DRAIN PIPE - 2700 WEST AND LAYTON CANAL CROSSING | 30% | 0% | 70% | | | $328,146.58 | | $229,702.61 | | $98,443.97 | |
| P21 | HOOPER SLOUGH 3600 SOUTH | DIVERSION STRUCTURE AND NEW CROSSING UNDER WILSON CANAL | 50% | 0% | 50% | | | $250,000.00 | | $125,000.00 | | $125,000.00 | |
| P23 | WINDSOR FARM PARK | BUTTERMILK REGIONAL DETENTION | 0% | 0% | 100% | | | $468,000.00 | | $468,000.00 | $1,652,942.40 | $0.00 | $257,011.18 |
| P13 | 4400 SOUTH FROM 4100 WEST TO 4300 WEST | NEW STORM DRAIN PIPE - 4400 SOUTH | 0% | 0% | 100% | | | | $229,655.20 | $229,655.20 | | $0.00 | |
| P14 | 5100 WEST FROM 4380 SOUTH TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 5100 WEST AND NEW HOOPER SLOUGH CULVERT | 30% | 0% | 70% | | | | $395,780.77 | $277,046.54 | | $118,734.23 | |
| P15 | 4300 WEST FROM 4175 SOUTH TO 4000 SOUTH | NEW STORM DRAIN PIPE - 4300 WEST | 30% | 0% | 70% | | | | $253,489.91 | $177,442.94 | | $76,046.97 | |
| P18C | 3300 SOUTH FROM WEST HAVEN BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH AND HOOPER CANAL CROSSING | 0% | 0% | 100% | | | | $1,461,500.97 | $1,461,500.97 | | $0.00 | |
| P18D | 3300 SOUTH FROM 4250 WEST TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH | 0% | 0% | 100% | | | | $199,784.50 | $199,784.50 | | $0.00 | |
| P19A | 2900 SOUTH FROM 2850 WEST TO WH BOUNDARY | NEW STORM DRAIN PIPE - 2900 SOUTH | 0% | 0% | 100% | | | | $532,435.40 | $532,435.40 | | $0.00 | |
| P19B | 2900 SOUTH FROM WH BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 2900 SOUTH | 0% | 0% | 100% | | | | $532,435.40 | $532,435.40 | | $0.00 | |
| P25 | 2700 W FROM 3700 S TO 3750 S | NEW STORM DRAIN PIPE - 2700 WEST | 0% | 0% | 100% | | | | $59,159.49 | $59,159.49 | $3,469,460.44 | $0.00 | $194,781.20 |
| | | | | | | $4,518,540.10 | $1,826,037.78 | $1,909,953.57 | $3,664,241.64 | | | | |

| Total Project Costs | Total Cost Attributed to Existing Development | Total Impact Fee Eligible Costs |
|---|---|---|
| $11,918,773.10 | $1,498,152.81 | $10,420,620.29 |

# CAPITAL PROJECTS




| Project No | Location | Description | PIPE SIZE |
|---|---|---|---|
| P1 | 2200 SOUTH 2700 W | STORM DRAIN SIPHON UNDER HOOPER CANAL | 24" |
| P2 | 2700 W FROM 2400 S TO 2550 S | NEW STORM DRAIN PIPE - 2700 WEST | 30" |
| P3 | 2200 SOUTH 2700 W | NEW STORM DRAIN EAST OF 2700 WEST - HOOPER SLOUGH | 30" |
| P4 | 2700 WEST FROM 2550 S TO BUTTERMILK SLOUGH | NEW STORM DRAIN PIPE - 2700 WEST | 24" |
| P5 | 2700 WEST FROM 2900 SOUTH TO BUTTERMILK SLOUGH | PIPE BUTTERMILK SLOUGH FROM 2500 S TO 2700 WEST CROSSING | 36" |
| P6 | 2700 WEST FROM 3150 S TO 3300 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P7 | 2700 WEST LAYTON CANAL CROSSING TO 3480 S | NEW STORM DRAIN PIPE - 2700 WEST AND LAYTON CANAL CROSSING | 18" |
| P8 | 2700 WEST FROM 3500 S TO 3600 SOUTH | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P9 | 3425 SOUTH FROM ISABEL WAY TO 2700 WEST | NEW STORM DRAIN PIPE - EAST OF 2700 WEST | 15" |
| P10 | 3425 SOUTH FROM 2700 WEST TO LAYTON CANAL | NEW STORM DRAIN EAST OF 2700 WEST TO SIPHON UNDER LAYTON CANAL | 30" |
| P11 | 3500 SOUTH FROM 2550 WEST TO 2650 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH | 18" |
| P12A | 3600 SOUTH FROM 3136 WEST TO HOWARD SLOUGH | NEW STORM DRAIN PIPE - 3600 SOUTH | 30" |
| P12B | 3600 SOUTH FROM 2700 WEST TO 3130 WEST | NEW STORM DRAIN PIPE - 3600 SOUTH LAYTON CANAL CROSSING | 24" |
| P13 | 4400 SOUTH FROM 4100 WEST TO 4200 WEST | NEW STORM DRAIN PIPE - 4400 SOUTH | 18" |
| P14 | 5100 WEST FROM 4300 SOUTH TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 5100 WEST AND NEW HOOPER SLOUGH CULVERT | 18"/36" |
| P15 | 4300 WEST FROM 4175 SOUTH TO 4000 SOUTH | NEW STORM DRAIN PIPE - 4300 WEST | 24" |
| P16 | 5100 WEST FROM 3720 SOUTH TO 3500 SOUTH | NEW STORM DRAIN PIPE - 5100 WEST | 36" |
| P17 | 3300 SOUTH FROM 4950 WEST TO 5100 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 24" |
| P18A | 3300 SOUTH FROM 4250 WEST TO 3600 WEST | NEW STORM DRAIN PIPE - 3300 SOUTH | 30" |
| P18B | 3300 SOUTH FROM 3450 WEST TO CITY BOUNDARY | NEW STORM DRAIN PIPE - 3300 SOUTH | 36" |
| P18C | 3300 SOUTH FROM WEST HAVEN BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH AND HOOPER CANAL CROSSING | 36" |
| P18D | 3300 SOUTH FROM 4250 WEST TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 3300 SOUTH | 18" |
| P19A | 2900 SOUTH FROM 2850 WEST TO WH BOUNDARY | NEW STORM DRAIN PIPE - 2900 SOUTH | 24" |
| P19B | 2900 SOUTH FROM WH BOUNDARY TO HOOPER SLOUGH | NEW STORM DRAIN PIPE - 2900 SOUTH | 30" |
| P20 | 3950 SOUTH FROM 3300 WEST TO 3500 WEST | PIPE THE HOWARD SLOUGH BEHIND ELLIES LANDING | 48" |
| P21 | HOOPER SLOUGH 3800 SOUTH | DIVERSION STRUCTURE AND NEW CROSSING UNDER WILSON CANAL | 0 |
| P22 | GREEN FARMS 3700 SOUTH AND 4200 WEST | HOOPER SLOUGH REGIONAL DETENTION | 5.2 |
| P23 | WINDSOR FARM PARK | BUTTERMILK REGIONAL DETENTION | 9.2 |
| P24 | COUNTRY PARK | REGIONAL DETENTION | 7.46 |
| P25 | 2700 W FROM 3700 S TO 3750 S | NEW STORM DRAIN PIPE - 2700 WEST | 18" |
| P26 | 1800 S FROM 2600 W TO 2700 W | REPLACE STORM DRAIN PIPE - 1800 SOUTH | 18" |

| Revisions | | |
|---|---|---|
| Date | Description | |

Date: 08-10-22
Scale: Custom
Designed: KAN
Drafted: KAN
Checked: RC

CAPITAL PROJECTS
WEST HAVEN - IFFP
VARIOUS LOCATIONS
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

F4

FIGURE 4

G:\WEST HAVEN CITY FOLDER\CAPITAL IMPACT\STORM DRAIN\2022\DESIGN\WEST HAVEN EXISTING STORM DRAIN.DWG

# PROPOSED PROJECT SIZING

Table 4

| PROJECT | BASIN AREA | C | i | Q cfs | Q Detained cfs | COMMENTS | RECOMMENDED PIPE SIZE | PROPOSED CAPCITY Q cfs | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| P1 | | | | | | EXISTING 24" TO BE PIPED UNDER HOOPER SLOUGH | 24" RCP | | |
| P2 | 53.56 | 0.3 | 1.38 | 22.17 | | FUTURE 57.3 ACRES FROM JVW @ 0.1 CFS/ACRE 5.73 CFS | 30" RCP 27.9 CFS @ 0.7% SLOPE | 15.63 | STUBBED FROM 2550 SOUTH 24" @ 0.50% |
| P3 | 121.3 | | | | 24.26 | RELEASE RATE OF 0.2 cfs/acre | 36" RCP @ 0.2% SLOPE | 29.15 | |
| P4 | 83.89 | | | | 16.78 | RELEASE RATE OF 0.2 cfs/acre mostly undeveloped land | 24" RCP @ 0.6% SLOPE | 17.13 | |
| P5 | | | | | | PIPE EXISTING DITCH | 18" RCP SLOPE 0.50% | 7.25 | |
| P6 | 52.58 | | | | 10.52 | FILL IN GAP CONNECTING TO 18" DOWNSTREAM | 18" RCP SLOPE 0.50% | 7.25 | |
| P7 | 6.36 | 0.3 | 2.06 | 3.93 | | EXISTING 18" UPSTREAM PIPE ACROSS LAYTON CANAL | 18" RCP SLOPE 0.50% | 7.25 | |
| P8 | | | | | 4.16 | DOWN STREAM EXISTING PIPE IS 15" Q=4.16 | 15" RCP | 4.16 | |
| P9 | 27.31 | | | | 8.03 | DETAINED FLOWS FROM KNUDSON CORNER ESTATES (2.57) AND FUTURE FLOWS UNDEVELOPED | 18" RCP @0.8% SLOPE | 9.18 | |
| P10 | 45.73 | | | | 21.34 | COMBINE FLOW WITH P9 AND P8 | 30" RCP SLOPE 0.40% | 25.35 | |
| P11 | 38.68 | | | | 7.74 | 28.22 ACRES WING SPAN APARTMENTS AND 10.46 ACRES HISTORIC FLOW | 18" RCP @ 1.0% | 10.27 | |
| P12A | 97.19 | | | | 27.17 | RELEASE RATE OF 0.2 cfs/acre | 30" RCP @ 0.6% SLOPE | 31.05 | |
| P12B | 42.01 | | | | 16.14 | RELEASE RATE OF 0.2 cfs/acre | 24" RCP @ 1.0% SLOPE | 22.11 | |
| P13 | | | | | | UPSTREAM AND DOWN STREAM EXISTING PIPE IS 18" | 18" RCP | | |
| P14 | 48.35 | | | | 9.67 | UNDEVELOPED RELEASE RATE OF 0.2 cfs/acre | 18" RCP @1% SLOPE | 10.27 | |
| P15 | | | | | | EXISTING PIPE UPSTREAM IS 18" DOWN STREAM CONNECTION IS A 24" | 24" RCP | | |
| P16 | | | | | | 4975 W AND 3625 S STUB 36" RCP | 36" RCP | | |
| P17 | 19.46 | 0.3 | 2.06 | 12.03 | | | 24" RCP SLOPE 0.50% | 15.63 | |
| P18A | | | | | 41.16 | Filling in Gap between upsteam and down stream 30" RCP 710' | 30" RCP SLOPE 1.10% | 42.04 | Basin E3,E6,E7 and EB1 |
| P18B | | | | | 52.72 | | 36" RCP SLOPE 0.70% | 54.54 | Basin E3,E6,E7,E9 and EB1 |
| P18C | | | | | 68.22 | 155.09 additional acres @ 0.1 cfs/acre 15.5 cfs | 36" RCP | 68.37 | Basin E3,E6,E7,E9 and EB1 |
| P18D | 44 | | | | 8.80 | | 18" RCP SLOPE 0.75% | 8.89 | |
| P19A | 72.09 | | | | 14.42 | 2745' of 24" to West Boundary | 24" RCP SLOPE 0.50% | 15.63 | |
| P19B | 52.09 | | | | 24.84 | 2786' of 30" to Hooper slough includes siphon under the Hooper Canal | 30" RCP SLOPE 0.50% | 28.35 | |
| P20 | | | | | 60.50 | Pipe 1033' of Slough BASIN C18-C21 BOX CULVERT CROSSING 3500 WEST IS 3X8 Upstream pipe is a 48" | 48" RCP SLOPE 0.20% | 62.78 | |
| P21 | | | | | | Diversion structure and pipe Hooper Slough | | | |
| P22 | | | | | | Regional Detention 5.2 acres | | | |
| P23 | | | | | | Regional Detention 9.2 acres | | | |
| P24 | | | | | | Regional Detention 7.48 acres | | | |
| P25 | | | | | | | | | |
| P26 | | | | | | | | | |

# APPENDIX B

## Existing Storm Drain System Mapping

# West Haven Storm Drain 2022 Map

**Legend**

- city boundary

**Storm Drain**

**Type**

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

**StormDrain Pipe**

**Diameter in inches**

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

**Diameter in inches**

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

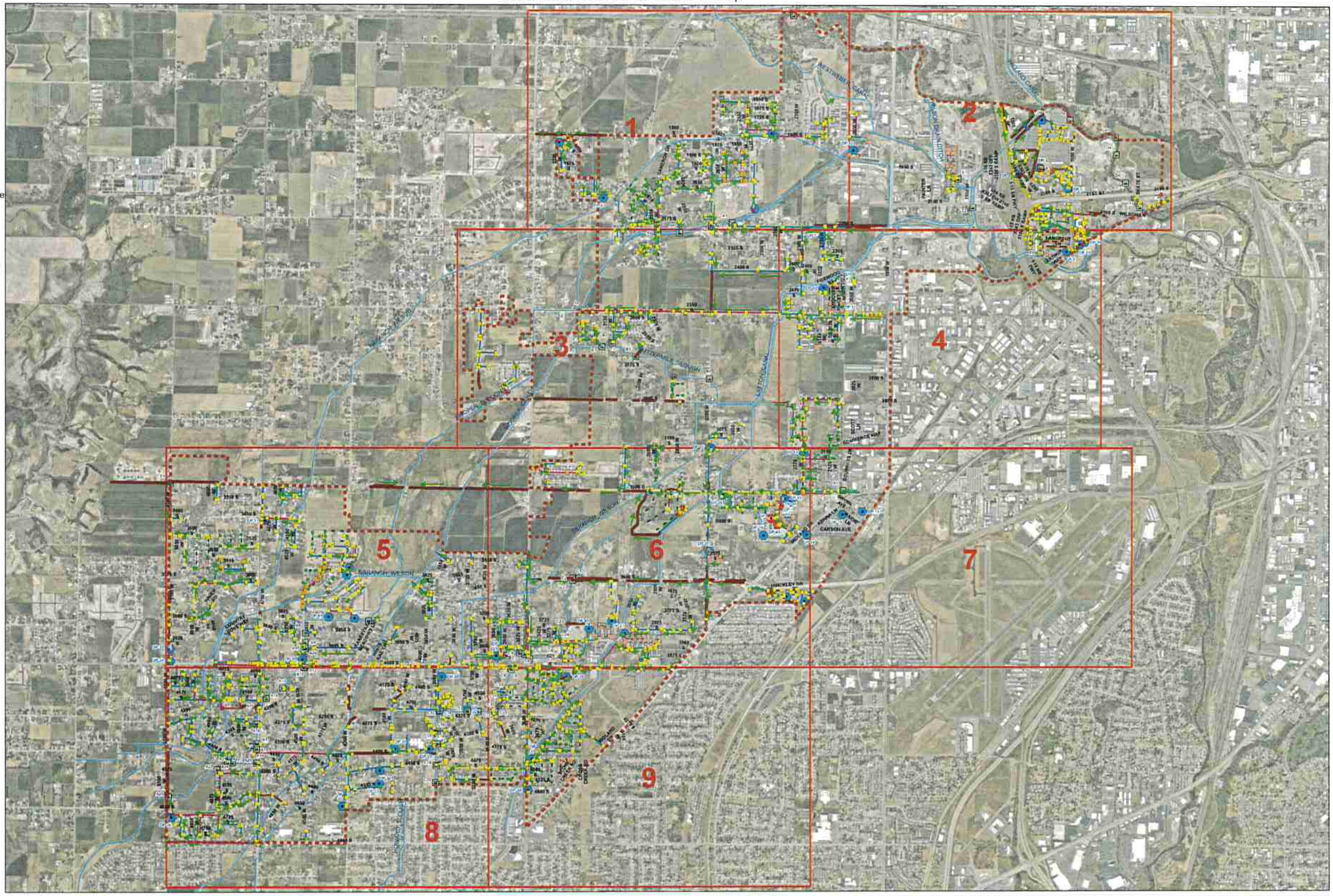
**Status**

- Surveyed
- Non Surveyed

**Detention Ponds**

**Type**

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




0 1,125 2,250 4,500 6,750 9,000 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map



**Legend**

city boundary

**Storm Drain**

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
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- 48

**LandDrainPipe**

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

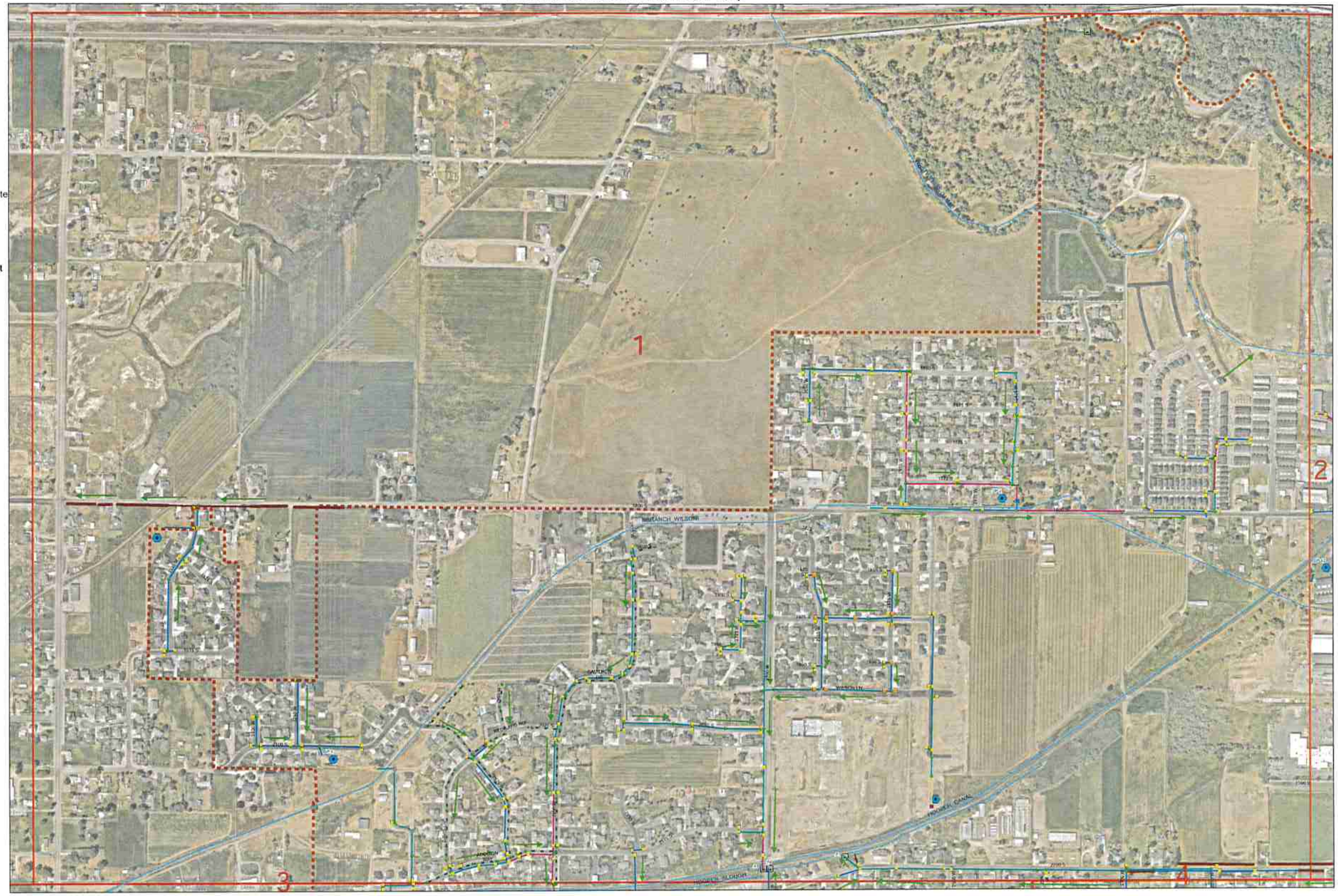
Status

- Surveyed
- Non Surveyed

**Detention Ponds**

Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map



## Legend

- city boundary

### Storm Drain

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

### StormDrain Pipe

Diameter in inches

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- 8
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- 15
- 18
- 24
- 30
- 36
- 40
- 48

### LandDrainPipe

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

### Storm Drain Outfall

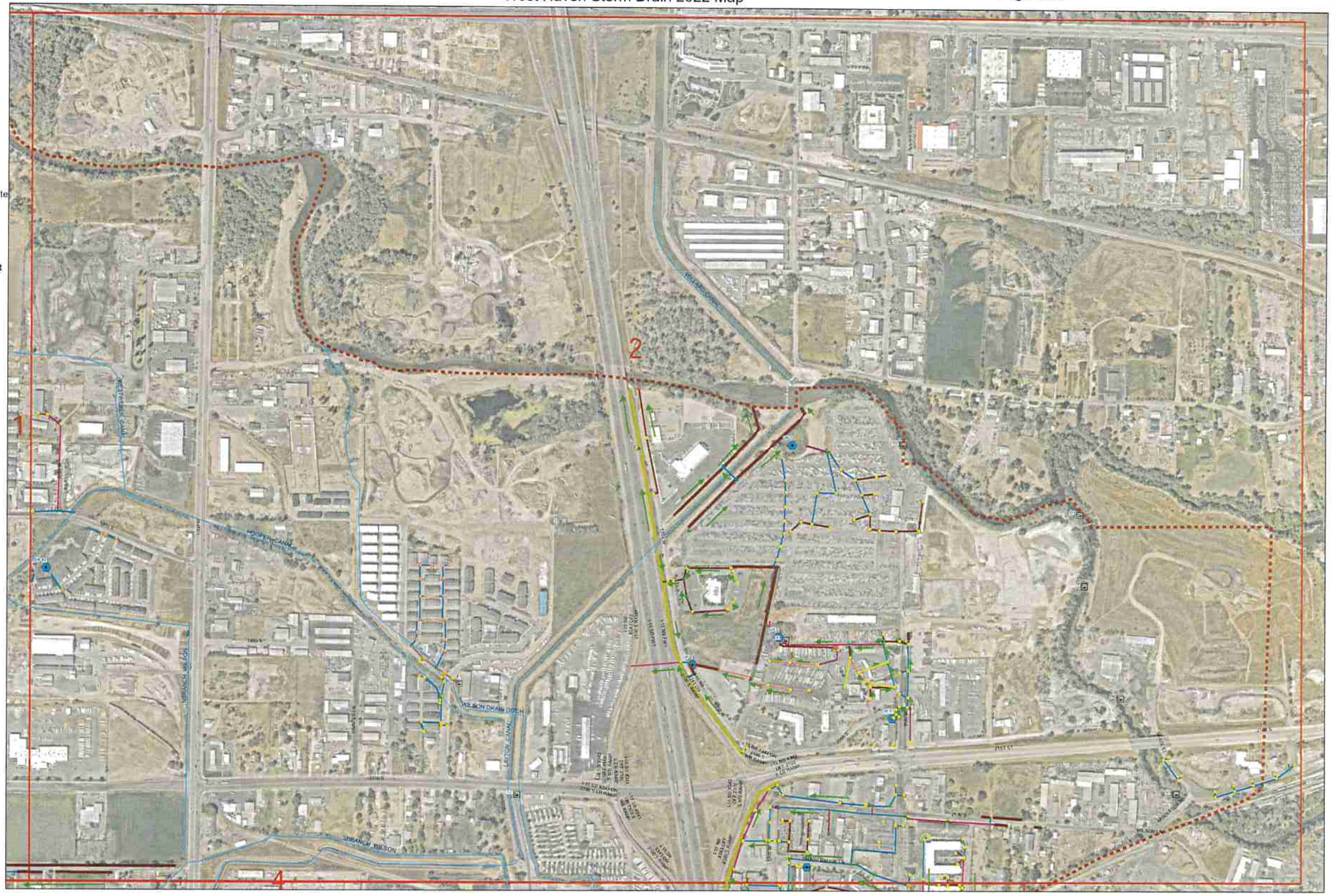
Status

- Surveyed
- Non Surveyed

### Detention Ponds

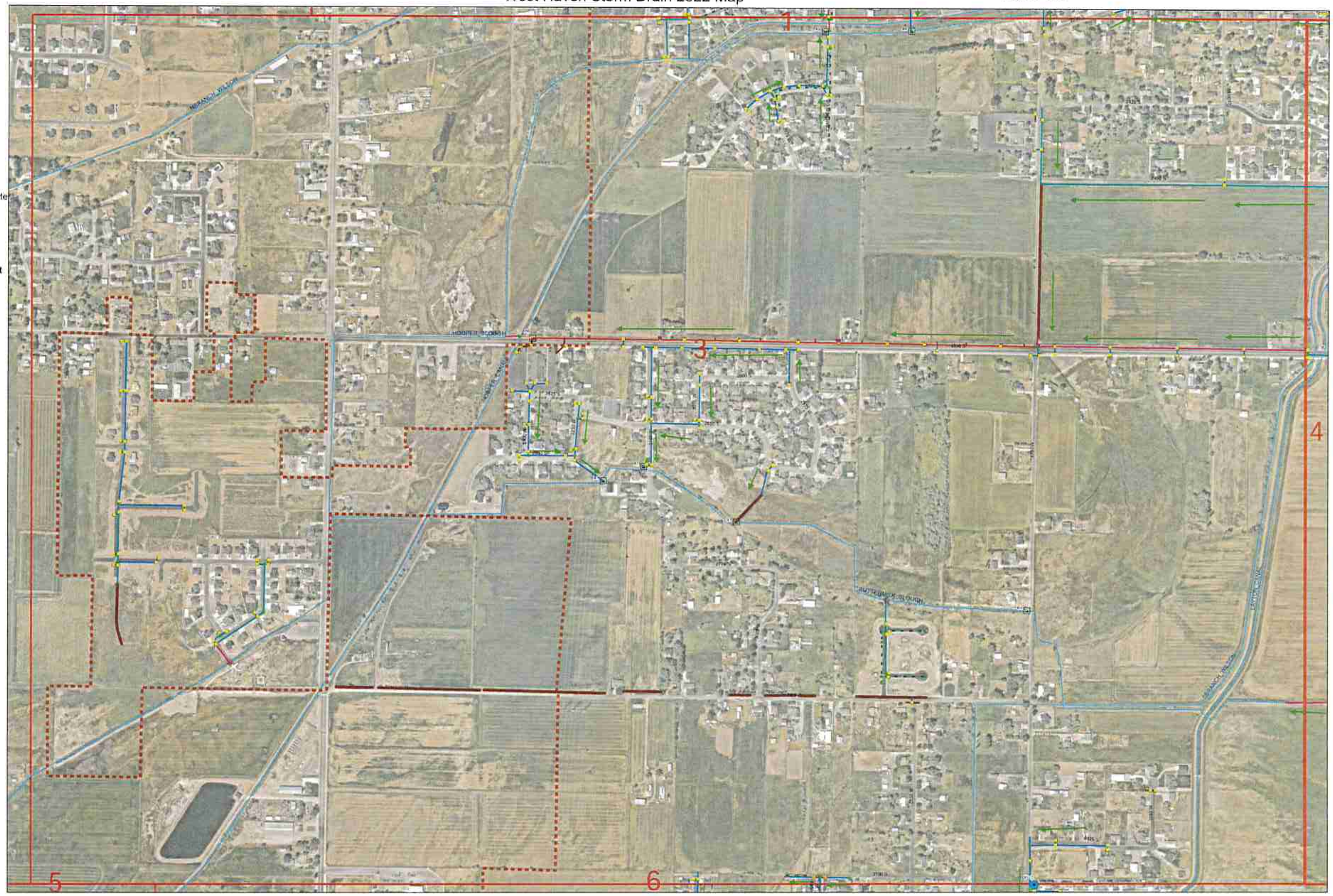
Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map




Legend

city boundary

Storm Drain

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
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StormDrain Pipe

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

LandDrainPipe

Diameter in inches

- 4
- 8

Flow Direction

Barrow Pit

OpenDitch

Storm Drain Outfall

Status

- Surveyed
- Non Surveyed

Detention Ponds

Type

- Underground
- Surface

CanalSlough

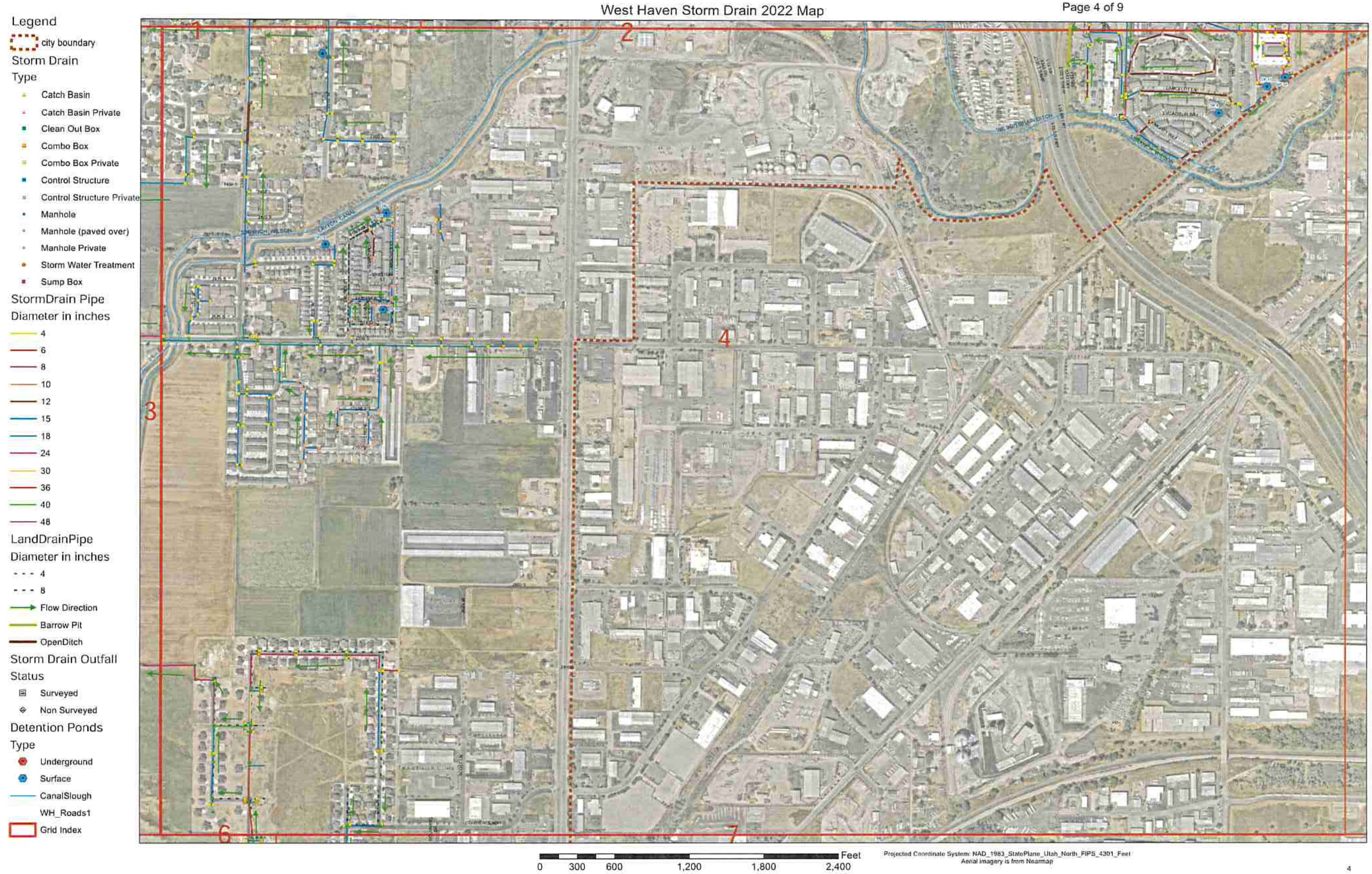
WH_Roads1

Grid Index

0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map

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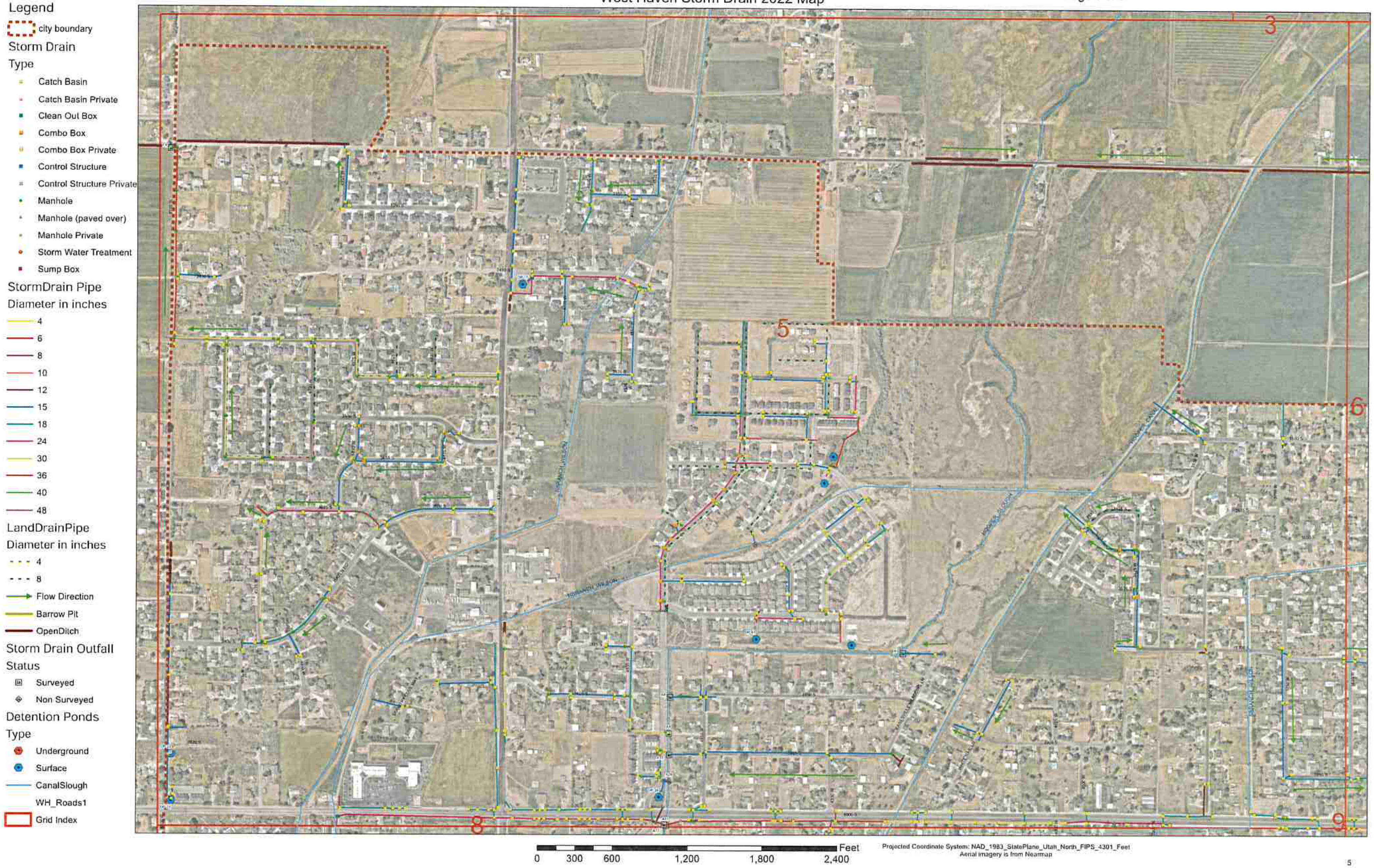
Aerial imagery is from Nearmap

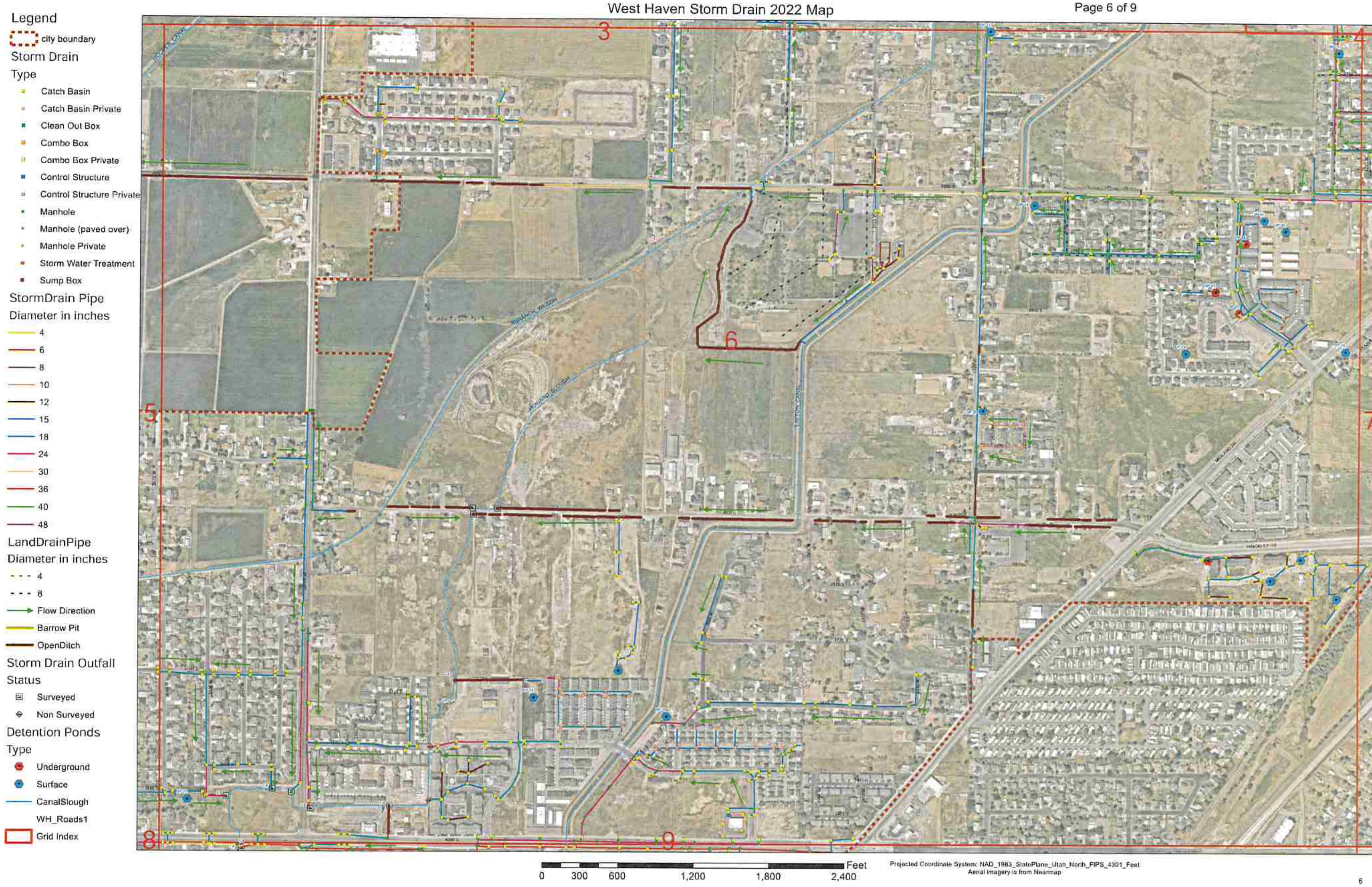
# West Haven Storm Drain 2022 Map




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map



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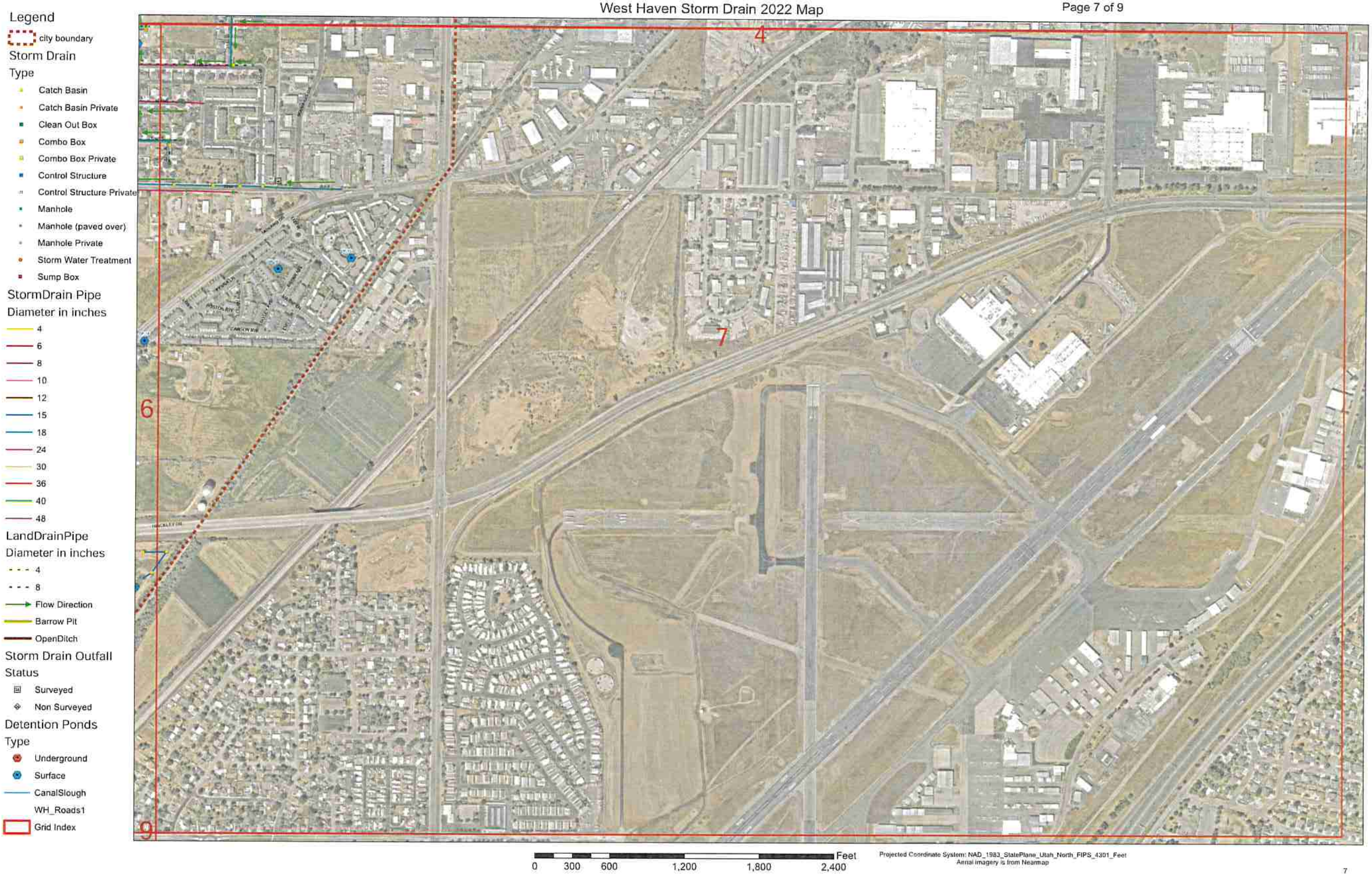
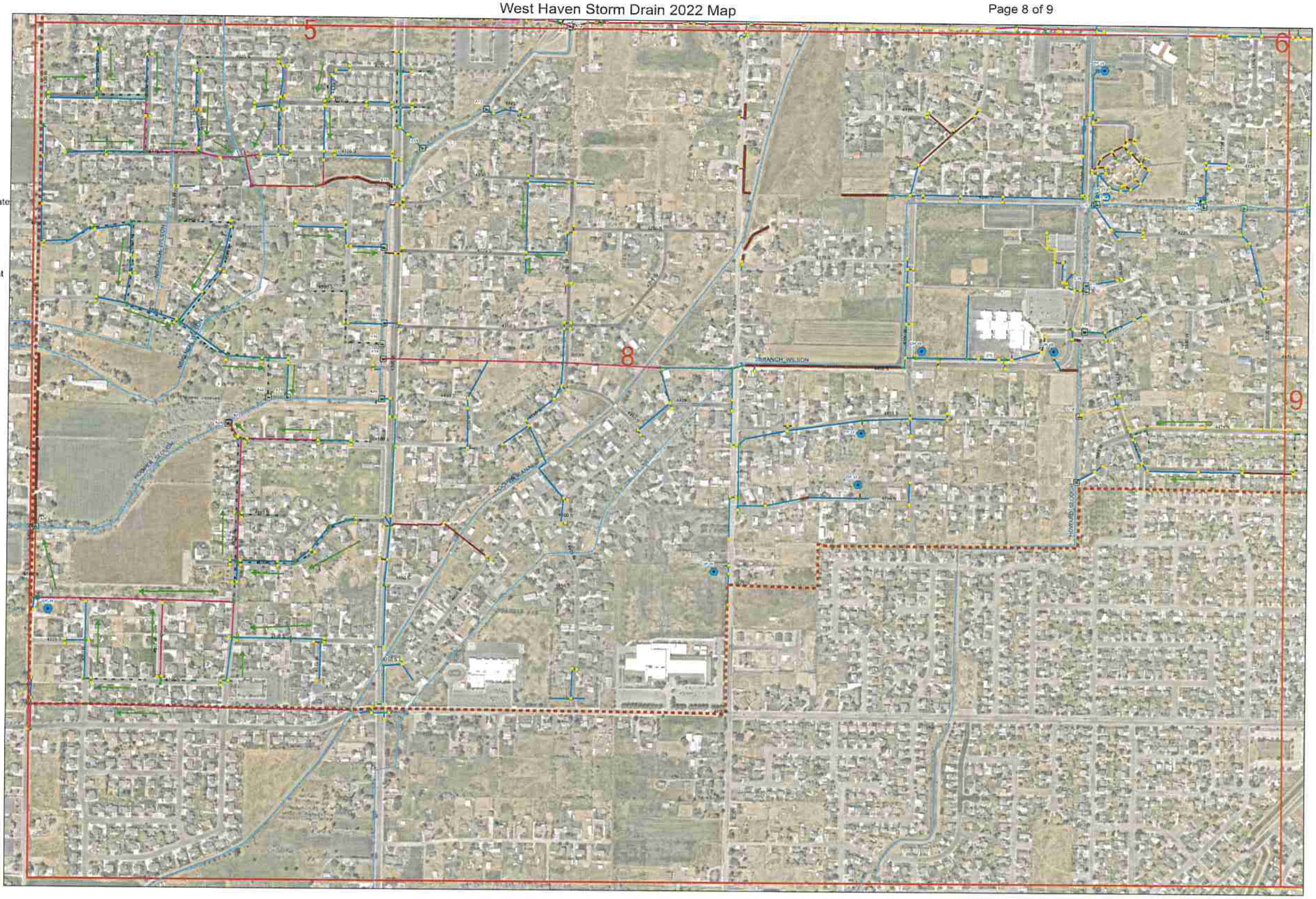
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map




Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map




## Legend

- city boundary

**Storm Drain**

Type

- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
- Manhole (paved over)
- Manhole Private
- Storm Water Treatment
- Sump Box

**StormDrain Pipe**

Diameter in inches

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 24
- 30
- 36
- 40
- 48

**LandDrainPipe**

Diameter in inches

- 4
- 8
- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

Status

- Surveyed
- Non Surveyed

**Detention Ponds**

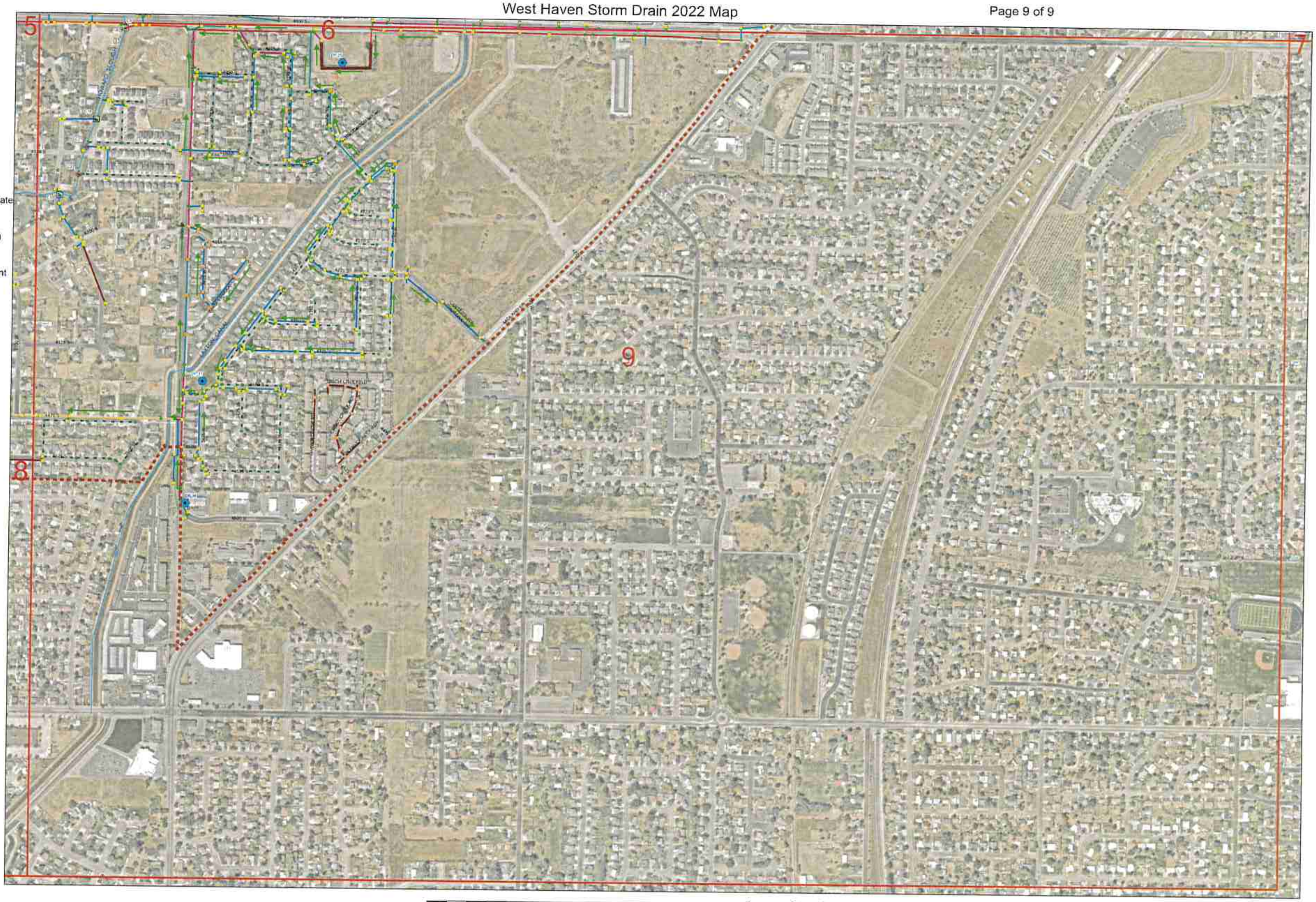
Type

- Underground
- Surface
- CanalSlough
- WH_Roads1
- Grid Index

0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# West Haven Storm Drain 2022 Map




## Legend

city boundary

**Storm Drain**

Type
- Catch Basin
- Catch Basin Private
- Clean Out Box
- Combo Box
- Combo Box Private
- Control Structure
- Control Structure Private
- Manhole
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- 4
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- 30
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- 40
- 48

**LandDrainPipe**

Diameter in inches
- 4
- 8

- Flow Direction
- Barrow Pit
- OpenDitch

**Storm Drain Outfall**

Status
- Surveyed
- Non Surveyed

**Detention Ponds**

Type
- Underground
- Surface

- CanalSlough
- WH_Roads1
- Grid Index

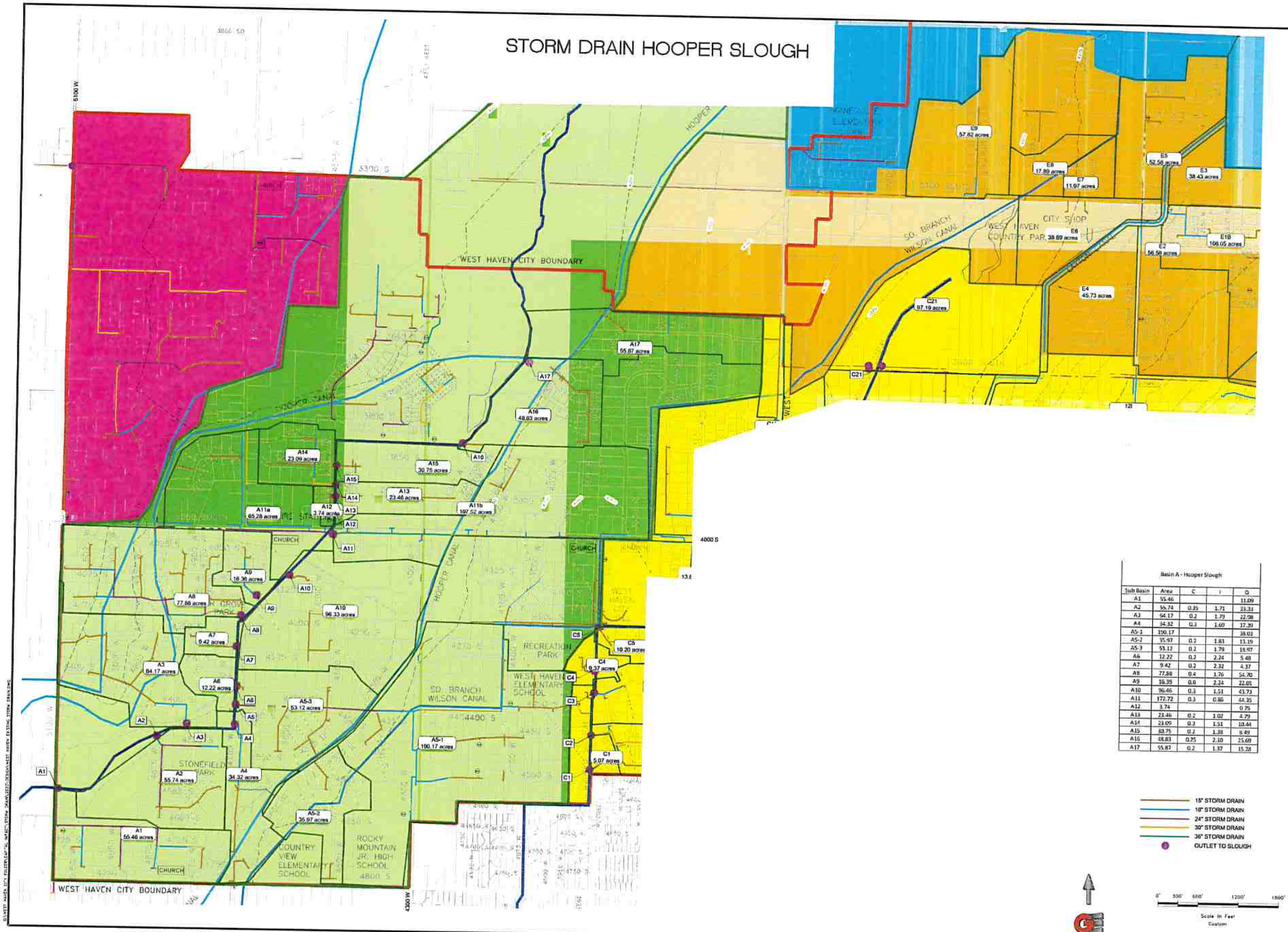
0 300 600 1,200 1,800 2,400 Feet

Projected Coordinate System: NAD_1983_StatePlane_Utah_North_FIPS_4301_Feet
Aerial imagery is from Nearmap

# APPENDIX C

## Storm Drain Basin Maps with Basin Flow Calculations

# STORM DRAIN HOOPER SLOUGH




Basin A - Hooper Slough

| Sub Basin | Area | C | I | Q |
|---|---|---|---|---|
| A1 | 55.46 | | | 11.09 |
| A2 | 55.74 | 0.35 | 1.71 | 33.33 |
| A3 | 84.17 | 0.2 | 1.79 | 22.98 |
| A4 | 34.32 | 0.3 | 1.69 | 17.39 |
| A5-1 | 190.17 | | | 38.03 |
| A5-2 | 35.97 | 0.2 | 1.83 | 13.19 |
| A5-3 | 53.12 | 0.2 | 1.79 | 18.97 |
| A6 | 12.22 | 0.2 | 2.24 | 5.48 |
| A7 | 9.42 | 0.2 | 2.32 | 4.37 |
| A8 | 77.88 | 0.4 | 1.76 | 54.70 |
| A9 | 16.36 | 0.6 | 2.24 | 22.01 |
| A10 | 96.46 | 0.3 | 1.51 | 43.73 |
| A11 | 172.72 | 0.3 | 0.86 | 44.35 |
| A12 | 3.74 | | | 0.75 |
| A13 | 23.46 | 0.2 | 1.02 | 4.79 |
| A14 | 23.09 | 0.3 | 1.51 | 10.44 |
| A15 | 30.75 | 0.2 | 1.38 | 8.49 |
| A16 | 48.83 | 0.25 | 2.10 | 25.69 |
| A17 | 55.87 | 0.2 | 1.37 | 15.28 |

SCALE: Custom
DATE: 08-10-22
DESIGN: EAN
DRAWN: EAN
CHECKED: BC

REVISIONS

| DATE | DESCRIPTION |
|---|---|
| | |

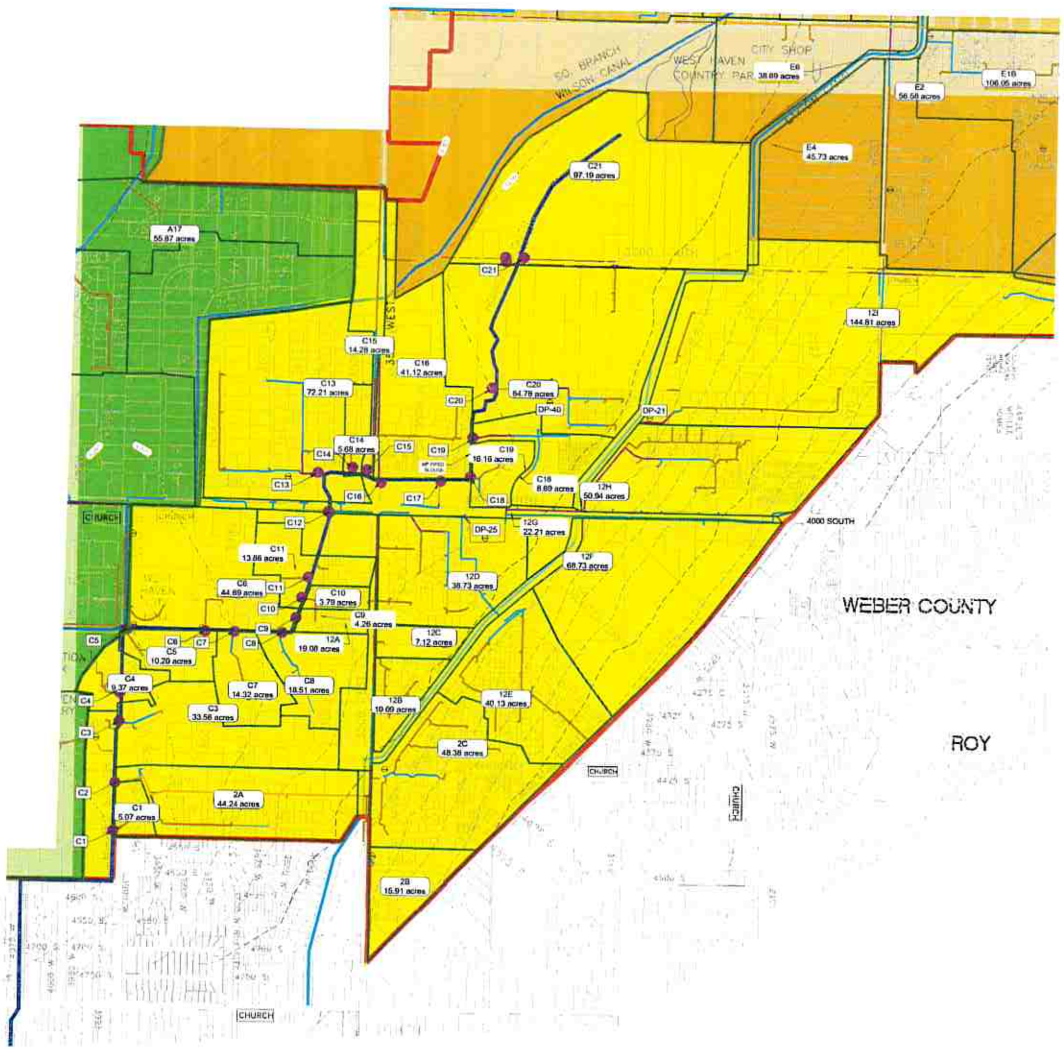
DWG:

STORM DRAIN HOOPER SLOUGH
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5968 S CHAMBER ST, SUITE #5, OGDEN, UT 84405
P 801.476.0202 F 801.476.0066

C1

# STORM DRAIN MAP - HOWARD SLOUGH




| Basin C - Howard Slough | | | | |
|---|---|---|---|---|
| Sub Basin | Area | C | i | Q |
| C1 | 5.07 | 0.2 | 2.45 | 2.49 |
| C2A | 44.24 | 0.2 | 1.77 | 15.69 |
| C2B | 15.91 | | | 3.18 |
| C2C | 48.38 | | | 9.68 |
| C3 | 33.56 | 0.2 | 1.74 | 11.68 |
| C4 | 9.37 | 0.18 | 2.30 | 3.88 |
| C5 | 10.2 | 0.2 | 2.16 | 4.40 |
| C6 | 44.69 | 0.24 | 1.95 | 20.89 |
| C7 | 14.32 | 0.2 | 1.94 | 5.57 |
| C8 | 18.51 | 0.2 | 1.84 | 6.82 |
| C9 | 4.26 | 0.4 | 2.34 | 3.99 |
| C10 | 3.79 | 0.4 | 2.33 | 3.53 |
| C11 | 13.86 | 0.2 | 2.05 | 5.69 |
| C12A | 19.08 | 0.6 | 1.89 | 21.61 |
| C12B | 10.09 | 0.5 | 2.33 | 11.77 |
| C12C | 7.12 | 0.55 | 2.27 | 8.91 |
| C12D | 38.71 | 0.3 | 2.00 | 23.20 |
| C12E | 40.13 | 0.45 | 2.27 | 40.95 |
| C12F | 68.73 | | | 13.75 |
| C12G | 15.19 | 0.6 | 1.65 | 15.01 |
| C12H | 50.94 | 0.7 | 2.40 | 85.50 |
| C12I | 144.81 | | | 28.96 |
| C13 | 72.21 | | | 14.44 |
| C14 | 5.68 | 0.4 | 2.13 | 4.85 |
| C15 | 14.28 | 0.4 | 0.85 | 4.87 |
| C16 | 41.12 | 0.5 | 1.13 | 23.21 |
| C17 | 6.89 | 0.7 | 2.23 | 10.76 |
| C18 | 8.69 | 0.4 | 2.18 | 7.58 |
| C19 | 16.16 | 0.5 | 2.05 | 16.53 |
| C20 | 84.78 | | | 16.96 |
| C21 | 97.19 | 0.4 | 1.38 | 19.44 |

15" STORM DRAIN
18" STORM DRAIN
24" STORM DRAIN
30" STORM DRAIN
36" STORM DRAIN
OUTLET TO SLOUGH

0' 300' 600' 1200' 1800'
Scale in Feet
Custom

| REVISIONS | |
|---|---|
| DATE | DESCRIPTION |

SCALE: Custom
DATE: 08-16-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC
DWG:

STORM DRAIN MAP - HOWARD SLOUGH
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH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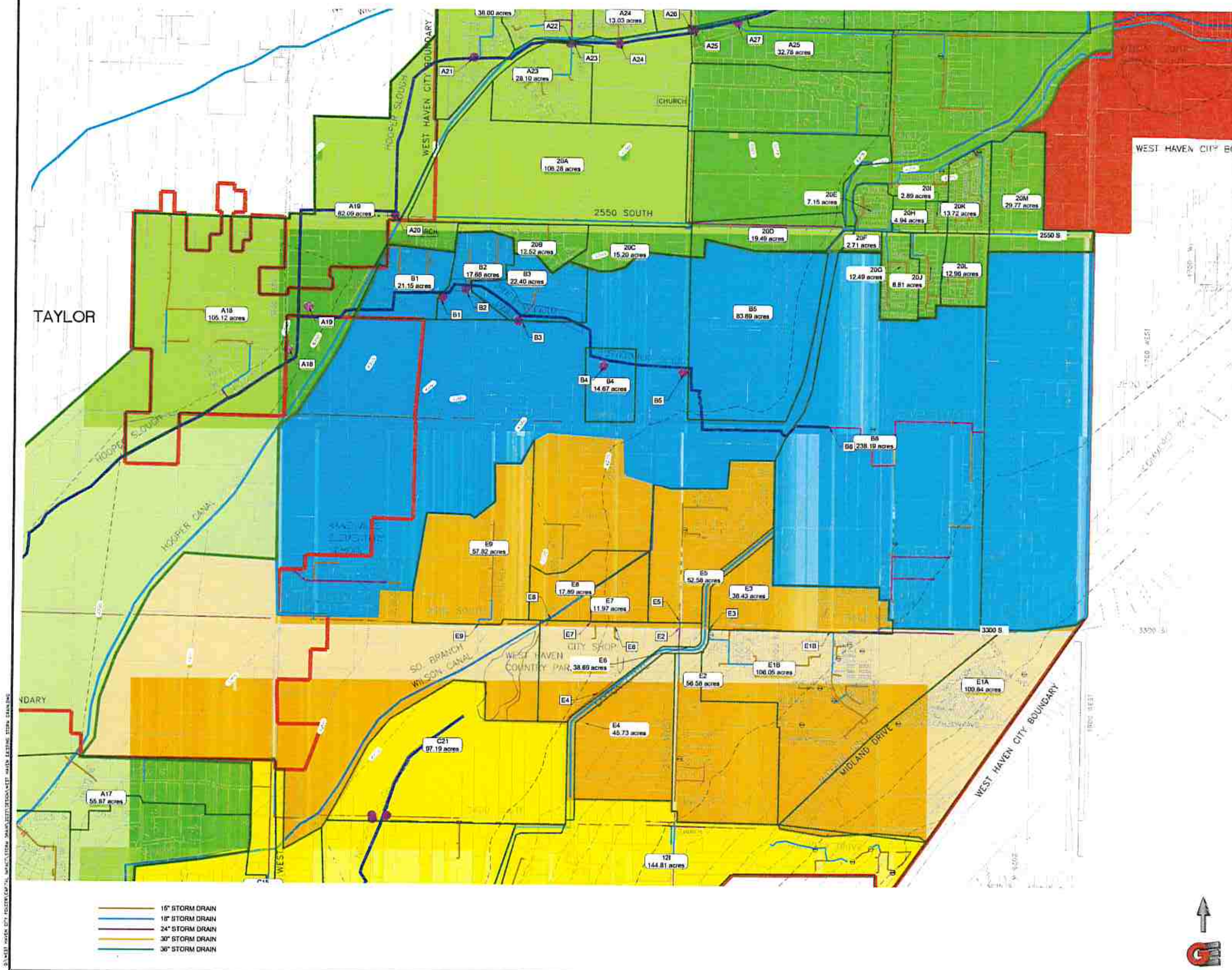
C2

# STORM DRAIN BASINS 3300 S AND BUTTERMILK SLOUGH




Basin B - Buttermilk Slough

| Sub Basin | Area | C | I | Q |
|---|---|---|---|---|
| B1 | 21.15 | 0.45 | 1.70 | 16.18 |
| B2 | 17.68 | 0.5 | 2.11 | 18.66 |
| B3 | 22.4 | 0.5 | 2.24 | 25.05 |
| B4 | 14.67 | 0.6 | 2.38 | 20.98 |
| B5 | 83.89 | | | 16.778 |
| B6 | 238.19 | | | 47.638 |

Basin E - 3300 SOUTH

| Sub Basin | Area | C | I | Q |
|---|---|---|---|---|
| E1A | 100.84 | | | 20.17 |
| E1B | 106.05 | | | 21.21 |
| E2 | 56.58 | | | 11.32 |
| E3 | 38.43 | | | 7.69 |
| E4 | 45.73 | | | 9.15 |
| E5 | 52.58 | 0.3 | 1.61 | 10.52 |
| E6 | 38.69 | 0.2 | 1.72 | 7.74 |
| E7 | 11.97 | 0.2 | 2.32 | 5.56 |
| E8 | 17.89 | 0.3 | 1.65 | 8.86 |
| E9 | 57.82 | 0.2 | 1.69 | 19.49 |

0' 300' 600' 1200' 1800'

Scale in feet
Custom

| REVISIONS | |
|---|---|
| DATE | DESCRIPTION |

SCALE: Custom
DATE: 08-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: NC

DWG:

STORM DRAIN BASINS 3300 S AND BUTTERMILK SLOUGH

WEST HAVEN - IFFP

PROJECT ADDRESS

WEST HAVEN, WEBER, UTAH

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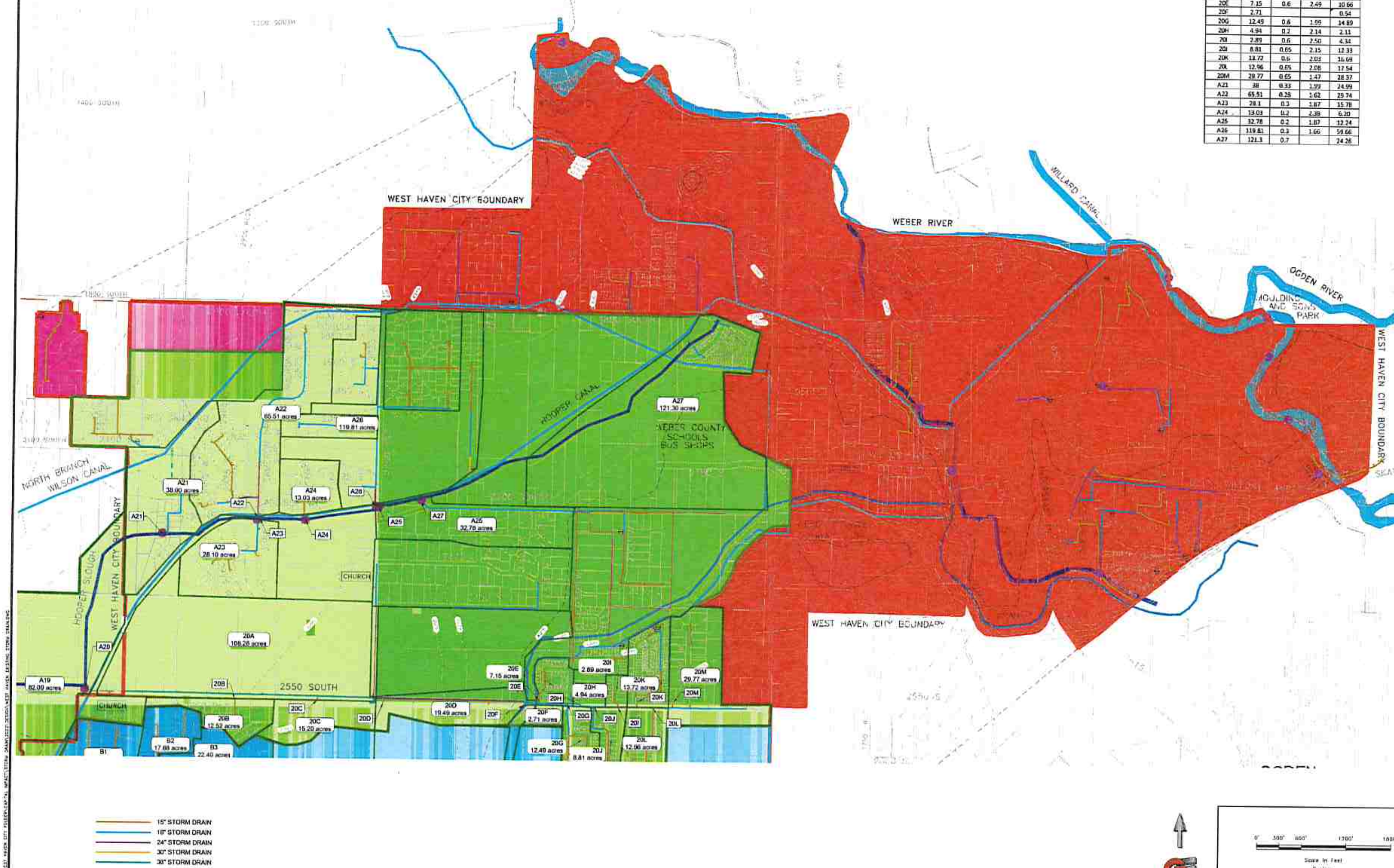
C3

# STORM DRAIN MAP

| Basin A - Hooper Slough | | | | |
|---|---|---|---|---|
| Sub Basin | Area | C | I | Q |
| 20A | 108.28 | | | 21.66 |
| 20B | 12.52 | 0.3 | 1.54 | 5.80 |
| 20C | 15.2 | 0.35 | 1.44 | 7.67 |
| 20D | 19.49 | 0.25 | 1.99 | 9.68 |
| 20E | 7.15 | 0.6 | 2.49 | 10.66 |
| 20F | 2.71 | | | 0.54 |
| 20G | 12.49 | 0.6 | 1.99 | 14.89 |
| 20H | 4.94 | 0.2 | 2.14 | 2.11 |
| 20I | 2.89 | 0.6 | 2.50 | 4.34 |
| 20J | 8.81 | 0.65 | 2.15 | 12.33 |
| 20K | 13.72 | 0.6 | 2.03 | 16.68 |
| 20L | 12.96 | 0.65 | 2.08 | 17.54 |
| 20M | 29.77 | 0.65 | 1.47 | 28.37 |
| A21 | 38 | 0.33 | 1.99 | 24.99 |
| A22 | 65.51 | 0.28 | 1.62 | 29.74 |
| A23 | 28.1 | 0.3 | 1.87 | 15.78 |
| A24 | 13.03 | 0.2 | 2.38 | 6.20 |
| A25 | 32.78 | 0.2 | 1.87 | 12.24 |
| A26 | 119.81 | 0.3 | 1.66 | 59.66 |
| A27 | 121.3 | 0.7 | | 24.26 |




| REVISIONS | |
|---|---|
| DATE | DESCRIPTION |
| | |

SCALE: Custom
DATE: 05-10-22
DESIGN: KAN
DRAWN: KAN
CHECKED: RC
DWG:

STORM DRAIN MAP
WEST HAVEN - IFFP
PROJECT ADDRESS
WEST HAVEN, WEBER, UTAH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C4

# APPENDIX D

## Cost Estimate

# Per Foot Cost Estimate - Storm Drain

9/2/2022

**15" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 15" RCP | | 1 | $ 85.00 | LF | $ 85.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 10.87 |
| Construction Management | 5% | | | | $ 6.79 |
| Contingency | 20% | | | | $ 27.17 |
| | | | | | |
| Total | | | | | $ 180.67 |

**18" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 18" RCP | | 1 | $ 95.00 | LF | $ 95.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 11.67 |
| Construction Management | 5% | | | | $ 7.29 |
| Contingency | 20% | | | | $ 29.17 |
| | | | | | |
| Total | | | | | $ 193.97 |

| 24" RCP | | | | | |
|---|---|---|---|---|---|
| **Description** | **Quantity** | **Quantity Per Foot of Pipe** | **Unit Price** | **Unit** | **Total Cost Per Foot of Pipe** |
| **24" RCP** | | 1 | $ 110.00 | LF | $ 110.00 |
| **Catch Basins w/ Laterals** | **2** per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| **SD Manhole** | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| **Structural Fill** | Full Length - 12" D x 4'W | 0.28 | $ 20.00 | TON | $ 5.60 |
| | | | | | |
| **Asphalt Patch** | 50% Length - 4"D x 6'W | 0.074925 | $ 150.00 | TON | $ 11.24 |
| **Traffic Control** | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| **Engineering** | 8% | | | | $ 12.87 |
| **Construction Management** | 5% | | | | $ 8.04 |
| **Contingency** | 20% | | | | $ 32.17 |
| | | | | | |
| **Total** | | | | | **$ 213.92** |

| 30" RCP | | | | | |
|---|---|---|---|---|---|
| **Description** | **Quantity** | **Quantity Per Foot of Pipe** | **Unit Price** | **Unit** | **Total Cost Per Foot of Pipe** |
| **30" RCP** | | 1 | $ 140.00 | LF | $ 140.00 |
| **Catch Basins w/ Laterals** | **2** per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| **SD Manhole** | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| **Structural Fill** | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| **Asphalt Patch** | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| **Traffic Control** | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| **Engineering** | 8% | | | | $ 15.79 |
| **Construction Management** | 5% | | | | $ 9.87 |
| **Contingency** | 20% | | | | $ 39.48 |
| | | | | | |
| **Total** | | | | | **$ 262.52** |

| 36" RCP | | | | | |
|---|---|---|---|---|---|
| **Description** | **Quantity** | **Quantity Per Foot of Pipe** | **Unit Price** | **Unit** | **Total Cost Per Foot of Pipe** |
| **36" RCP** | | 1 | $ 165.00 | LF | $ 165.00 |
| **Catch Basins w/ Laterals** | **2** per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| **SD Manhole** | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| **Structural Fill** | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| **Asphalt Patch** | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| **Traffic Control** | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| **Engineering** | 8% | | | | $ 17.79 |
| **Construction Management** | 5% | | | | $ 11.12 |
| **Contingency** | 20% | | | | $ 44.48 |
| | | | | | |
| **Total** | | | | | **$ 295.77** |

**42" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 42" RCP | | 1 | $ 195.00 | LF | $ 195.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 20.19 |
| Construction Management | 5% | | | | $ 12.62 |
| Contingency | 20% | | | | $ 50.48 |
| | | | | | |
| Total | | | | | $ 335.67 |

**48" RCP**

| Description | Quantity | Quantity Per Foot of Pipe | Unit Price | Unit | Total Cost Per Foot of Pipe |
|---|---|---|---|---|---|
| 48" RCP | | 1 | $ 210.00 | LF | $ 210.00 |
| Catch Basins w/ Laterals | 2 per 500 ft | 0.004 | $ 4,500.00 | EA | $ 18.00 |
| SD Manhole | 1 per 500 ft | 0.002 | $ 5,500.00 | EA | $ 11.00 |
| Structural Fill | Full Length - 12" D x 6'W | 0.42 | $ 20.00 | TON | $ 8.40 |
| | | | | | |
| Asphalt Patch | 50% Length - 4"D x 8'W | 0.0999 | $ 150.00 | TON | $ 14.99 |
| Traffic Control | 1 Per 2000 ft | 0.0005 | $ 10,000.00 | LS | $ 5.00 |
| | | | | | |
| Engineering | 8% | | | | $ 21.39 |
| Construction Management | 5% | | | | $ 13.37 |
| Contingency | 20% | | | | $ 53.48 |
| | | | | | |
| Total | | | | | $ 355.62 |

# APPENDIX E

## Development Projection and Impervious Area Estimate

## Appendix E

## Development Projection and Impervious Area Estimate

**Average Impervious Area:**
Existing Single-Family Residential Development within the City was sampled to determine the average impervious area on various single-family lot sizes. The sampling process consisted of measuring impervious area and total lot sizes on existing lots throughout the City using aerial imagery. The total lot count per size was determined by utilizing parcel data from Weber County sorted by area to create a total lot count for each size group. The total lots sampled listed indicates how many lots were analyzed to measure total impervious area and lot size. The goal was to sample enough lots to achieve a 95% confidence interval with a 5% margin of error. This goal was achieved on smaller lot size groups. The goal was not achieved on lot sizes of 2 AC – 3 AC and above because of the lack of developed parcels of these larger sizes. The data is summarized in Table 1:

**TABLE 1**

| Single Family Lot Sizes | Min (sf) | Max (sf) | Average Impervious Area (sf) | Average Impervious Area (%) | Lot Count | Lots Sampled |
|---|---|---|---|---|---|---|
| ¼ AC or Less- Single Family Residential | 5,000 | 12,499 | 4,281 | 44.6% | 1,518 | 307 |
| Greater than ¼ AC up to ½ AC - Single Family Residential | 12,500 | 21,780 | 6,108 | 38.3% | 1,264 | 294 |
| Greater than ½ AC up to 1 AC - Single Family Residential | 21,780 | 43,560 | 7,626 | 21.0% | 1,403 | 304 |
| Greater than 1 AC up to-2 AC - Single Family Residential | 43,560 | 87,120 | 8,962 | 16.3% | 646 | 241 |
| Greater than 2 AC up to 3 AC - Single Family Residential | 87,121 | 130,680 | 9,563 | 9.5% | 150 | 91 |
| Greater than 3 AC up to- 4 AC - Single Family Residential | 130,681 | 174,240 | 11,454 | 7.9% | 78 | 22 |
| Greater than 4 AC or More - Single Family Residential | 174,241 | + | 13,027 | 3.6% | 150 | 47 |
| | | | | | | |
| 2 AC or Less - Single Family Residential | 5,000 | 87,120 | 6,621 | 23.8% | - | - |

**The average impervious area of all single-family lots sampled was 7,134 square feet.

**Projected Development:**
Data from the Weber County Assessor indicates that an average of 100 acres per year are developed within the City. Table 2 includes developed acres per year.

**TABLE 2**

| Year | Developed Acres (AC) |
|---|---|
| **2017** | 100.6 |
| **2018** | 75.3 |
| **2019** | 93.7 |
| **2020** | 113.4 |
| **2021** | 100.0 |
| **2022** | 116.3 |
| **Total** | 599.35 (average **99.9**) |

Table 3 includes estimates for each development type during the impact fee collection period. The percentages were estimated using data from the Weber County Assessor from 2017 – 2022 for single family and multi-family residential. Out of 100 acres developed, the following includes yearly average area and percentages of each type.

**TABLE 3**

| Type | Yearly Average Developed Acres | Yearly Average Developed by % |
|---|---|---|
| Single Family Residential | 73 Acres | 73% |
| Multi-Family Residential | 13 Acres | 13% |
| Non Residential | 14 Acres | 14% |

To estimate the projected impervious area developed per year during impact fee collection period, the following assumptions have been used:

- Single Family Residential will be developed at lot sizes of 2 Acres or less, and it is estimated that 23.8% of developed lots will be impervious area. This range of lot sizes was selected as a conservative estimate assuming that the majority of lots developed within the City will be within this range. Note that this percentage of imperviousness is based on data sampled from existing residential development in the above-noted lot size range.

- Multi-Family Residential will be developed at an average of 71.1% impervious area. This percentage of imperviousness is based on the data sampled from existing multi-family residential development within the City. Each of the existing multi-family developments throughout the city were sampled by measuring the total area and impervious area. The ratio of impervious to total area was calculated.

- Non-Residential will be developed at an estimate of 80.0% impervious area. The estimate is based on recent residential development. It is anticipated that future commercial development will include impervious area in the range of 70-90%.

**Summary:**
Using the estimated developed area and impervious area percentages above; of the projected 100 developed acres per year, it is estimated that 37.81 acres or 1,646,836 square feet will be impervious.

## Exhibit D – Parks Impact Fee Facilities Plan & Impact Fee Analysis

PUBLIC FINANCE ADVISORS

LEWIS | ROBERTSON | BURNINGHAM


# WEST HAVEN, UTAH

OCTOBER 2025

## IMPACT FEE FACILITIES PLAN (IFFP) & IMPACT FEE ANALYSIS (IFA)

PARKS, RECREATION, OPEN SPACE, AND TRAILS

**PREPARED BY:**

**LRB PUBLIC FINANCE ADVISORS**

FORMERLY LEWIS YOUNG ROBERTSON & BURNINGHAM INC.

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# IMPACT FEE CERTIFICATION

## IFFP CERTIFICATION

LRB Public Finance Advisors (formerly Lewis Young Robertson & Burningham, Inc.) certifies that the attached impact fee facilities plan:

1. includes only the costs of public facilities that are:
   a. allowed under the Impact Fees Act; and
   b. actually incurred; or
   c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
   a. costs of operation and maintenance of public facilities;
   b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
   c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and,
3. complies in each and every relevant respect with the Impact Fees Act.

## IFA CERTIFICATION

LRB Public Finance Advisors certifies that the Impact Fee Analysis (IFA):

1. includes only the costs of public facilities that are:
   a. allowed under the Impact Fees Act; and
   b. actually incurred; or
   c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
   a. costs of operation and maintenance of public facilities;
   b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
   c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement;
   d. offsets costs with grants or other alternate sources of payment; and
3. complies with every relevant respect with the Impact Fees Act.

**LRB Public Finance Advisors makes this certification with the following caveats:**

1. All the recommendations for implementation of the IFFP made in the IFFP documents or in the IFA documents are followed by City Staff and elected officials.
2. If all or a portion of the IFFP or IFA are modified or amended, this certification is no longer valid.
3. All information provided to LRB is assumed to be correct, complete, and accurate. This includes information provided by the City as well as outside sources.

LRB PUBLIC FINANCE ADVISORS

# DEFINITIONS

The following acronyms or abbreviations are used in this document:

**IFA:** Impact Fee Analysis

**IFFP:** Impact Fee Facilities Plan

**HH**: Household

**LOS:** Level of Service

**LRB:** LRB Public Finance Advisors

The following definitions are used in this document:

| | |
|---|---|
| **Development Activity:** | any construction or expansion of a building, structure, or use, any change in use of a building or structure, or any changes in the use of land that creates additional demand and need for public facilities.[1] |
| **Per Capita:** | per person. |
| **Public Facilities**: | impact fee facilities[2] that have a life expectancy of 10 or more years and are owned or operated by or on behalf of a local political subdivision or private entity. |
| **System Improvements**: | existing public facilities that are: identified in the impact fee analysis and designed to provide services to service areas within the community at large, and future public facilities that are intended to provide services to service areas within the community at large.[3] |
| **Single Family:** | Defined as any single unit detached housing. |
| **Multi-Family:** | Any residential units not considered single family. |

[1] 11-36a-102(3)
[2] See 11-36-a-102(17) for list of applicable impact fee facilities.
[3] 11-36a-102(22)

# SECTION I: EXECUTIVE SUMMARY

The purpose of the Parks, Recreation, Open Space and Trails Impact Fee Facilities Plan (IFFP), with supporting Impact Fee Analysis (IFA), is to fulfill the requirements established in Utah Code Title 11 Chapter 36a, the "Impact Fees Act", and help the City of West Haven (the City) fund necessary capital improvements for future growth. This document will address the future parks, recreation, open space, and trails infrastructure needed to serve the City through the next 10 years, as well as the maximum legal impact fees the City may charge to new growth to maintain the existing level of service (LOS).

- **Impact Fee Service Area:** The Service Area for this analysis includes all areas within the City incorporated limits, and as amended. **FIGURE 3.1** illustrates the Service Area including the City's incorporated limits as of December 2024. This document identifies the necessary future system improvements for the Service Area that will maintain the existing LOS into the future.
- **Demand Analysis:** The demand units utilized in this analysis include population and household growth. As new development (and in some cases redevelopment) occurs within the City, it generates increased demand on City infrastructure. The system improvements identified in this study are designed to maintain the existing LOS for any new (or possibly redeveloped property, if the redevelopment includes housing) within the City.
- **Level of Service:** Through the inventory of existing public facilities, combined with the growth assumptions, this analysis identifies the existing LOS which is provided to the City's existing residents and ensures that future public facilities are constructed to maintain this same LOS.
- **Excess Capacity:** This study calculates a buy-in component related to the City's community center (The Barn Community Center). However, the City has ultimately opted to exclude the buy-in component from the analysis since this facility is rented and not freely available to the public.
- **Capital Facilities Analysis:** Due to the projected new development (and possible redevelopment) within the City, additional capital improvements will be necessary as they relate to parks, recreation, open space, and trails.
- **Funding of Future Facilities:** This analysis assumes future growth-related facilities will be funded through impact fee revenues.

## SUMMARY OF MAXIMUM LEGAL IMPACT FEE

The impact fees in this analysis will be assessed within the Service Area. The table below illustrates the calculated maximum legal impact fee for parks, recreation, open space, and trails.

**TABLE 1.1: ESTIMATE OF IMPACT FEE VALUE PER CAPITA**

| TYPE OF IMPROVEMENT | | | TOTAL COST PER CAPITA |
|---|---|---|---|
| Combined | | | $1,452 |
| **OTHER COMPONENTS TO FEE** | **ADDITIONAL VALUE** | **DEMAND SERVED** | **TOTAL VALUE PER CAPITA** |
| Impact Fee Credit | - | 9,850 | $0 |
| Professional Expense | $10,850 | 9,850 | $1 |
| | | **Estimate of Impact Fee Per Capita** | **$1,453** |

TABLE 1.2: IMPACT FEE PER HOUSEHOLD

| | AVERAGE HH SIZE[1] | FEE PER HH | EXISTING FEE PER HH | % CHANGE |
|---|---|---|---|---|
| Single-Family | 3.62 | $5,260 | $2,144 | 145% |
| Multi-Family (Including Mobile Homes) | 2.65 | $3,850 | $1,796 | 114% |

Single family residential is defined as any single unit detached housing. Multi-family is defined as any residential unit not considered single family.
[1] Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates
Table B25033: Total Population in Occupied Housing Units by Tenure by Units in Structure
Table DP04: Selected Housing Characteristics

## NON-STANDARD IMPACT FEES

The City reserves the right under the Impact Fees Act to assess an adjusted fee that more closely matches the true impact that the land use will have upon public facilities.[4] This adjustment could result in a different impact fee if the City determines that a particular user may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis.

#### FORMULA FOR NON-STANDARD PARKS AND RECREATION IMPACT FEES:

**Estimated Population per Unit x 1,453 = Impact Fee per Unit**

### CONSIDERATION OF ALL REVENUE SOURCES

The Impact Fees Act requires this document to consider all revenue sources to finance the impacts on system improvements, including: (a) grants; (b) bonds; (c) interfund loans; (d) impact fees; and (e) anticipated or accepted dedications of system improvements. See **Section V** for further discussion regarding the consideration of revenue sources.

### EXPENDITURE OF IMPACT FEES

The Impact Fee Act requires that impact fees should be spent or encumbered within six years after each impact fee is paid, indicating that there is a rolling timeline when identifying the impacts placed on public facilities by development activity. This analysis addresses a 10-year planning horizon in order to account for the rolling timeline, while ensuring that the assumptions included in the analysis are relevant to new development activity, and accounting for the need for entities to update the impact fee analysis periodically. Impact fees collected in the IFFP planning horizon should be spent only on those system improvements identified to maintain the LOS.

### GROWTH-DRIVEN EXTRAORDINARY COSTS

The City does not anticipate any extraordinary costs necessary to provide services to future development.

### SUMMARY OF TIME-PRICE DIFFERENTIAL

The Impact Fees Act allows for the inclusion of a time price differential to ensure that the future value of costs incurred at a later date is accurately calculated to include the costs of construction inflation. A three percent annual construction inflation adjustment is applied to the proposed capital improvements identified in this analysis. The impact fee analysis should be updated regularly to account for changes in cost estimates over time.

[4] 11-36a-402(1)(c)

# SECTION II: GENERAL IMPACT FEE METHODOLOGY

FIGURE 2.1: IMPACT FEE METHODOLOGY


The purpose of this study is to fulfill the requirements of the Impact Fees Act regarding the establishment of an IFFP and IFA. The IFFP is designed to identify the existing LOS and the demands placed upon existing public facilities by future development and evaluate how these demands will be met. The IFFP is also intended to outline the system improvements which are intended to be funded by impact fees.

The IFA is designed to proportionately allocate the cost of the new public facilities and any excess capacity to new development, while ensuring that all methods of financing are considered. Each component must consider the existing level of service (LOS) provided to existing development and ensure that impact fees are not used to raise that level of service. The following elements are important considerations when completing an IFFP and IFA.

### DEMAND ANALYSIS

The demand analysis serves as the foundation for the IFFP. This element focuses on a specific demand unit related to each public facility – the existing demand on public facilities and the future demand as a result of new development that will impact public facilities.

### LEVEL OF SERVICE ANALYSIS

The demand placed upon existing public facilities by existing development is known as the existing "Level of Service" ("LOS"). Through the inventory of existing facilities, combined with the growth assumptions, this analysis identifies the level of service which is provided to a community's existing residents and ensures that future facilities maintain these standards. Any excess capacity identified within existing facilities can be apportioned to new development. Any demand generated from new development that overburdens the existing public facilities beyond the existing capacity justifies the construction of new public facilities.

### EXISTING FACILITY INVENTORY

In order to quantify the demands placed upon existing public facilities by new development activity, to the extent possible, the Impact Fee Facilities Plan provides an inventory of the existing public facilities. The inventory valuation should include the original construction cost and estimated useful life of each facility. The inventory of existing facilities is important to properly determine the excess capacity of existing facilities and the utilization of excess capacity by new development.

### FUTURE CAPITAL FACILITIES ANALYSIS

The demand analysis, existing facility inventory, and LOS analysis allow for the development of a list of capital projects necessary to serve new growth and to maintain the existing LOS. This list includes any excess capacity of existing facilities as well as future system improvements necessary to maintain the level of service.

## FINANCING STRATEGY

This analysis must also include a consideration of all revenue sources, including impact fees, future debt costs, alternative funding sources, and the dedication of system improvements, which may be used to obtain or finance system improvements.[5] In conjunction with this revenue analysis, there must be a determination that impact fees are necessary to maintain the existing LOS. [6]

## PROPORTIONATE SHARE ANALYSIS

The written impact fee analysis (IFA) is required under the Impact Fees Act and must identify the impacts placed on public facilities by development activity and how these impacts are reasonably related to the new development. The written impact fee analysis (IFA) must include a proportionate share analysis, clearly detailing that the cost of future or existing (that have excess capacity) public facilities improvements are roughly proportionate to the reasonably related to the service demands needed for any new development activity. A local political subdivision or private entity may only impose impact fees on development activities when its plan for financing system improvements establishes that impact fees are necessary to maintain the existing level of service (UCA 11-36a-302 (3)). The City has determined that assessing impact fees on development activities are necessary to maintain the existing level of services in the future.

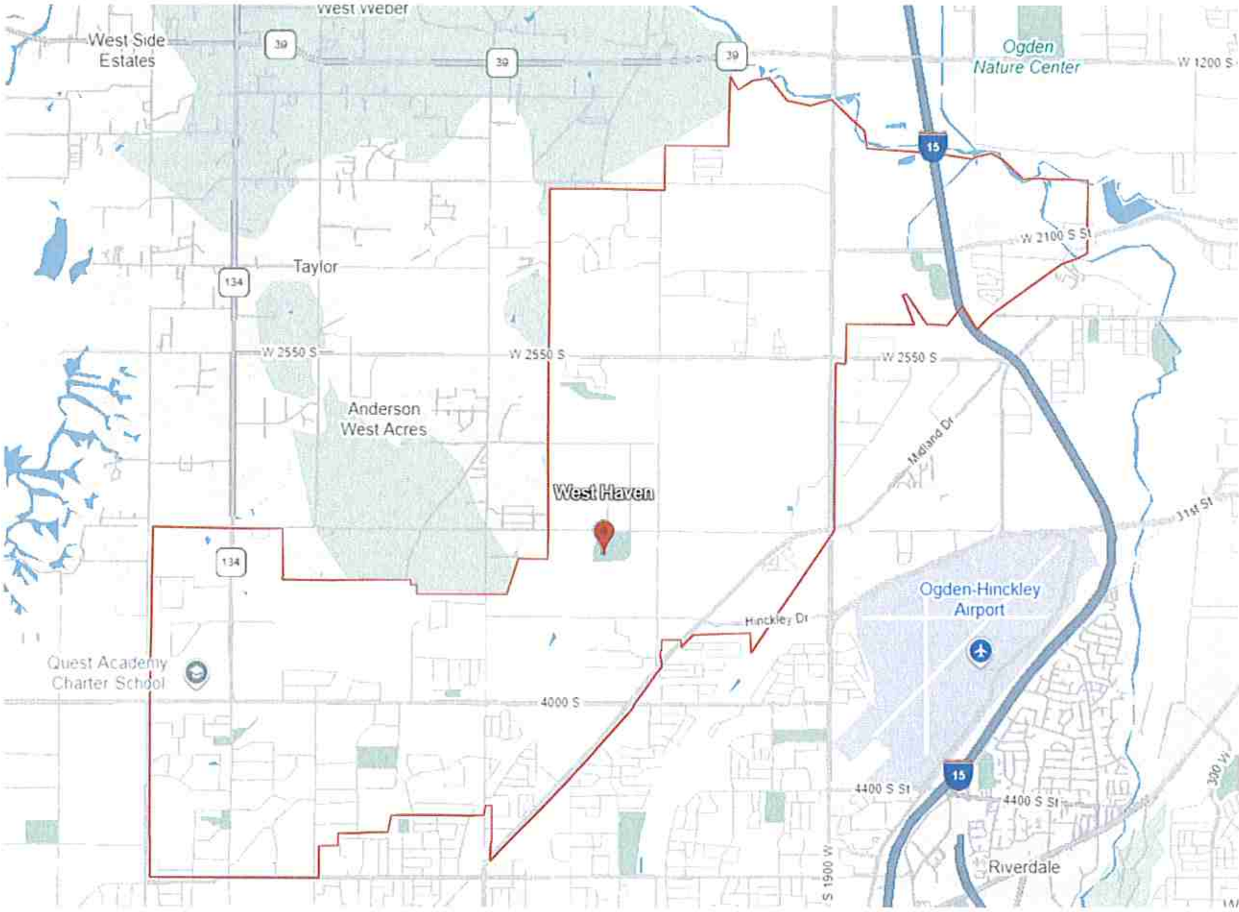
[5] 11-36a-302(2)
[6] 11-36a-302(3)

# SECTION III: OVERVIEW OF SERVICE AREA & DEMAND

## SERVICE AREA

**Figure 3.1** illustrates the proposed impact fee service area, which incorporates the entire municipal boundary of the City. The impact fees related to parks, recreation, open space, and trails will be assessed within the service area, and as the incorporated boundaries of the City is amended through annexations.

**FIGURE 3.1: PROPOSED SERVICE AREA**




## DEMAND UNITS

The demand unit in this analysis is population and growth in population. For purposes of this analysis, the existing population is estimated at 23,990 people and is anticipated to reach 33,840 people within the 10-year planning horizon (2034). This represents an increase of 9,850 people. The population projections are based on several sources including historical Census data, and an assumed growth rate of 3.5 percent (See **Appendix B**).

TABLE 3.1: DEMAND PROJECTIONS

| YEAR | POPULATION |
|---|---|
| **2024** | **23,990** |
| **2034** | **33,840** |

TABLE 3.2: EXISTING DEMAND PROJECTIONS

| YEAR | POPULATION |
|---|---|
| **10 Yr. IFFP Growth** | **9,850** |
| Average HH Size | 3.23 |
| Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates Table DP02: Selected Social Characteristics | |

Because of this growth, the City will need to construct additional parks, recreation, open space, and trails to maintain the existing LOS. The future population in the City is used to determine the additional parks and recreation needs a 10-year planning horizon. The LOS standards for parks, recreation facilities, open space, and trails improvements have been calculated, with a blended LOS determined for the future population, giving the City flexibility to provide future residents with the types of improvements that are desired. If growth projections and land use change significantly in the future, the City will need to update the demand projections and the impact fees.

# SECTION IV: EXISTING FACILITIES INVENTORY & LOS

The purpose of this section is to address the parks, recreation, open space, and trails IFA and to help the City plan for the necessary public facilities improvements for future growth. This section will address the future parks, recreation, open space, and trails facilities needed to serve the City through the next 10 years, as well as address the appropriate parks, recreation, open space, and trails impact fees the City may charge to new growth (development activity) to maintain the existing LOS.

## EXISTING FACILITY INVENTORY

The City's existing inventory for the purpose of determining impact fees is shown in **TABLE 4.1.** See **APPENDIX A** for a detailed list of facilities and amenities. The City-owned public facilities illustrated below will be the basis for the LOS analysis discussed later in this section. The table below includes all eligible parks, recreation, open space, and trail facilities. The impact fee analysis isolates only the City-funded, impact fee eligible facilities, with a useful life of 10 or more years when determining LOS.

**TABLE 4.1: PARKS, RECREATION, OPEN SPACE, AND TRAIL FACILITIES**

| | CITY FUNDED ACREAGE | TOTAL VALUE | EXISTING POPULATION | PER CAPITA |
|---|---|---|---|---|
| Combined | 149.21 | $34,832,855 | 23.990 | $1,452 |
| Note: Calculations based on a 2024 population of 23,990. | | | | |

### LAND VALUATION

Recent land acquisitions by the City were used to determine the land acquisition cost for additional park land in the City. For the purposes of this analysis, $90,000 per acre is used as the cost to acquire additional park land. The basis for this cost is based on a recent appraisal of property provided to the City. [7]

### MANNER OF FINANCING EXISTING PUBLIC FACILITIES

The City's existing parks and recreation facilities have been funded through a combination of General Fund revenues, grants, other governmental funds, and donations. General Fund revenues include a mix of sales taxes, federal and state grants, and any other available General Fund revenues. While the City has received some grants and donations to fund parks and recreation facilities, all park land and improvements funded through grants and donations have been excluded in the impact fee calculations.

## LEVEL OF SERVICE ANALYSIS

The LOS for this analysis is based on the current parks, recreation facilities, open space and trails. The LOS consists of developed and undeveloped[8] park facilities that have been funded by the City. **TABLE 4.2** below shows the LOS for parks and public lands within the Service Area. The City proposed LOS in the future is the same as the existing LOS identified in this analysis.

[7] Appraisal report dated January 26, 2024, prepared for Wall Consultant Group on Behalf of West Haven City.

[8] Undeveloped facilities include land that is dedicated for parks, recreation, open space, and trails and is considered part of the existing LOS.

TABLE 4.2: LEVEL OF SERVICE SUMMARY

| | CITY FUNDED ACREAGE | TOTAL VALUE[1] | EXISTING POPULATION | PER CAPITA |
|---|---|---|---|---|
| **Combined LOS** | **149.21** | **$34,832,855** | **23.990** | **$1,452** |

Note: Calculations based on a 2024 population of 23,990.
1.Total value reflects the existing inventory's total land and improvement value of $31,666,232, with an additional 10% ($3,166,623) allocated to design and engineering.
Note: Calculations based on a 2024 population of 23,990.

## EXCESS CAPACITY

The City currently operates a rentable community center that is available for public use and has a useful life of more than 10 years. The facility will serve existing and future development through buildout. The determination of a buy-in value per capita is found in **TABLE 4.3**.

TABLE 4.3: CALCULATION OF BUY-IN

| EXISTING AMENITY | VALUE PER UNIT | CITY FUNDS | ESTIMATED VALUE OF CITY FUNDED |
|---|---|---|---|
| Reservable Building - Community Center | $887,421 | 100%[1] | $887,421 |
| | | Population Served | 40,000 |
| | | **Value Per Capita** | **$22.19** |

1. The City provided density credits in exchange for community center.

However, the City has ultimately opted to exclude the buy-in component from the analysis since this facility is rented and not freely available to the public.

# SECTION V: PUBLIC FACILITY ANALYSIS

Future planning for parks, recreation, open spaces and trails is an ongoing process based on the changes in population and community preference. The City will purchase and improve parks and public lands to maintain the LOS defined in this document. Actual future improvements will be determined as development occurs and the opportunity to acquire and improve park land arises. Impact fees will only be assessed to maintain the existing LOS.

The analysis of impact fee eligible costs above is further refined based on the expected changes in population over the 10- year planning horizon and the existing LOS. Based on the expected growth of 9,850 people, **Table 5.1** illustrates the City will need to invest an estimate of $14.3 million in parks, recreation, open space, and trail facilities (including amenities) to maintain the existing LOS as shown in **Table 4.2.** The City may invest at a higher level; however, impact fees cannot be used to increase the existing LOS.

Table 5.1: Illustration of Investment Needed to Maintain LOS

| Type of Improvement | Unit of Measure | Population Increase IFFP Horizon | Total Value per Capita | Estimated Future Investment |
|---|---|---|---|---|
| Combined LOS | Per Capita | 9,850 | $1,425 | $14,302,327 |

**Table 5.1** illustrates the estimated population growth in the Service Area and the estimated future investment, excluding buy-in to existing public facilities. Future investment will be used to acquire additional parks, recreation, open spaces, and trails and fund new park improvements and amenities or make improvements to existing park facilities to add capacity to the system. The following types of improvements may be considered, or others, so long as the improvements add capacity to public facilities:

- Land Acquisition
- Sod and Irrigation Improvements
- Pavilions
- Restrooms and other Parks and Recreation Buildings
- Picnic Tables
- Playgrounds
- Trailways/Walkways
- Volleyball Courts
- Tennis Courts
- Basketball Courts
- Other Recreational Courts and Facilities
- Baseball/Softball Field Facilities
- Multi-Purpose Fields
- Field Lighting
- Concession/ Buildings
- Parking
- Skate Parks
- Design, engineering, and planning
- Water shares
- Other Park and Recreation Amenities

The timing of construction for growth-related parks and recreation facilities will depend on the rate of development activity and the availability of funding. For the purposes of this analysis, a specific construction schedule is not required. The construction of park facilities can follow development without impeding continued development activity. This analysis assumes that construction of needed park facilities will proceed on a pay-as-you-go basis.

## SYSTEM VS. PROJECT IMPROVEMENTS

System improvements are defined as existing and future public facilities designed to provide services to the community at large.[9] Project improvements are improvements and facilities that are planned and designed to provide service for a specific development (resulting from a development activity) and considered necessary for the use and convenience of the occupants or users of that development.[10] The Impact Fee Analysis may only include the costs of impacts on system improvements related to new growth within the proportionate share analysis. Only parks and recreation facilities that serve the entire community (i.e. system improvements) are included in the LOS.

## FINANCING STRATEGY & CONSIDERATION OF ALL REVENUE RESOURCES

This analysis assumes that construction of needed parks and recreation facilities will proceed on a pay-as-you-go basis, and assumes a standard annual dollar amount the City should anticipate collecting and plan to expend on park improvements. The IFFP must also include a consideration of all revenue sources including impact fees and developer dedications of system improvements, which may be used to finance system improvements.[11] In conjunction with this revenue analysis, there must be a determination that impact fees are necessary to maintain the existing LOS.[12]

### GENERAL FUND REVENUES

It is anticipated that the City may continue to utilize General Fund revenues, to maintain existing park, recreation, open space, and trail facilities. Impact fee revenues will be a continual source of revenue to fund growth related improvements. The City does not currently assess property tax.

### GRANTS AND DONATIONS

New developments may dedicate future system improvements related to park facilities and in such instances the entity that dedicates these system improvements will be entitled to an impact fee credit or reimbursement for the negotiated value of system improvements.

The City may receive grant money to assist with park construction and improvements. This analysis has removed all funding that has come from grants and donations to ensure that none of those infrastructure items are included in the LOS. Therefore, the City's existing LOS standards have been funded by the City's existing residents. Funding future improvements through impact fees places a similar burden upon future users as that which has been placed upon existing users through impact fees, and other revenue sources.

### IMPACT FEE REVENUES

Impact fees are an ideal mechanism for funding growth-related infrastructure. Impact fees are currently charged to ensure that new growth pays its proportionate share of the costs for the development of public facilities. Impact fee revenues can also be attributed to the future expansion of public facilities if the revenues are used to maintain an existing LOS. Increases to an existing LOS cannot be funded with impact fee revenues. An impact fee analysis is required to accurately assess the true impact of a particular user on the City public facilities to mitigate the impact of new

[9] 11-36a-102(20)
[10] 11-36a102(13)
[11] 11-36a-302(2)
[12] 11-36a-302(3)

development on public facilities. The City has determined that assessing impact fees on development activities is necessary to maintain the existing level of services in the future.

### DEBT FINANCING

In the event the City has not amassed sufficient impact fees in the future to pay for the construction of time sensitive or urgent public facilities needed to accommodate new growth, the City must look to revenue sources other than impact fees for funding. The Impact Fees Act allows for the costs related to the financing of future public facilities to be legally included in the impact fee. This allows the City to finance and quickly construct infrastructure for new development and reimburse itself later from impact fee revenues for the costs of issuing debt (i.e., interest costs). Future debt financing has not been considered in the calculation of the parks and recreation impact fee.

# SECTION VI: IMPACT FEE CALCULATION

The calculation of the parks, recreation, open space, and trails impact fee is based on the growth-driven approach, which is based on the **growth** in population (or residential land uses). The growth-driven methodology utilizes the existing LOS and perpetuates that LOS into the future. Impact fees are then calculated to provide sufficient funds for the entity to expand or provide additional public facilities, as growth occurs within the community (service area). Under this methodology, impact fees are calculated to ensure new residential development provides sufficient investment to maintain the current LOS standards in the community (service area). This approach is often used for public facilities that are not governed by specific capacity limitations and do not need to be built before development occurs (i.e., park facilities).

## PARKS AND RECREATION IMPACT FEE CALCULATION

Utilizing the estimated value per capita within the system and the value per capita to provide the same level of improvements, the total fee per capita is shown in **TABLE 6.1** below. The impact fee also includes a buy-in fee which development activity will contribute toward the excess capacity of system. It is anticipated that new development will also pay general taxes similar to existing development for the general operation and maintenance of the system.

TABLE 6.1: ESTIMATE OF IMPACT FEE VALUE PER CAPITA

| TYPE OF IMPROVEMENT | | | TOTAL COST PER CAPITA |
|---|---|---|---|
| Combined | | | $1,452 |
| **OTHER COMPONENTS TO FEE** | **ADDITIONAL VALUE** | **DEMAND SERVED** | **TOTAL VALUE PER CAPITA** |
| Impact Fee Credit | - | 9,850 | $0 |
| Professional Expense | $10,850 | 9,850 | $1 |
| | | **Estimate of Impact Fee Per Capita** | **$1,453** |

TABLE 6.2: IMPACT FEE PER HOUSEHOLD

| | AVERAGE HH SIZE[1] | FEE PER HH | EXISTING FEE PER HH | % CHANGE |
|---|---|---|---|---|
| Single-Family | 3.62 | $5,260 | $2,144 | 145% |
| Multi-Family | 2.65 | $3,850 | $1,796 | 114% |

Single family residential is defined as any single unit detached housing. Multi-family is defined as any residential unit not considered single family.
[1] Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates
Table B25033: Total Population in Occupied Housing Units by Tenure by Units in Structure
Table DP04: Selected Housing Characteristics

## NON-STANDARD IMPACT FEE

The proposed fees are based on population growth. The Impact Fees Act allows the City to assess an adjusted fee that more closely matches the true impact that the land use will have upon parks and recreation facilities.[13] This adjustment could result in a different impact fee if the City determines that a particular land use may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis. The formula for determining a non-standard impact fee is found below.

[13] 11-36a-402(1)(c)

The Impact Fee Act requires that impact fees should be spent or encumbered within six years after each impact fee is paid, indicating that there is a rolling timeline when identifying the impacts placed on public facilities by development activity. This analysis addresses a 10-year planning horizon in order to account for the rolling timeline, while ensuring that the assumptions included in the analysis are relevant to new development activity, and accounting for the need for entities to update the impact fee analysis periodically. Impact fees collected in the IFFP planning horizon should be spent only on those system improvements identified to maintain the LOS.

## GROWTH-DRIVEN EXTRAORDINARY COSTS

The City does not anticipate any extraordinary costs necessary to provide services to future development.

## SUMMARY OF TIME PRICE DIFFERENTIAL

The Impact Fees Act allows for the inclusion of a time price differential to ensure a fair comparisons of amounts paid at different times. The LOS for this analysis is based on the current value of parks, recreation facilities, open space and trails in today's dollars. The LOS consists of developed and undeveloped park facilities that have been funded by the City. This ensures the impact fee captures the value of the investment made by current residents while adjusting for the value in today's dollars.

# APPENDIX A: PARK INVENTORY

1. Existing Park Inventory

| Park Type | Accessible Park | Total Acreage | Pickleball Court | Baseball Field | Playground | Pavilion | Restroom | Concession/Restroom | Bleachers | Basketball Court | Tennis Court | Sand Volleyball Court | Rodeo Arena | Open Space (per SF) | Parking Lot (per SF) | [illegible] (LF) | Sidewalk/Trail (per LF) | Trail Road Base (per LF) | Trail (per LF) | Scoreboard | Camping Area | Dog Park | Fish Pond | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Cost per unit | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Developed Parks | | | | | | | | | | | | | | | | | | | | | | | | |
| Country Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Donated | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Donated | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Country [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Fair [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Farms Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Donated | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Sports Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] and [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Park/Weber River Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Parkway Trail Head | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Farm Park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Sycamore park | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Park Trail [illegible] | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
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| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] Farms Park and [illegible] Pond | Yes | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funds | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Funded $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Total [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| Cost $ | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| City Count | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

This analysis excludes the Barn Community Center.

# APPENDIX B: POPULATION PROJECTIONS

FORMULA FOR NON-STANDARD PARKS AND RECREATION IMPACT FEES:
**Estimated Population per Unit x $1,453 = Impact Fee per Unit**

The formula for a non-standard impact fee should be included in the impact fee enactment (by resolution or ordinance). In addition, the impact fee enactment should contain the following elements:

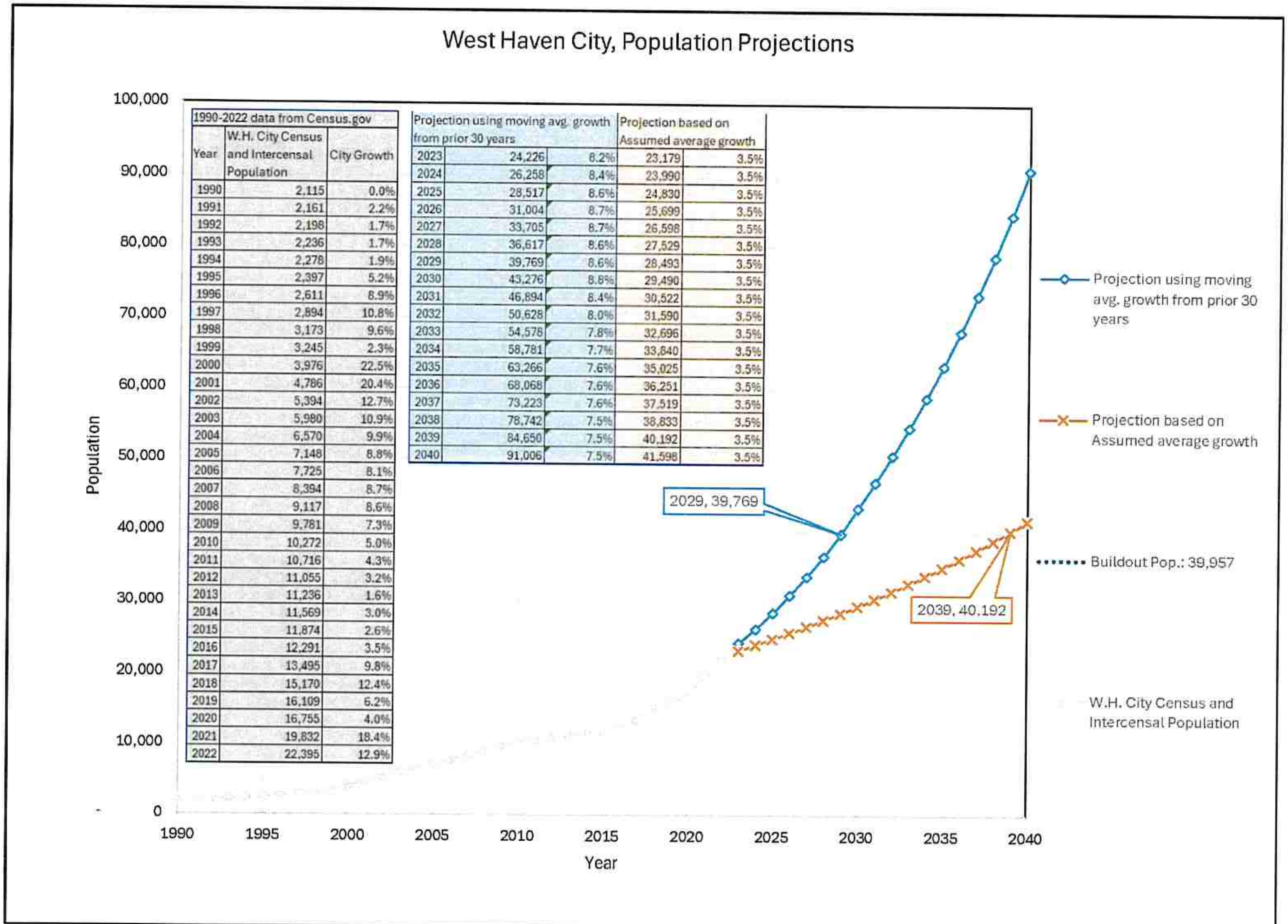
- A provision establishing one or more service areas within which the local political subdivision or private entity calculates and imposes impact fees for various land use categories.
- A schedule of impact fees for each type of development activity that specifies the amount of the impact fee to be imposed or the formula that the local political subdivision or private entity will use to calculate each impact fee.
- A provision authorizing the local political subdivision or private entity to adjust the standard impact fee at the time the fee is charged to:
    - Respond to unusual circumstances in specific cases or a request for a prompt and individualized impact fee review for the development activity of the state, a school district, or a charter school and an offset or credit for a public facility for which an impact fee has been or will be collected.
    - Ensure that the impact fees are imposed fairly.
- A provision governing the calculation of the amount of the impact fee to be imposed on a particular development that permits adjustment of the amount of the impact fee based upon studies and data submitted by the developer.
- A provision that allows a developer, including a school district or a charter school, to receive a credit against or proportionate reimbursement of an impact fee if the developer:
    - Dedicates land for a system improvement.
    - Builds and dedicates some or all of a system improvement.
    - Dedicates a public facility that the local political subdivision or private entity and the developer agree will reduce the need for a system improvement.
- A provision that requires a credit against impact fees for any dedication of land for, improvement to, or new construction of, any system improvements provided by the developer if the facilities:
    - Are system improvements; or,
    - Dedicated to the public and offset the need for an identified system improvement.

Other provisions of the impact fee enactment include exemption of fees for development activity attributable to low-income housing, the state, a school district, or a charter school. Exemptions may also include other development activities with a broad public purpose. If an exemption is provided, the entity should establish one or more sources of funds other than impact fees to pay for that development activity. The impact fee exemption for development activity attributable to a school district or charter school should be applied equally to either scenario.

## CONSIDERATION OF ALL REVENUE SOURCES

The Impact Fees Act requires this document consider all revenue sources to finance the impacts on system improvements, including: (a) grants; (b) bonds; (c) interfund loans; (d) impact fees; and (e) anticipated or accepted dedications of system improvements. See **Section V** for further discussion regarding the consideration of revenue sources.

## EXPENDITURE OF IMPACT FEES




| 1990-2022 data from Census.gov | | |
|---|---|---|
| Year | W.H. City Census and Intercensal Population | City Growth |
| 1990 | 2,115 | 0.0% |
| 1991 | 2,161 | 2.2% |
| 1992 | 2,198 | 1.7% |
| 1993 | 2,236 | 1.7% |
| 1994 | 2,278 | 1.9% |
| 1995 | 2,397 | 5.2% |
| 1996 | 2,611 | 8.9% |
| 1997 | 2,894 | 10.8% |
| 1998 | 3,173 | 9.6% |
| 1999 | 3,245 | 2.3% |
| 2000 | 3,976 | 22.5% |
| 2001 | 4,786 | 20.4% |
| 2002 | 5,394 | 12.7% |
| 2003 | 5,980 | 10.9% |
| 2004 | 6,570 | 9.9% |
| 2005 | 7,148 | 8.8% |
| 2006 | 7,725 | 8.1% |
| 2007 | 8,394 | 8.7% |
| 2008 | 9,117 | 8.6% |
| 2009 | 9,781 | 7.3% |
| 2010 | 10,272 | 5.0% |
| 2011 | 10,716 | 4.3% |
| 2012 | 11,055 | 3.2% |
| 2013 | 11,236 | 1.6% |
| 2014 | 11,569 | 3.0% |
| 2015 | 11,874 | 2.6% |
| 2016 | 12,291 | 3.5% |
| 2017 | 13,495 | 9.8% |
| 2018 | 15,170 | 12.4% |
| 2019 | 16,109 | 6.2% |
| 2020 | 16,755 | 4.0% |
| 2021 | 19,832 | 18.4% |
| 2022 | 22,395 | 12.9% |

| Projection using moving avg. growth from prior 30 years | | | Projection based on Assumed average growth | |
|---|---|---|---|---|
| 2023 | 24,226 | 8.2% | 23,179 | 3.5% |
| 2024 | 26,258 | 8.4% | 23,990 | 3.5% |
| 2025 | 28,517 | 8.6% | 24,830 | 3.5% |
| 2026 | 31,004 | 8.7% | 25,699 | 3.5% |
| 2027 | 33,705 | 8.7% | 26,598 | 3.5% |
| 2028 | 36,617 | 8.6% | 27,529 | 3.5% |
| 2029 | 39,769 | 8.6% | 28,493 | 3.5% |
| 2030 | 43,276 | 8.8% | 29,490 | 3.5% |
| 2031 | 46,894 | 8.4% | 30,522 | 3.5% |
| 2032 | 50,628 | 8.0% | 31,590 | 3.5% |
| 2033 | 54,578 | 7.8% | 32,696 | 3.5% |
| 2034 | 58,781 | 7.7% | 33,840 | 3.5% |
| 2035 | 63,266 | 7.6% | 35,025 | 3.5% |
| 2036 | 68,068 | 7.6% | 36,251 | 3.5% |
| 2037 | 73,223 | 7.6% | 37,519 | 3.5% |
| 2038 | 78,742 | 7.5% | 38,833 | 3.5% |
| 2039 | 84,650 | 7.5% | 40,192 | 3.5% |
| 2040 | 91,006 | 7.5% | 41,598 | 3.5% |

Q:\WEST HAVEN CITY FOLDER\West Haven Special Service District\Sewer IFFP\2023\DOCUMENTS\Excel\
West Haven City Population Estimates_3-22-2024.xlsx

3/22/2024
1/1

## Exhibit E - Transportation Impact Fee Analysis

LRB | PUBLIC FINANCE ADVISORS

LEWIS | ROBERTSON | BURNINGHAM


# WEST HAVEN, UTAH

OCTOBER 2025

## IMPACT FEE ANALYSIS (IFA)

TRANSPORTATION

**PREPARED BY:**

**LRB PUBLIC FINANCE ADVISORS**

FORMERLY LEWIS YOUNG ROBERTSON & BURNINGHAM INC.

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# IMPACT FEE CERTIFICATION

## IFA CERTIFICATION

LRB Public Finance Advisors certifies that the Impact Fee Analysis (IFA) prepared for transportation:

1. includes only the costs of public facilities that are:
    a. allowed under the Impact Fees Act; and
    b. actually incurred; or
    c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
    a. costs of operation and maintenance of public facilities;
    b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
    c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement;
    d. offsets costs with grants or other alternate sources of payment; and
3. complies with every relevant respect with the Impact Fees Act.

**LRB Public Finance Advisors makes this certification with the following caveats:**

1. All the recommendations for implementation of the IFFP made in the IFFP documents or in the IFA documents are followed by City Staff and elected officials.
2. If all or a portion of the IFFP or IFA are modified or amended, this certification is no longer valid.
3. All information provided to LRB is assumed to be correct, complete, and accurate. This includes information provided by the City as well as outside sources.

LRB PUBLIC FINANCE ADVISORS

# DEFINITIONS

The following acronyms or abbreviations are used in this document:

| | |
|---|---|
| **AADT:** | Average Annual Daily Trips |
| **CFP:** | Capital Facilities Plan |
| **IFA:** | Impact Fee Analysis |
| **IFFP:** | Impact Fee Facilities Plan |
| **KSF:** | 1,000 Square Feet |
| **LOS:** | Level of Service |
| **LRB:** | LRB Public Finance Advisors |

The following definitions are used in this document:

**Development Activity:** any construction or expansion of a building, structure, or use, any change in use of a building or structure, or any changes in the use of land that creates additional demand and need for public facilities.[1]

**Public Facilities:** impact fee facilities[2] that have a life expectancy of 10 or more years and are owned or operated by or on behalf of a local political subdivision or private entity.

**System Improvements:** existing public facilities that are: identified in the impact fee analysis and designed to provide services to service areas within the community at large, and future public facilities that are intended to provide services to service areas within the community at large.[3]

**Trip:** A vehicle trip represents the average daily trip with an origin or destination (entering or exiting) within the Service Area.

[1] 11-36a-102(3)

[2] See 11-36-a-102(17) for list of applicable impact fee facilities.

[3] 11-36a-102(22)

# SECTION I: EXECUTIVE SUMMARY

The purpose of the Transportation Impact Fee Analysis (IFA) is to fulfill the requirements established in Utah Code Title 11 Chapter 36a, the "Impact Fee Act," and help West Haven City (the City) plan necessary capital improvements for future growth. This document will determine the maximum legal impact fee the City may charge to new growth to maintain the existing level of service (LOS) for the transportation system. This analysis is supported by the 2025 West Haven Transportation Capital Facilities Plan (CFP) and Impact Fee Facilities Plan (IFFP) prepared by A Trans Transportation Engineering and the West Haven Trip Generation Estimate Memo (see **Appendix A**).

- **Impact Fee Service Area:** The impact fees related to transportation will be assessed within the proposed Service Area, which includes the City's incorporated limits and as amended through annexations.

- **Demand Analysis:** The demand unit used in this analysis is based upon each land use category's impact and road usage characteristics expressed in the number of trips generated. As residential and commercial growth occurs within the City, it generates increased demand on existing and proposed roadways in the City. The system improvements identified in this study are designed to maintain the existing LOS within the City.

- **Level of Service:** Level of Service (LOS) assesses the level of congestion and associated delays on a roadway segment or intersection. LOS is measured using a letter grade A through F, where A represents free flowing traffic with absolutely no congestion and F represents grid lock. The City has adopted an acceptable standard of LOS D for its street network and intersections. A LOS D is when roadways operate at its most efficient capacity. Generally, up to a LOS D traffic volumes have not commenced to decrease in spite of increased delays.

- **Excess Capacity:** It is anticipated that new development will benefit from the existing roadways that have been constructed within the service area. Approximately 15.8 percent of the system is attributed to the demand within the IFFP planning horizon. As a result, **$2.7M** of the total original system cost is included in this analysis, based on the original cost of system improvements as identified in the City's financial records.

- **Capital Facilities Analysis:** The IFFP has identified **$21.2M** in improvements needed within the next ten years, based on construction timing and inflation of three percent annually. A total of **$9M** is related to the demand within the next ten years, which is the IFA's planning horizon.

- **Financing of Future Facilities:** The future capital projects which are intended to serve new growth will be financed using impact fees, grants, transportation funding, or general fund revenues. The costs associated with future debt are not included in the Impact Fee Analysis.

## PROPORTIONATE SHARE ANALYSIS

The proportionate share analysis determines the cost assignable to new development based on the proposed capital projects and the new growth served by the proposed projects during the 10-year planning horizon. The impact fee per trip is **$298.38** as shown in **Table 1.1** below.

TABLE 1.1: PROPORTIONATE SHARE ANALYSIS

| | TOTAL COST | ALLOCATION TO IFFP | COST TO IFFP | TRIPS SERVED | COST PER TRIP* |
|---|---|---|---|---|---|
| Existing Facilities | $17,166,110 | 15.8% | $2,712,245 | 39,695 | $68.33 |
| Future Roadways | $18,894,402 | 42.8% | $8,084,010 | 39,695 | $203.65 |
| Future Intersections | $2,338,995 | 42.8% | $1,000,744 | 39,695 | $25.21 |
| Professional Expense (IFFP/IFA) | $47,150 | 100.0% | $47,150 | 39,695 | $1.19 |
| | | | | **Total** | **$298.38** |

* A vehicle trip represents average daily trip with origin or destination (entering or exiting) within the Service Area. The Trips Served represent the total increase in average daily trips within the IFFP planning horizon that occur within the Service Area.

## IMPACT FEE SUMMARY BY LAND USE TYPE

The impact fee by land use type is illustrated in **Table 1.2**.

TABLE 1.2: IMPACT FEE SUMMARY BY LAND USE TYPE

| LAND USE CATEGORY | ITE CODE | DEMAND UNIT* | AVERAGE DAILY TRIPS | PASS BY REDUCTION | PASS BY TRIPS REDUCED | TOTAL TRIPS | PROPOSED IMPACT FEE |
|---|---|---|---|---|---|---|---|
| **Cost per Trip** | | | | | | | **$298.38** |
| Single Family Residential | 210 | Unit | 9.43 | 0% | - | 9.43 | $2,814 |
| Multi Family Low Rise** | 220 | Unit | 6.74 | 0% | - | 6.74 | $2,011 |
| Multi Family Mid Rise*** | 221 | Unit | 4.54 | 0% | - | 4.54 | $1,355 |
| Senior Adult Housing-Detached | 251 | Unit | 4.31 | 0% | - | 4.31 | $1,286 |
| Senior Adult Housing-Attached | 252 | Unit | 3.24 | 0% | - | 3.24 | $967 |
| Assisted Living | 254 | Beds | 2.60 | 0% | - | 2.60 | $776 |
| Hotel | 310 | Rooms | 7.99 | 0% | - | 7.99 | $2,384 |
| Light Industrial | 110 | KSF | 4.08 | 0% | - | 4.08 | $1,217 |
| Industrial Park | 130 | KSF | 3.37 | 0% | - | 3.37 | $1,006 |
| Mini Warehouse | 151 | KSF | 1.45 | 0% | - | 1.45 | $433 |
| Elementary School | 520 | Students | 2.27 | 0% | - | 2.27 | $677 |
| Middle/Jr. High School | 522 | Students | 2.10 | 0% | - | 2.10 | $627 |
| High School | 525 | Students | 1.94 | 0% | - | 1.94 | $579 |
| Daycare Center | 565 | KSF | 47.62 | 0% | - | 47.62 | $14,209 |
| Nursing Home | 620 | Beds | 3.06 | 0% | - | 3.06 | $913 |
| Clinic | 630 | KSF | 37.60 | 0% | - | 37.60 | $11,219 |
| Church | 560 | KSF | 7.60 | 0% | - | 7.60 | $2,268 |
| General Office | 710 | KSF | 10.84 | 0% | - | 10.84 | $3,234 |
| Medical Dental Office | 720 | KSF | 36.00 | 0% | - | 36.00 | $10,742 |
| Free-Standing Discount Superstore | 813 | KSF | 50.52 | 28% | 14.15 | 36.37 | $10,853 |
| Hardware/Paint Store | 816 | KSF | 8.07 | 26% | 2.10 | 5.97 | $1,782 |
| Shopping Center/General Commercial | 820 | KSF | 37.01 | 34% | 12.58 | 24.43 | $7,288 |
| New Car Sales | 841 | KSF | 27.84 | 0% | - | 27.84 | $8,307 |
| Tire Store | 848 | KSF | 27.69 | 0% | - | 27.69 | $8,262 |
| Supermarket | 850 | KSF | 93.84 | 36% | 33.78 | 60.06 | $17,920 |
| Convenience Market w/ Gas Pumps | 853 | KSF | 624.20 | 66% | 411.97 | 212.23 | $63,324 |
| Discount Club | 857 | KSF | 42.26 | 23% | 9.72 | 32.54 | $9,709 |
| Home Improvement Superstore | 862 | KSF | 30.74 | 48% | 14.76 | 15.98 | $4,770 |
| Department Store | 875 | KSF | 22.88 | 0% | - | 22.88 | $6,827 |
| Pharmacy/Drugstore w/ Drive Thru | 881 | KSF | 108.40 | 49% | 53.12 | 55.28 | $16,496 |
| Drive-In Bank | 912 | KSF | 100.35 | 47% | 47.16 | 53.19 | $15,869 |
| Quality Restaurant | 931 | KSF | 83.84 | 44% | 36.89 | 46.95 | $14,009 |

| LAND USE CATEGORY | ITE CODE | DEMAND UNIT* | AVERAGE DAILY TRIPS | PASS BY REDUCTION | PASS BY TRIPS REDUCED | TOTAL TRIPS | PROPOSED IMPACT FEE |
|---|---|---|---|---|---|---|---|
| High Turnover/Sit Down Restaurant | 932 | KSF | 107.20 | 43% | 46.10 | 61.10 | $18,232 |
| Fast Food with Drive Thru | 934 | KSF | 467.48 | 50% | 233.74 | 233.74 | $69,743 |
| Quick Lube | 941 | KSF | 69.57 | 0% | - | 69.57 | $20,758 |
| Self-Service Car Wash | 947 | Wash Stalls | 108.00 | 0% | - | 108.00 | $32,225 |

Source for trip statistics is the Institute of Traffic Engineers (ITE) Manual, 11th Edition. Adjustment factors can be found using the "List of Land Uses with Vehicle Pass-By Rates and Data." Land use categories indicated are not all inclusive. Refer to ITE manual for appropriate category and adjustment factors if not found in this report. For non-standard uses, the non-standard formula can be used. Each land use within proposed development will be evaluated.

* KSF: 1,000 Square Feet

** Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

*** Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

## NON-STANDARD IMPACT FEES

The City reserves the right under the Impact Fees Act to assess an adjusted fee that more closely matches the true impact that the land use will have upon public facilities.[4] This adjustment could result in a different impact fee if the City determines that a particular user may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis.

FORMULA FOR NON-STANDARD TRANSPORTATION IMPACT FEES:

**Total Demand Units x Estimate Trips per Unit x Adjustment Factors x $298.38 = Impact Fee per Unit**

## CONSIDERATION OF ALL REVENUE SOURCES

The Impact Fees Act requires this document to consider all revenue sources to finance the impacts on system improvements, including: (a) grants; (b) bonds; (c) interfund loans; (d) impact fees; and (e) anticipated or accepted dedications of system improvements. See **Section V** for further discussion regarding the consideration of revenue sources.

## EXPENDITURE OF IMPACT FEES

The Impact Fee Act requires that impact fees should be spent or encumbered within six years after each impact fee is paid, indicating that there is a rolling timeline when identifying the impacts placed on public facilities by development activity. This plan addresses a 10-year planning horizon in order to account for the rolling timeline, while ensuring that the assumptions included in the analysis are relevant to new development activity, and accounting for the need for entities to update the impact fee analysis periodically. Impact fees collected in the IFFP planning horizon should be spent only on those projects outlined in the IFFP as growth related costs to maintain the LOS.

## GROWTH-DRIVEN EXTRAORDINARY COSTS

The City does not anticipate any extraordinary costs necessary to provide services to future development.

## SUMMARY OF TIME PRICE DIFFERENTIAL

The Impact Fees Act allows for the inclusion of a time price differential to ensure a fair comparison of amounts paid at different times. The LOS for this analysis is based on the original value of the transportation system when determining a buy-in component, while addressing the current and future cost when calculating the portion of the fee attributed to new construction.

[4] 11-36a-402(1)(c)

# SECTION II: GENERAL IMPACT FEE METHODOLOGY

The purpose of this study is to fulfill the requirements of the Impact Fees Act regarding the establishment of an IFFP and IFA. The IFFP is designed to identify the demands placed upon existing facilities by future development and evaluate how these demands will be met. The IFFP is also intended to outline system improvements which are intended to be funded by impact fees.

FIGURE 2.1: IMPACT FEE METHODOLOGY


The IFA is designed to proportionately allocate the cost of the new facilities and any excess capacity to new development, while ensuring that all methods of financing are considered. Each component must consider the existing level of service (LOS) provided to existing development and ensure that impact fees are not used to raise that level of service. The following elements are important considerations when completing an IFFP and IFA.

## DEMAND ANALYSIS

The demand analysis serves as the foundation for the IFFP. This element focuses on a specific demand unit related to each public service – the existing demand on public facilities and the future demand as a result of new development that will impact public facilities.

## LEVEL OF SERVICE ANALYSIS

The demand placed upon existing public facilities by existing development is known as the existing "Level of Service" ("LOS"). Through the inventory of existing facilities, combined with the growth assumptions, this analysis identifies the level of service which is provided to a community's existing residents and ensures that future facilities maintain these standards. Any excess capacity identified within existing facilities can be apportioned to new development. Any demand generated from new development that overburdens the existing system beyond the existing capacity justifies the construction of new public facilities.

## PLANNING HORIZON

The impact fee facilities plan, and impact fee analysis is based on a 10-year planning window. This ensures that the proportionate share of costs attributed to new development activity are related to the development activity's impact on the system. In addition, this planning horizon facilitates the requirement to expend impact fees collected within the six-year expenditure period.

## EXISTING FACILITY INVENTORY

In order to quantify the demands placed upon existing public facilities by new development activity, to the extent possible, the Impact Fee Facilities Plan provides an inventory of the existing public facilities. The inventory valuation should include the original construction cost and estimated useful life of each facility. The inventory of existing facilities is important to properly determine the excess capacity of existing facilities and the utilization of excess capacity by new development.

## FUTURE CAPITAL FACILITIES ANALYSIS

The demand analysis, existing facilities inventory, and LOS analysis allow for the development of a list of capital projects necessary to serve new growth and to maintain the existing LOS. This list includes any excess capacity of existing facilities as well as future system improvements necessary to maintain the level of service.

## FINANCING STRATEGY

This analysis requires consideration of all revenue sources, including impact fees, future debt costs, alternative funding sources, and the dedication of system improvements, which may be used to finance system improvements.[5] In conjunction with this revenue analysis, there must be a determination that impact fees are necessary to maintain the existing LOS.[6]

## PROPORTIONATE SHARE ANALYSIS

The written impact fee analysis is required under the Impact Fees Act and must identify the impacts placed on the public facilities by development activity and how these impacts are reasonably related to the new development. The written impact fee analysis must include a proportionate share analysis, clearly detailing the cost of future or existing (that have excess capacity) public facilities improvements are roughly proportionate to the reasonably related to the service demands needed for any new development activity.

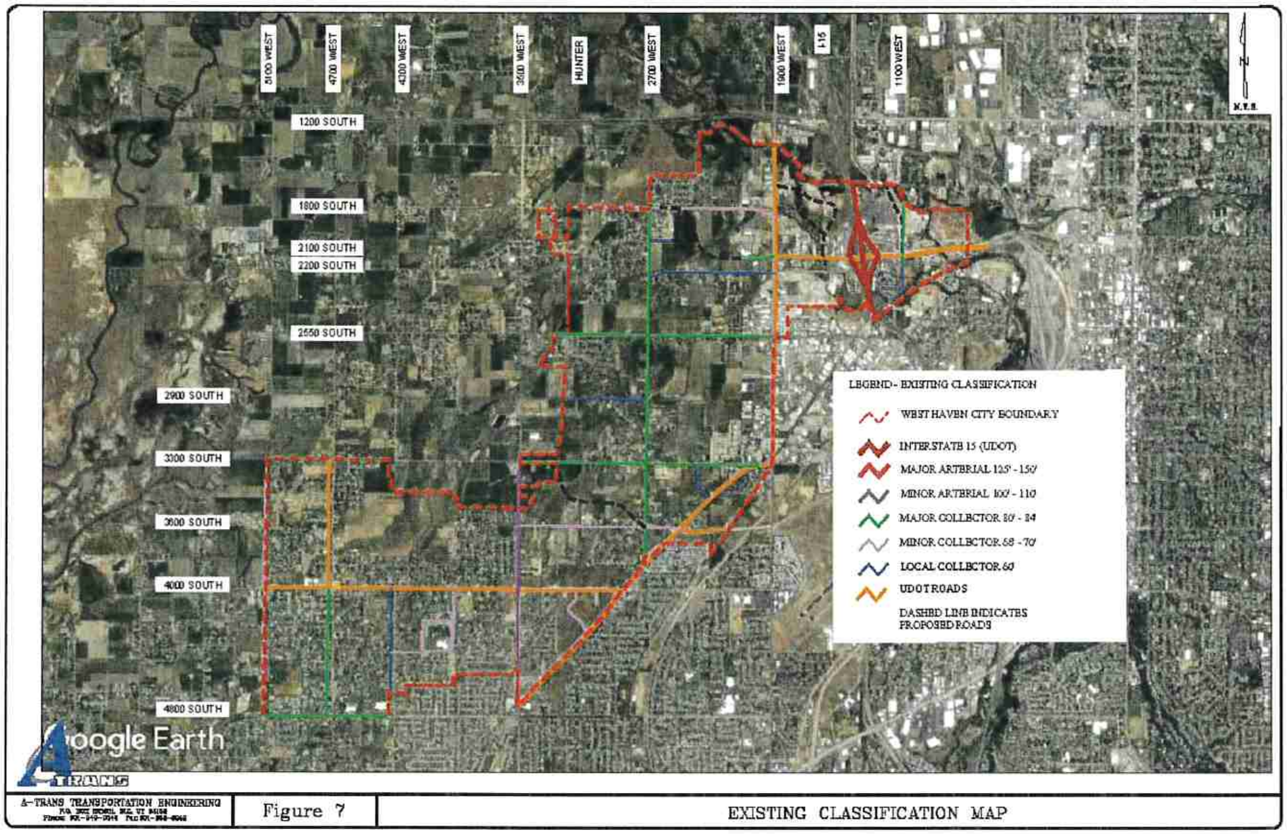
[5] 11-36a-302(2)
[6] 11-36a-302(3)

# SECTION III: OVERVIEW OF SERVICE AREA, DEMAND AND LEVEL OF SERVICE

## SERVICE AREA

**Figure 3.1** illustrates the proposed impact fee service area, which incorporates the entire municipal boundary of the City and as amended through annexations. The impact fees related to transportation will be assessed within the proposed service area.

FIGURE 3.1: PROPOSED SERVICE AREA




## DEMAND UNITS

The demand units utilized in this analysis are based on undeveloped residential and commercial land and the new trips generated from these land-use types once developed. As residential and commercial growth occurs within the City, additional trips will be generated on the City's roadways. The transportation system improvements identified in this study are based on maintaining the current level of service as defined by the City. The proposed impact fees are based upon the projected growth in demand units which are used as a means to quantify the impact that future users will have upon the City's system. The demand unit used in the calculation of the transportation impact fee is based upon each land use category's impact and road usage characteristics expressed in the number of trips generated. The existing and future trip statistics used in this analysis were prepared by A Trans Transportation Engineering based on existing modeling software.

To determine the proportionate impact from each land use type, the existing trips are allocated to the different land use types based on trip statistics as presented in the Institute of Traffic Engineers (ITE) Trip Generation Manual, 11th Edition. The most common method of determining growth is measuring the number of trips within a community based on the differences between existing and future land uses. Appropriate adjustment factors are applied to remove pass-by traffic. Based on the growth in trips, the City will need to expand its current facilities to accommodate new growth. Growth from new development will create an additional 39,695 (Projected 2033 Trips (120,705) – 2022 Trips (81,010)) trips by 2033, as show in **Appendix A** and is the total demand units during this planning horizon.

## LEVEL OF SERVICE

LOS assesses the level of congestion on a roadway segment or intersection and is a qualitative rating of traveler satisfaction from A to F. LOS A corresponds to a roadway that has the greatest excess capacity, and LOS F corresponds to a roadway that has far exceeded its reasonable operating capacity. Delay times and inconveniences on roadways gradually increase between these two operating points. When roadways reach their most efficient capacity, they operate at a LOS D. Generally, up to that point, traffic volumes have not commenced to decrease in spite of increased delays.

West Haven City has adopted an acceptable standard of LOS D for its street network and intersections[7] providing for maximum volume while keeping delays and inconveniences within the limits of toleration. This LOS D rating is based on standard and recommended practices by national guidelines. This LOS D threshold would indicate the PM peak traffic hours operating at this level and then all other times are typically operating at a better LOS.

[7] See West Haven Transportation Capital Facilities Plan and Impact Fee Facilities Plan, 2025 p.13

# SECTION IV: EXISTING FACILITIES INVENTORY

## EXCESS CAPACITY & BUY-IN

The City has determined that transportation impact fees are necessary to finance system improvements for trips generated by new development activity. Additionally, the City has determined that a buy-in component is necessary for the roadways that have sufficient capacity to accommodate new development activity while maintaining the existing level of service.

## EXISTING TRANSPORTATION SYSTEM BUY-IN

The determination of a buy-in component related to existing roadways is based on a capacity utilization analysis of existing roadways. According to the analysis shown in **Table 4.1**, approximately 16.4 percent of the existing system roadways will be used by new demand in the IFFP planning horizon. This analysis excludes State or County owned road facilities, as well as project improvements (neighborhood roadways).

TABLE: 4.1: ALLOCATION OF BUY-IN COMPONENT

| ROADWAY | 2023 AADT | EXISTING LOS D CAPACITY | EXISTING EXCESS CAPACITY | LINK LENGTH (FEET) | LENGTH AS % OF TOTAL | 2033 AADT | NEW GROWTH | CAPACITY USED | % OF ROAD CAPACITY |
|---|---|---|---|---|---|---|---|---|---|
| 4800 South | 12,000 | 11,500 | - | 5,280 | 4.9% | 13,000 | 1,000 | - | 0.0% |
| 3600 South | 2,700 | 10,500 | 7,800 | 5,270 | 4.9% | 3,900 | 1,200 | 1,200 | 11.4% |
| 3600 South | 2,700 | 10,500 | 7,800 | 1,415 | 1.3% | 3,900 | 1,200 | 1,200 | 11.4% |
| Connector 1800/2100 | - | | | | 0.0% | 10,500 | 10,500 | - | 0.0% |
| 3300 South | 1,700 | 10,500 | 8,800 | 10,550 | 9.8% | 4,400 | 2,700 | 2,700 | 25.7% |
| 3300 South | 1,300 | 11,500 | 10,200 | | 0.0% | 9,700 | 8,400 | 8,400 | 73.0% |
| 3300 South | 1,300 | 11,500 | 10,200 | 9,580 | 8.9% | 2,700 | 1,400 | 1,400 | 12.2% |
| 2900 South | - | 10,500 | | 3,450 | 3.2% | 0 | - | - | 0.0% |
| 2550 South | 6,200 | 11,500 | 5,300 | 3,450 | 3.2% | 9,100 | 2,900 | 2,900 | 25.2% |
| 2550 South | 6,200 | 11,500 | 5,300 | 5,260 | 4.9% | 9,100 | 2,900 | 2,900 | 25.2% |
| 2200 South | - | 10,500 | | 5,250 | 4.9% | 0 | - | - | 0.0% |
| Connector 3300/3600 | - | | | | 0.0% | 12,000 | 12,000 | - | 0.0% |
| Wilson Lane | - | 10,500 | | | 0.0% | 0 | - | - | 0.0% |
| 1800 South | 3,500 | 10,500 | 7,000 | | 0.0% | 5,300 | 1,800 | 1,800 | 17.1% |
| 1800 South | 3,500 | 10,500 | 7,000 | | 0.0% | 12,300 | 8,800 | 7,000 | 66.7% |
| 1800 South | 3,500 | 10,500 | 7,000 | 5,200 | 4.8% | 4,300 | 800 | 800 | 7.6% |
| 5100 West | 1,900 | 10,500 | 8,600 | 10,900 | 10.1% | 2,400 | 500 | 500 | 4.8% |
| 4300 West | 2,000 | 10,500 | 8,500 | 5,300 | 4.9% | 4,000 | 2,000 | 2,000 | 19.0% |

| ROADWAY | 2023 AADT | EXISTING LOS D CAPACITY | EXISTING EXCESS CAPACITY | LINK LENGTH (FEET) | LENGTH AS % OF TOTAL | 2033 AADT | NEW GROWTH | CAPACITY USED | % OF ROAD CAPACITY |
|---|---|---|---|---|---|---|---|---|---|
| 3500 West | 5,300 | 13,000 | 7,700 | | 0.0% | 6,900 | 1,600 | 1,600 | 12.3% |
| 3500 West | 3,100 | 13,000 | 9,900 | 5,300 | 4.9% | 4,300 | 1,200 | 1,200 | 9.2% |
| 2700 West | 1,900 | 10,500 | 8,600 | 14,740 | 13.7% | 5,000 | 3,100 | 3,100 | 29.5% |
| 1100 West | 4,100 | 10,500 | 6,400 | 3,340 | 3.1% | 8,100 | 4,000 | 4,000 | 38.1% |
| **Total** | | **230,500** | **126,100** | **94,285** | **100.0%** | | | | |
| **Weighted% to Growth** | | | | | | | | | **15.8%** |

Source: CFP p. 19

City records indicate that the transportation system's actual costs were $53M to construct. However, approximately $17.166M is considered system improvements (eligible system value), with the remaining considered project improvements and therefore removed from the analysis. The eligible system value is used to determine the appropriate buy-in fee. New development activity will benefit from the existing roadways that are system improvements that have been constructed within the service area, and development activities proportionate share for buy-in to the existing system improvements is $2.7M ($17.166M × .158).

# SECTION V: PUBLIC FACILITY ANALYSIS

## FUTURE CAPITAL PROJECTS

The IFFP has identified the growth-related projects needed within the next 10 years. Capital projects related to curing existing deficiencies were not included in the calculation of the impact fees. Total future projects applicable to new development are shown below. The percentage of costs related to this analysis is based on the 10 year demand as a percent of capacity added from the 2033 LOS D capacity. **Table 5.1** illustrates the estimated cost of future roadway system improvements within the Service Area, as identified in the IFFP. **Table 5.2** details the future cost of intersection improvements in the IFFP. Similar to roadway improvements, 42.8 percent is related to demand in the planning horizon (See **Table 5.1**).

**TABLE 5.1: SUMMARY OF FUTURE ROADWAY SYSTEM IMPROVEMENTS WITHIN IFFP PLANNING HORIZON**

| Project # | Roadway | From | To | Cost Estimate | WACOG Funding | Estimated City | Estimated Date | Const. Yr. Cost | % to IFA | Cost to IFA |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3300 South | 4700 West | 5100 West | $2,615,457 | $1,999,000 | $616,457 | 2026 | $653,999 | 100.0% | $653,999 |
| 2 | 5100 West | 3150 South | 3800 South | $3,787,721 | $2,799,000 | $988,721 | 2026 | $1,048,934 | 50.0% | $524,467 |
| 3 | 2700 West | 2050 South | 2550 South | $3,550,000 | $1,892,000 | $1,658,000 | 2025 | $1,707,740 | 100.0% | $1,707,740 |
| 4 | Connector | 1800 South | 2100 South | $5,785,410 | $4,804,000 | $981,410 | 2026 | $1,041,178 | 39.3% | $409,644 |
| 5 | 1800 South | 2700 West | 2300 West | $5,513,418 | $3,479,360 | $2,034,058 | 2028 | $2,289,350 | 44.0% | $1,007,314 |
| 6 | 3600 South | 2700 West | Midland Drive | $1,223,056 | $0 | $1,223,056 | 2029 | $1,417,857 | 6.0% | $85,071 |
| 7 | Connector | 3300 South | 3600 South | $12,624,360 | $2,800,000 | $9,824,360 | 2027 | $10,735,343 | 34.4% | $3,695,774 |
| | | | **Total** | **$35,099,422** | **$17,773,360** | **$17,326,062** | | **$18,894,402** | **42.8%** | **$8,084,010** |

**TABLE 5.2: SUMMARY OF FUTURE SIGNALIZATION SYSTEM IMPROVEMENTS WITHIN IFFP PLANNING HORIZON**

| Project # | Intersection | | Cost Estimate | WACOG Funding | Estimated Date | Const. Yr. Cost | % to IFA | Cost to IFA |
|---|---|---|---|---|---|---|---|---|
| 8 (part of #4) | 1800 South | Connector Road | $500,000 | $0 | 2026 | $530,450 | 42.8% | $226,954 |
| 9 | 4000 South | 5100 West | $1,000,000 | $900,000 | 2026 | $106,090 | 42.8% | $45,391 |
| 10 | 4000 South | 4300 West | $1,000,000 | $900,000 | 2026 | $106,090 | 42.8% | $45,391 |
| 11 | 1800 South | 1900 West | $2,248,300 | $1,848,300 | 2027 | $437,091 | 42.8% | $187,010 |
| 12 (part of #7) | 3300 South | Connector Road | $500,000 | $0 | 2029 | $579,637 | 42.8% | $247,999 |
| 13 | 2700 West | 3600 South | $500,000 | $0 | 2029 | $579,637 | 42.8% | $247,999 |
| | | **Total** | **$5,748,300** | **$3,648,300** | | **$2,338,995** | | **$1,000,744** |

Source: Appendix C Table 2: 2028/2033

## SYSTEM VS. PROJECT IMPROVEMENTS

System improvements are defined as existing and future public facilities designed to provide services to service areas within the community at large.[8] Project improvements are improvements and facilities that are planned and designed to provide service for a specific development (resulting from a development

[8] 11-36a-102(21)

activity) and considered necessary for the use and convenience of the occupants or users of that development.[9] The Impact Fee Analysis may only include the costs of impacts on system improvements related to new growth within the proportionate share analysis.

## FUNDING OF FUTURE FACILITIES

The IFFP must also include a consideration of all revenue sources, including impact fees and developer dedication of system improvements, which may be used to finance system improvements.[10] In conjunction with this revenue analysis, there must be a determination that impact fees are necessary to maintain the existing level of service. [11]

### GENERAL FUND REVENUES

In considering the funding of future facilities, the IFFP has identified the portion of each project that is intended to be funded by the City, as well as funding sources from other government agencies. It is anticipated that the capital projects that will be constructed to cure the existing system deficiencies or the portion that is not attributed to development activity within this IFA planning horizon will be funded through General Fund revenues. Impact fee revenues will be a continual source of revenue to fund growth related improvements. The City does not currently assess property tax. User charges may also be a funding source. For example, some entities in Utah employ a Transportation Utility Fee (TUF) to fund road infrastructure. Often this fee is used to help with repair an replacement of road infrastructure. The City does not currently assess a TUF.

### GRANTS AND DONATIONS

The City does not anticipate any donations from new development for future system-wide improvements related to transportation facilities. Any donor in the future will be entitled to a reimbursement for the negotiated value of system improvements funded through impact fees if donations are made by new development activity. The impact fees should also be adjusted if additional grant monies are received. **Tables 5.1** and **5.2** identify existing grant funds provided by the Weber Area Council of Government (WACOG) grant funds and are removed from this analysis.

### IMPACT FEE REVENUES

Impact fees are an ideal mechanism for funding growth-related infrastructure. Impact fees are currently charged to ensure that new growth pays its proportionate share of the costs for the development of public facilities. Impact fee revenues can also be attributed to the future expansion of public infrastructure if the revenues are used to maintain an existing LOS. Increases to an existing LOS cannot be funded with impact fee revenues. An impact fee analysis is required to accurately assess the true impact of a particular user upon the City facilities to mitigate the impact of new development on public facilities. The City has determined that assessing impact fees on development activities is necessary to maintain the existing LOS in the future.

### DEBT FINANCING

In the event the City has not amassed sufficient impact fees in the future to pay for the construction of time sensitive or urgent public facilities needed to accommodate new growth, the City must look to revenue sources other than impact fees for funding. The Impact Fees Act allows for the costs related to the financing of future public facilities to be legally included in the impact fee. This allows the City to finance and quickly construct infrastructure for new development

[9] 11-36a-102(14)
[10] 11-36a-302(2)
[11] 11-36a-302(3)

and reimburse itself later from impact fee revenues for the costs of issuing debt (i.e., interest costs). <u>Future debt has not been considered in the calculation of the transportation impact fee.</u> If bonding is used in the future, this cost associated with issuance and debt service can be included in the analysis.

## PROPOSED CREDITS OWED TO DEVELOPMENT

The Impact Fees Act requires a local political subdivision or private entity to ensure that the impact fee enactment allows a developer, including a school district or a charter school, to receive a credit against or proportionate reimbursement of an impact fee if the developer: (a) dedicates land for a system improvement; (b) builds and dedicates some or all of a system improvement; or (c) dedicates a public facility that the local political subdivision or private entity and the developer agree will reduce the need for a system improvement.[12]

The facilities must be considered system improvements or be dedicated to the public and offset the need for an improvement identified in the IFFP.

## EQUITY OF IMPACT FEES

Impact fees are intended to recover the costs of system improvements that relate to future growth. The impact fee calculations are structured for impact fees to fund the cost of public facility improvements that are roughly proportionate and reasonably related to the service demands and needs for new development activity through a proportionate share analysis as presented in the impact fee analysis. Even so, there may be years that impact fee revenues cannot cover the annual growth-related expenses. In those years, other revenues such as general fund revenues will be used to make up any annual deficits. Any borrowed funds or General Fund revenues used to make up annual deficits will be repaid in their entirety through impact fees.

## NECESSITY OF IMPACT FEES

An entity may only impose impact fees on development activity if the entity's plan for financing system improvements establishes that impact fees are necessary to perpetuate the existing LOS D into the future. This analysis has identified the improvements to public facilities and the funding mechanisms to complete the suggested improvements. Impact fees are identified as a necessary funding mechanism to help offset the costs of new capital improvements related to new growth.

[12] 11-36a-402(2)

# SECTION VI: TRANSPORTATION IMPACT FEE CALCULATION

The transportation impact fees calculated in this analysis will be assessed to the Service Area as defined in **Section III**. The impact fee calculations include development activities' proportionate share of the costs of construction of existing and future transportation system improvements.

## PROPOSED TRANSPORTATION IMPACT FEE

The proportionate share analysis determines the cost assignable to new development based on the existing and future system improvements and the new growth served by the proposed projects. Additionally, as allowed by UCA 11-36a-305(1), professional expenses associated with developing the IFFP and IFA are included. The impact fee per trip is **$298.38** as shown in **Table 6.1** below.

TABLE 6.1: PROPORTIONATE SHARE ANALYSIS

| | TOTAL COST | ALLOCATION TO IFFP | COST TO IFFP | TRIPS SERVED | COST PER TRIP* |
|---|---|---|---|---|---|
| Existing Facilities | $17,166,110 | 15.8% | $2,712,245 | 39,695 | $68.33 |
| Future Roadways | $18,894,402 | 42.8% | $8,084,010 | 39,695 | $203.65 |
| Future Intersections | $2,338,995 | 42.8% | $1,000,744 | 39,695 | $25.21 |
| Professional Expense (IFFP/IFA) | $47,150 | 100.0% | $47,150 | 39,695 | $1.19 |
| | | | | **Total** | **$298.38** |

* A vehicle trip represents average daily trip with origin or destination (entering or exiting) within the Service Area. The Trips Served represent the total increase in average daily trips within the IFFP planning horizon that occur within the Service Area.

## IMPACT FEE SUMMARY BY LAND USE TYPE

The impact fee by land use type is, is illustrated in **Table 6.2**.

TABLE 6.2: IMPACT FEE SUMMARY BY LAND USE TYPE

| LAND USE CATEGORY | ITE CODE | DEMAND UNIT* | AVERAGE DAILY TRIPS | PASS BY REDUCTION | PASS BY TRIPS REDUCED | TOTAL TRIPS | PROPOSED IMPACT FEE |
|---|---|---|---|---|---|---|---|
| **Cost per Trip** | | | | | | | **$298.38** |
| Single Family Residential | 210 | Unit | 9.43 | 0% | - | 9.43 | $2,814 |
| Multi Family Low Rise** | 220 | Unit | 6.74 | 0% | - | 6.74 | $2,011 |
| Multi Family Mid Rise*** | 221 | Unit | 4.54 | 0% | - | 4.54 | $1,355 |
| Senior Adult Housing-Detached | 251 | Unit | 4.31 | 0% | - | 4.31 | $1,286 |
| Senior Adult Housing-Attached | 252 | Unit | 3.24 | 0% | - | 3.24 | $967 |
| Assisted Living | 254 | Beds | 2.60 | 0% | - | 2.60 | $776 |
| Hotel | 310 | Rooms | 7.99 | 0% | - | 7.99 | $2,384 |
| Light Industrial | 110 | KSF | 4.08 | 0% | - | 4.08 | $1,217 |
| Industrial Park | 130 | KSF | 3.37 | 0% | - | 3.37 | $1,006 |
| Mini Warehouse | 151 | KSF | 1.45 | 0% | - | 1.45 | $433 |
| Elementary School | 520 | Students | 2.27 | 0% | - | 2.27 | $677 |
| Middle/Jr. High School | 522 | Students | 2.10 | 0% | - | 2.10 | $627 |
| High School | 525 | Students | 1.94 | 0% | - | 1.94 | $579 |
| Daycare Center | 565 | KSF | 47.62 | 0% | - | 47.62 | $14,209 |
| Nursing Home | 620 | Beds | 3.06 | 0% | - | 3.06 | $913 |
| Clinic | 630 | KSF | 37.60 | 0% | - | 37.60 | $11,219 |
| Church | 560 | KSF | 7.60 | 0% | - | 7.60 | $2,268 |
| General Office | 710 | KSF | 10.84 | 0% | - | 10.84 | $3,234 |

| LAND USE CATEGORY | ITE CODE | DEMAND UNIT* | AVERAGE DAILY TRIPS | PASS BY REDUCTION | PASS BY TRIPS REDUCED | TOTAL TRIPS | PROPOSED IMPACT FEE |
|---|---|---|---|---|---|---|---|
| Medical Dental Office | 720 | KSF | 36.00 | 0% | - | 36.00 | $10,742 |
| Free-Standing Discount Superstore | 813 | KSF | 50.52 | 28% | 14.15 | 36.37 | $10,853 |
| Hardware/Paint Store | 816 | KSF | 8.07 | 26% | 2.10 | 5.97 | $1,782 |
| Shopping Center/General Commercial | 820 | KSF | 37.01 | 34% | 12.58 | 24.43 | $7,288 |
| New Car Sales | 841 | KSF | 27.84 | 0% | - | 27.84 | $8,307 |
| Tire Store | 848 | KSF | 27.69 | 0% | - | 27.69 | $8,262 |
| Supermarket | 850 | KSF | 93.84 | 36% | 33.78 | 60.06 | $17,920 |
| Convenience Market w/ Gas Pumps | 853 | KSF | 624.20 | 66% | 411.97 | 212.23 | $63,324 |
| Discount Club | 857 | KSF | 42.26 | 23% | 9.72 | 32.54 | $9,709 |
| Home Improvement Superstore | 862 | KSF | 30.74 | 48% | 14.76 | 15.98 | $4,770 |
| Department Store | 875 | KSF | 22.88 | 0% | - | 22.88 | $6,827 |
| Pharmacy/Drugstore w/ Drive Thru | 881 | KSF | 108.40 | 49% | 53.12 | 55.28 | $16,496 |
| Drive-In Bank | 912 | KSF | 100.35 | 47% | 47.16 | 53.19 | $15,869 |
| Quality Restaurant | 931 | KSF | 83.84 | 44% | 36.89 | 46.95 | $14,009 |
| High Turnover/Sit Down Restaurant | 932 | KSF | 107.20 | 43% | 46.10 | 61.10 | $18,232 |
| Fast Food with Drive Thru | 934 | KSF | 467.48 | 50% | 233.74 | 233.74 | $69,743 |
| Quick Lube | 941 | KSF | 69.57 | 0% | - | 69.57 | $20,758 |
| Self-Service Car Wash | 947 | Wash Stalls | 108.00 | 0% | - | 108.00 | $32,225 |

Source for trip statistics is the Institute of Traffic Engineers (ITE) Manual, 11th Edition. Adjustment factors can be found using the "List of Land Uses with Vehicle Pass-By Rates and Data." Land use categories indicated are not all inclusive. Refer to ITE manual for appropriate category and adjustment factors if not found in this report. For non-standard uses, the non-standard formula can be used. Each land use within proposed development will be evaluated.

* KSF: 1,000 Square Feet

** Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

*** Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

## NON-STANDARD IMPACT FEES

The City reserves the right under the Impact Fees Act to assess an adjusted fee to fairly assess the impact that a non-standard land use will have upon public facilities.[13] This adjustment could result in a different impact fee if the City determines that a particular user may create a different impact than what is standard for its land use. The City may also decrease the impact fee if the developer can provide documentation, evidence, or other credible analysis that the proposed impact will be lower than what is proposed in this analysis.

#### FORMULA FOR NON-STANDARD TRANSPORTATION IMPACT FEES:

**Total Demand Units x Estimate Trips per Unit x Adjustment Factors x $298.38 = Impact Fee per Unit**

The formula for a non-standard impact fee should be included in the impact fee enactment (by resolution or ordinance). In addition, the impact fee enactment should contain the following elements:

- A provision establishing one or more service areas within which the local political subdivision or private entity calculates and imposes impact fees for various land use categories.
- A schedule of impact fees for each type of development activity that specifies the amount of the impact fee to be imposed for each type of system improvement or the formula that the local political subdivision or private entity will use to calculate each impact fee.
- A provision authorizing the local political subdivision or private entity to adjust the standard impact fee at the time the fee is charged to:

[13] 11-36a-402(1)(c)

    - Respond to unusual circumstances in specific cases or a request for a prompt and individualized impact fee review for the development activity of the state, a school district, or a charter school and an offset or credit for a public facility for which an impact fee has been or will be collected.
    - Ensure that the impact fees are imposed fairly.
- A provision governing calculation of the amount of the impact fee to be imposed on a particular development that permits adjustment of the amount of the impact fee based upon studies and data submitted by the developer.
- A provision that allows a developer, including a school district or a charter school, to receive a credit against or proportionate reimbursement of an impact fee if the developer:
    - Dedicates land for a system improvement.
    - Builds and dedicates some or all of a system improvement.
    - Dedicates a public facility that the local political subdivision or private entity and the developer agree will reduce the need for a system improvement.
- A provision that requires a credit against impact fees for any dedication of land for, improvement to, or new construction of, any system improvements provided by the developer if the facilities:
    - Are system improvements; or,
    - Dedicated to the public and offset the need for an identified system improvement.

Other provisions of the impact fee enactment include exemption of fees for development activity attributable to low-income housing, the state, a school district, or a charter school. Exemptions may also include other development activities with a broad public purpose. If an exemption is provided, the entity should establish one or more sources of funds other than impact fees to pay for that development activity. The impact fee exemption for development activity attributable to a school district or charter school should be applied equally to either scenario.

## CONSIDERATION OF ALL REVENUE SOURCES

The Impact Fees Act requires this document to consider all revenue sources to finance the impacts on system improvements, including: (a) grants; (b) bonds; (c) interfund loans; (d) impact fees; and (e) anticipated or accepted dedications of system improvements. See **Section V** for further discussion regarding the consideration of revenue sources.

## EXPENDITURE OF IMPACT FEES

The Impact Fee Act requires that impact fees should be spent or encumbered within six years after each impact fee is paid, indicating that there is a rolling timeline when identifying the impacts placed on public facilities by development activity. This plan addresses a 10-year planning horizon in order to account for the rolling timeline, while ensuring that the assumptions included in the analysis are relevant to new development activity, and accounting for the need for entities to update the impact fee analysis periodically. Impact fees collected in the IFFP planning horizon should be spent only on those projects outlined in the IFFP as growth related costs to maintain the LOS.

## GROWTH-DRIVEN EXTRAORDINARY COSTS

The City does not anticipate any extraordinary costs necessary to provide services to future development.

## SUMMARY OF TIME PRICE DIFFERENTIAL

The Impact Fees Act allows for the inclusion of a time price differential to ensure a fair comparison of amounts paid at different times. The LOS for this analysis is based on the original value of the transportation system when determining a buy-in component, while addressing the current and future cost when calculating the portion of the fee attributed to new construction.

## IMPACT FEE ENACTMENT

According to Utah Code 11-36A Section 402, the impact fee enactment should contain the following elements:

- A provision establishing one or more service areas within which the local political subdivision or private entity calculates and imposes impact fees for various land use categories.
- A schedule of impact fees for each type of development activity that specifies the amount of the impact fee to be imposed for each type of system improvement or the formula that the local political subdivision or private entity will use to calculate each impact fee.
- A provision authorizing the local political subdivision or private entity to adjust the standard impact fee at the time the fee is charged to:
    - Respond to unusual circumstances in specific cases or a request for a prompt and individualized impact fee review for the development activity of the state, a school district, or a charter school and an offset or credit for a public facility for which an impact fee has been or will be collected.
    - Ensure that the impact fees are imposed fairly.
- A provision governing calculation of the amount of the impact fee to be imposed on a particular development that permits adjustment of the amount of the impact fee based upon studies and data submitted by the developer.
- A provision that allows a developer, including a school district or a charter school, to receive a credit against or proportionate reimbursement of an impact fee if the developer:
    - Dedicates land for a system improvement.
    - Builds and dedicates some or all of a system improvement.
    - Dedicates a public facility that the local political subdivision or private entity and the developer agree will reduce the need for a system improvement.
- A provision that requires a credit against impact fees for any dedication of land for, improvement to, or new construction of, any system improvements provided by the developer if the facilities:
    - Are system improvements; or,
    - Dedicated to the public and offset the need for an identified system improvement.

Other provisions of the impact fee enactment include exemption of fees for development activity attributable to low-income housing, the State, a school district, or a charter school. Exemptions may also include other development activities with a broad public purpose. If an exemption is provided, the entity should establish one or more sources of funds other than impact fees to pay for that development activity. The impact fee exemption for development activity attributable to a school district or charter school should be applied equally to either scenario.

# APPENDIX A: WEST HAVEN TRIP GENERATION ESTIMATE MEMO

March 18, 2024

TRANSPORTATION ENGINEERING

RE: West Haven Trip Generation Estimate

The purpose of this memo is to determine the trips generated within West Haven City between now and 2033 for use in the Impact Fee Analysis. The traffic growth in the city was based on the growth from the existing AADT compared to 2050 WFRC long range forecasts. This yielded an average growth of 2.3% per year. Population estimates indicate that the city will experience higher growth over the next 10 years and then taper off. It was assumed that 50% of the growth would occur by 2033 (10 year horizon). This yielded a growth rate of over the next 10 years of 4.09%. This is a 10 year growth factor of 1.49.

Typically the number of units and the ITE trip generation manual would be used to generate trips from residential homes. However, the number of single family vs multi-family units is unknown along with the density and projected densities of commercial or industrial related land uses. Therefore a different methodology was implemented. Trips per Utah household were calculated based on the Utah Travel Study from January 2013 and this methodology was applied to West Haven demographics specifically. Table 1 shows the estimated trips per household and person for Wasatch Front and West Haven. The existing and future projections for population and homes are shown in Table 2.

**Table 1: Trips Per Household and Person**

| Wasatch Front | | West Haven | |
|---|---|---|---|
| Trips per Unit Table 1.9 | 11.23 | Trips per Unit based on 3.75 People per Household Table 1.11 | 13.57 |
| People Per Household Calculated | 3.09 | People Per Household Assumed | 3.75 |
| Trips per Person Table 1.9 | 3.63 | Trips per Person Calculated | 3.62 |

**Table 2: Existing and Future Homes and Populations Projections**

| | 2018 | 2022 | 2030 | 2033 | 2040 |
|---|---|---|---|---|---|
| Homes | 4129 | 5972 | 6957 | **8898**<br>7589 | 9065 |
| Population | 15155 | 22395 | 26087 | **33369**<br>28459 | 33995 |
| Household Size | 3.67 | 3.75 | 3.75 | 3.75 | 3.75 |
| Legend | | | | | |
| Calculated Based on WH General Plan | datacommons.org | Calculated | West Haven City General Plan | 1.49 growth factor for Traffic in 2033 | Assumed |

P.O. Box 521651 Salt Lake City, UT 84152
(801) 949-0348
atrans@comcast.net

There are a projected 2,926 residential units proposed between 2022 and 2033. The trips per household rate for West Haven Is 13.57 trips. New trips generated by residential units between 2022 and 2033 is 39,695 trips. The residential trips account for all types of trips within the city, i.e. home-based work, home-based retail, non-home-based work etc. A complete list of trip types is available in table 1.6 of the Utah Travel Study. The total trips projected to be generated by 2033 is shown in Table 3.

**Table 3: Total Trips**

| | Trips in 2022 | Trips in 2033 |
|---|---|---|
| Total Trips | 81010 | 120705 |
| New Trips | | 39695 |

The current IFA assumes 27,093 new trips from 2018-2029 and $6,104,499 in improvements yielding an impact fee of $225.32. The new proposed costs are $17,605,483 (after other funding sources are considered as provided by Gardner Engineering) divided by 39,695 new trips yielding an impact fee of $443.52. This is shown in Table 4.

**Table 4: Impact Fee Comparison**

| | 2018 – Current IFA | 2023 – Proposed IFA |
|---|---|---|
| New Trips over 10 Years | 27,093 | 39,695 |
| Improvement Cost | $6,104,499 | $17,605,483[a] |
| Cost per Trip | $225.32 | $443.52 |

a – the total costs for improvements after funding sources are subtracted per Gardner Engineering

Note: Calculation was done previously using an alternate method, calculating trips based on ITE for residential and commercial uses. The 2018 calculations are shown in Table 5. If land use information is provided, this methodology can be implemented.

**Table 5: Existing IFA Trip Calculations**

| LAND USE | 2018 | 2024 | 2029 | 2040 |
|---|---|---|---|---|
| Residential | 37,741 | 47,755 | 58,102 | 89,447 |
| Commercial | 171,385 | 186,108 | 198,565 | 225,368 |
| Industrial | 6,470 | 6,673 | 6,875 | 7,246 |
| Raw Trip Gen Total | 215,596 | 240,536 | 263,542 | 322,061 |
| 34% Commercial Reduction for Pass-by | (58,271) | (63,277) | (67,512) | (76,625) |
| 30% Reduction for Double Count | (47,198) | (53,178) | (58,809) | (73,631) |
| Projected Total City Trips | 110,128 | 124,081 | 137,221 | 171,805 |
| **New Trips** | | **13,953** | **27,093** | **61,677** |

Table 3.1 of existing IFA

**Summary:**
**39,695 new trips are projected between 2022 and 2033 based on the projected West Haven population change and the Utah Travel Study.**

Please let me know if you have any questions.

Sincerely,
**A-Trans Engineering**

Joseph Perrin, Jr.

Joseph Perrin, PhD, PE, PTOE
Principal

### 5.1.1 Trip Generation

Smaller households, and older people, tend to travel less. This trend is easily visible in the 2012 data, and when comparing data for Dixie to the other regions. Washington County is home to the largest segment of retirees in the State, and has the smallest average household size, and therefore work trip rates and overall trip rates are lower than the rest of the State.

In addition to demographic shifts that would lead to reduced travel, it is important to note that the 2012 survey data processing for this summary excluded external trips (outside the MPO boundary).

Table 1.10 presents a comparison of trip productions per household (and per person) by trip purpose. In this comparison, and others below, WFRC and MAG are combined since their model is the same. The UDOT numbers in this table and others below represent data for the remainder of the State not covered by one of the MPO models (i.e. every county except Cache, Weber, Davis, Salt Lake, Utah and Washington).

It is interesting to consider the way that demographics affect travel behavior. The following series of tables present trip generation rates for different types of household and people. The patterns are generally intuitive, and should be considered when deciding how to incorporate demographic data into demand modeling. Some interesting aspects of the data summary include the stark differences in trip rates by the type of household (life cycle), the importance of income on overall trip making, and how trip-making seems to increase and then decrease with age.

**Table 1.9: Daily Trip Production Rates**

| MPO | WASATCH FRONT 2012 | CACHE 2012 | DIXIE 2012 | UDOT 2012 | STATEWIDE 2012 |
|---|---|---|---|---|---|
| Trips per HH | 11.23 | 11.88 | 10.90 | 11.34 | 11.26 |
| Trips per Person | 3.63 | 3.77 | 3.77 | 3.76 | 3.67 |

**Table 1.10: 2012 Trip Productions per Household**

| | TRIPS/HOUSEHOLD | | | | TRIPS/PERSON | | | |
|---|---|---|---|---|---|---|---|---|
| REGION/ GEOGRAPHY | HBW | HBO | NHB | TOTAL | HBW | HBO | NHB | TOTAL |
| Wasatch Front 2012 | 1.69 | 6.53 | 3.01 | 11.2 | 0.55 | 2.11 | 0.97 | 3.63 |
| Cache 2012 | 1.84 | 6.55 | 3.49 | 11.9 | 0.58 | 2.08 | 1.11 | 3.77 |
| Dixie 2012 | 1.30 | 6.34 | 3.27 | 10.9 | 0.45 | 2.19 | 1.13 | 3.77 |
| UDOT 2012 | 1.63 | 6.23 | 3.48 | 11.3 | 0.54 | 2.07 | 1.16 | 3.76 |

**Table 1.11: 2012 Daily Trip Rates by Household Size**

| HOUSEHOLD SIZE | WASATCH FRONT | CACHE | DIXIE | UDOT | STATEWIDE |
|---|---|---|---|---|---|
| 1 Person | 4.08 | 3.52 | 3.99 | 4.18 | 4.07 |
| 2 Person | 7.60 | 8.32 | 7.47 | 7.57 | 7.62 |
| 3 Person | 10.73 | 10.56 | 11.03 | 10.08 | 10.63 |
| 4 Person | 14.51 | 14.69 | 13.18 | 14.23 | 14.42 |
| 5 Person | 17.96 | 19.62 | 19.95 | 20.98 | 18.59 |
| 6+ Person | 22.53 | 23.93 | 25.92 | 24.89 | 23.10 |

## Exhibit F – Storm Water Impact Fee Analysis

**Zions Public Finance, Inc**

for

**West Haven City**

# Amended Storm Water Impact Fee Analysis

**September 2025**

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# Executive Summary of Impact Fee Analysis

## Background Information

West Haven City (the "City") retained Gardner Engineering to prepare an Revised Impact Fee Facilities Plan (IFFP) for storm water, and retained Zions Public Finance, Inc. to prepare this Revised Impact Fee Analysis (IFA) for the calculation of appropriate storm water impact fees. This IFA relies on the information provided in the Revised IFFP regarding current system capacity and future stormwater Public Facility needs, cost, and timing.

*Service Areas*. There is one service area in West Haven for the purpose of calculating storm water impact fees, which includes the City's incorporated limits and as amended by annexation.

*Level of Service*. The IFFP identifies the existing level of service as follows.

TABLE 1: EXISTING SERVICE LEVELS

| Description | Standard |
|---|---|
| Allowable Runoff | Development within the City is required to detain storm water with a release rate of 0.2 cfs/acre. This release rate is intended to maintain predevelpoment runoff rates. |
| Detention | Volume required to hold the 100-year design storm with at least 1 ft of freeboard. Release rate per allowable runoff. |
| Storm Drain Conveyance | Pipes shall be designed to carry the minor 10-year storm. The major 100-year storm is planned to be conveyed in detention ponds, pipes, and within road right of ways. Minimum pipe size is 15" RCP with adequate slope to carry necessary flows. |

*Source: West Haven City Storm Drain Impact Fee Facilities Plan Amended September 2025*

The proposed level of service during this impact fee collection period is the same as the existing level of service.

*Growth Projections.*

The City is projected to grow by an average of 100 acres per year, or 37.81 impervious acres per year, based on historic development data gathered from the Weber County Assessor and existing development impervious areas sampled throughout the City. See *Appendix E- Development Projection and Impervious Area Estimates* in the Revised IFFP for additional information on this projection.

TABLE 2: PROJECTED GROWTH IN DEVELOPED ACRES

| Year | Developed Acres | Impervious Acres |
|---|---|---|
| 2022 | 4,888 | 1,848 |
| 2023 | 4,988 | 1,886 |
| 2024 | 5,088 | 1,924 |
| 2025 | 5,188 | 1,962 |
| 2026 | 5,288 | 1,999 |

| Year | Developed Acres | Impervious Acres |
|---|---|---|
| 2027 | 5,388 | 2,037 |
| 2028 | 5,488 | 2,075 |

*Source: West Haven Storm Water Impact Fee Facilities Plan, September 2022; Revised IFFP dated September 2025, Table 1*

## Impact on Consumption of Existing Capacity

*Utah Code 11-36a-304(1)(a)*

The IFFP does not identify any existing excess capacity, for which new development activities would benefit or to which it would "Buy-In".[1]

## Impact on System Improvements by Anticipated New Development

*Utah Code 11-36a-304(1)(b)*

The City has determined that, to maintain its current level of stormwater service, additional stormwater improvements will be required at a total cost of $4,518,540. These improvements are listed in detail in the IFFP; however, the improvements listed also contain improvements necessary to cure existing deficiencies. These deficiencies cannot be, and are not, included in the calculation of impact fees. The cost of new system improvements necessitated by new development activity and eligible for impact fees within the impact fee collection period is $2,137,857.

## Proportionate Share Analysis and Impact Fee Calculation

*Utah Code 11-36a-304(1)(d) and (e) and (2)(a) and (b)*

The impact fee calculation includes costs for the construction of new system improvements, consultant costs in preparing the IFFP and IFA, and credits for projects that will cure existing deficiencies and thereby benefit new development activity. The maximum allowable impact fee is $9,327.39 per impervious acre, which equates to $0.21 per impervious square foot.[2]

TABLE 3: PER IMPERVIOUS ACRE IMPACT FEE CALCULATION

| Summary | |
|---|---|
| New Construction | $9,423.68 |
| Consultant Costs | $158.69 |
| Impact Fee Fund Balance | $0.00 |
| Credits for Deficiencies | ($254.98) |
| **Max Fee per Impervious Acre** | **$9,327.39** |

All single-family homes within a given range of each lot size will be charged the maximum impact fee for that category.

[1] West Haven City Storm Water IFFP, Amended September 2025, p. 11

[2] This number is rounded from $0.2141

TABLE 4: MAXIMUM IMPACT FEE SCHEDULE BY SINGLE FAMILY LOT SIZE

| Single-Family Lot Categories | Average Impervious SF* | Average Impervious % of Category | Impact Fee for Lot Category |
|---|---|---|---|
| ¼ acre and Less | 4,281 | 39.3% | $916.68 |
| Greater than ¼ acre up to ½ acre | 6,108 | 28.0% | $1,307.89 |
| Greater than ½ acre up to 1 acre | 7,626 | 17.5% | $1,632.94 |
| Greater than 1 acre up to2 acres | 8,962 | 10.3% | $1,919.01 |
| Greater than 2 acres up to 3 acres | 9,563 | 7.3% | $2,047.70 |
| Greater than 3 acres up to4 acres | 11,454 | 6.6% | $2,452.61 |
| Greater than 4 acres | 13,027 | | $2,789.44 |
| *Amended IFFP July 2025 | | | |

All other development including multi-family housing will be charged $0.21 per impervious square foot.

## Utah Code Legal Requirements

Utah law requires that cities prepare an Impact Fee Analysis (IFA) based on the information presented in the Impact Fee Facilities Plan (IFFP) before enacting an impact fee. Utah law also requires that cities give notice of their intent to prepare and adopt an IFA. This IFA follows all legal requirements as outlined below.

### Notice of Intent to Prepare Impact Fee Analysis

A local political subdivision must provide written notice of its intent to prepare an IFA before preparing the Analysis (Utah Code 11-36a-503(1)). This notice must be posted on the Utah Public Notice website. The City has complied with this noticing requirement for the IFA by posting notice.

### Preparation of Impact Fee Analysis

Utah Code requires that "each local political subdivision... intending to impose an impact fee shall prepare a written analysis of each impact fee" (Utah Code 11-36a-303).

Section 11-36a-304 of the Utah Code outlines the requirements of an impact fee analysis, which is required to identify the following:

(a) identify the anticipated impact on or consumption of any existing capacity of a public facility by the anticipated development activity;

(b) identify the anticipated impact on system improvements required by the anticipated development activity to maintain the established level of service for each public facility;

(c) demonstrate how anticipated impacts are reasonably related to the anticipated development activity;

(d) estimate the proportionate share of:

- (i) The costs for existing capacity that will be recouped (buy-in); and
- (ii) The costs of impacts on system improvement that are reasonably related to the new development activity; and

(e) based on the requirements of this chapter (in Utah Code), identify how the impact fee was calculated.

Further, in analyzing whether or not the proportionate share of the costs of public facilities is reasonably related to the new development activity, the local political subdivision or private entity, as the case may be, shall identify, if applicable:

(a) the cost of each existing public facility that has excess capacity to serve the anticipated development resulting from the new development activity;

(b) the cost of system improvements for each public facility;

(c) other than impact fees, the manner of financing for each public facility such as user charges, special assessments, bonded indebtedness, general taxes, or federal grants;

(d) the relative extent to which development activity will contribute to financing the excess capacity of and system improvements for each existing public facility, by means such as user charges, special assessments, or payment from the proceeds of general taxes;

(e) the relative extent to which development activity will contribute to the cost of existing public facilities and system improvements in the future;

(f) the extent to which the development activity is entitled to a credit against impact fees because the development activity will dedicate system improvements or public facilities that will offset the demand for system improvements, inside or outside the proposed development;

(g) extraordinary costs, if any in servicing the newly developed properties; and

(h) the time-price differential inherent in fair comparisons of amounts paid at different times.

## Calculating Impact Fees

Utah Code states that for purposes of calculating an impact fee, a local political subdivision or private entity may include:

(a) the construction contract price;

(b) the cost of acquiring land, improvements, materials, and fixtures;

(c) the cost for planning, surveying, and engineering fees for services provided for and directly related to the construction of the system improvements; and

(d) for political subdivision, debt service charges, if the political subdivision might use impact fees as a revenue stream to pay the principal and interest on bonds, notes, or other obligations issued to finance the costs of the system improvements.

Additionally, the Code states that each political subdivision or private entity shall base impact fee amounts on realistic estimates, and the assumptions underlying those estimates shall be disclosed in the impact fee analysis.

## Certification of Impact Fee Analysis

Utah Code states that an impact fee analysis shall include a written certification from the person or entity that prepares the impact fee facilities analysis. This certification is included as part of this Impact Fees Analysis.

## Impact Fee Enactment

Utah Code states that a local political subdivision or private entity wishing to impose impact fees shall pass an impact fee enactment in accordance with Section 11-36a-402. Additionally, an impact fee imposed by an impact fee enactment may not exceed the highest fee justified by the impact fee analysis. An impact fee enactment may not take effect until 90 days after the day on which the impact fee enactment is approved.

## Consumption of Existing Capacity, Impact on System Improvements, and How Impacts are Related to Anticipated Development Activity

*Utah Code 11-36a-304(1)(a),(b),and (c)*

### Growth in Demand

Growth in impervious acres will generate demand for stormwater facilities. Table 5 shows the projected growth in the City.

TABLE 5: PROJECTED GROWTH IN DEVELOPED ACRES

| Year | Developed Acres | Impervious Acres |
|---|---|---|
| 2022 | 4,888 | 1,848 |
| 2023 | 4,988 | 1,886 |
| 2024 | 5,088 | 1,924 |
| 2025 | 5,188 | 1,962 |
| 2026 | 5,288 | 1,999 |
| 2027 | 5,388 | 2,037 |
| 2028 | 5,488 | 2,075 |

*Source: West Haven Storm Water Impact Fee Facilities Plan, Amended September 2025; ZPFI*
*The IFFP (p. 3) states that there will be an estimated 37.81 impervious acresper 100 developed acres*

### Consumption of Existing Capacity by Anticipated New Development

According to Gardner Engineering, the City's stormwater engineers, there is no existing, excess capacity in the stormwater system.

### Impact on System Improvements by Anticipated New Development

The City has determined to maintain its current level of stormwater service. Therefore, additional stormwater improvements will be required to maintain the existing stormwater level of service. The IFFP identifies the level of service as follows:

TABLE 6: EXISTING AND PROPOSED SERVICE LEVELS

| Description | Standard |
|---|---|
| Allowable Runoff | Development within the City is required to detain storm water with a release rate of 0.2 cfs/acre. This release rate is intended to maintain predevelpoment runoff rates. |
| Detention | Volume required to hold the 100-year design storm with at least 1 ft of freeboard. Release rate per allowable runoff. |
| Storm Drain Conveyance | Pipes shall be designed to carry the minor 10-year storm. The major 100-year storm is planned to be conveyed in detention ponds, pipes, and within road right of ways. Minimum pipe size is 15" RCP with adequate slope to carry necessary flows. |

| Description | Standard |
|---|---|
| *Source: West Haven City Storm Drain Impact Fee Facilities Plan Amended September 2025* | |

The following projects have been identified in the IFFP as necessary for existing and new development activity to maintain the existing level of service.

TABLE 7: NEW SYSTEM IMPROVEMENTS NECESSITATED BY EXISTING AND NEW DEVELOPMENT

| | | % of Project Cost Attributable to Existing Development | % of Project Cost Attributed to Future Development Current Planning Window | % of Project Cost Attributed to Future Development after Planning Window | TOTAL Project Cost | Cost Attributed to Future Development during Planning Window | Project Cost Attributed to Existing Development |
|---|---|---|---|---|---|---|---|
| P1 | Storm Drain Siphon under Hooper Canal | 75% | 25% | 0% | $106,473.70 | $26,618.43 | $79,855.28 |
| P2 | New Storm Drain Pipe - 2700 west | 0% | 60% | 40% | $307,150.80 | $184,290.48 | $0.00 |
| P3 | New Storm Drain East of 2700 West - Hooper Slough | 0% | 60% | 40% | $797,221.12 | $478,332.67 | $0.00 |
| P10 | New Storm Drain East of 2700 West to Siphon under Layton Canal | 0% | 60% | 40% | $363,593.04 | $218,155.82 | $0.00 |
| P16 | New Storm Drain Pipe - 5100 West | 0% | 60% | 40% | $638,783.91 | $383,270.35 | $0.00 |
| P17 | New Storm Drain Pipe - 3300 South | 0% | 60% | 40% | $290,925.13 | $174,555.08 | $0.00 |
| P18A | New Storm Drain Pipe - 3300 South | 0% | 60% | 40% | $186,390.66 | $111,834.40 | $0.00 |
| P18B | New Storm Drain Pipe - 3300 South | 0% | 60% | 40% | $382,666.14 | $229,599.68 | $0.00 |
| P20 | Pipe the Howard Slough behind Ellie's Landing | 100% | 0% | 0% | $367,357.58 | $0.00 | $367,357.58 |
| P22 | Regional Detention | 0% | 60% | 40% | $552,000.00 | $331,200.00 | $0.00 |
| P26 | Replace Storm Drain Pipe - 1800 South | 100% | 0% | 0% | $525,978.03 | $0.00 | $525,978.03 |
| | TOTAL | | | | **$4,518,540.11** | **$2,137,856.91** | **$973,190.89** |

### Relation of Anticipated Development Activity to Impacts on Existing Capacity and System Improvements

Based on information provided in the IFFP and shown in Table 7 above, new development activity's share of the new system improvements, over the planning window (6 years), is $2,137,856.91.

## Proportionate Share Analysis

*Utah Code 11-36a-304(1)(d)(i) and (ii), (e)*

*Costs of System Improvements Related to New Development Activity*

The City intends to maintain its existing level of service for stormwater services through adding the new system improvements described in the Impact Fee Facilities Plan and previously in this Impact Fee Analysis. In addition, engineering and consultant fees are considered a legitimate cost in calculating impact fees. These costs are also summarized below.

Total impact-fee eligible costs for new system improvements, attributable to new development activity over 6 years, are $2,137,867. Consultant costs for the IFFP and IFA were $36,000 in order to prepare the engineering plans, impact fee facility plans and impact fee analysis that were necessary in order to calculate defensible impact fees.

TABLE 8: PER ACRE COST FOR NEW SYSTEM IMPROVEMENTS

| New Construction | |
|---|---|
| Cost in Planning Window | $2,137,856.91 |
| Growth in Impervious Acres | 226.9 |
| **Cost per Impervious Acre** | **$9,423.68** |

*Impact Fee Calculation*

The maximum impact fee allowable under law includes new system costs of $9,423.68 per impervious acre, plus consultant costs of $158.69 per impervious acre, minus $254.98 for credits for deficiencies, resulting in a total maximum impact fee of $9,327.39 per impervious acre.

TABLE 9: PROPORTIONATE SHARE IMPACT FEE CALCULATION

| Description | Amount |
|---|---|
| New Construction | $9,423.68 |
| Consultant Costs | $158.69 |
| Impact Fee Fund Balance | $0.00 |
| Credits for Deficiencies | ($254.98) |
| **Max Fee per Impervious Acre** | **$9,327.39** |

The maximum fee per impervious acre is $9,327.39 and the maximum fee per impervious square foot is $0.21.

The credits for deficiencies are discussed in the following section.

## Manner of Financing, Credits, Etc.

*Utah Code 11-36a-304(2)*

Credits must be made for the deficiency amounts of the new construction projects, as these amounts will likely later be funded through increased user rates. The annual deficiency credit per impervious acre is shown below with a 6-year average credit of $254.98.

TABLE 10: IMPACT FEE CREDITS BY YEAR FOR FUTURE USER RATE INCREASES TO PAY FOR EXISTING DEFICIENCIES

| Years | Payment per Year | Impervious Acres | Payment per Acre | NPV* per Acre |
|---|---|---|---|---|
| 2023 | $162,198.48 | 1,886 | $86.01 | $430.73 |
| 2024 | $162,198.48 | 1,924 | $84.31 | $361.95 |
| 2025 | $162,198.48 | 1,962 | $82.69 | $292.12 |
| 2026 | $162,198.48 | 1,999 | $81.13 | $221.11 |
| 2027 | $162,198.48 | 2,037 | $79.62 | $148.83 |
| 2028 | $162,198.48 | 2,075 | $78.17 | $75.16 |

*NPV = net present value discounted at 4 percent

Other than impact fees, the City has not identified any other means (such as user charges, special assessments, bonded indebtedness, general taxes, or federal grants) of financing system improvements created by new development activity.

## Maximum Impact Fee Schedule

All development within a given single-family lot category would be charged the maximum impact fee for that category.

TABLE 11: MAXIMUM IMPACT FEE SCHEDULE BY LOT SIZE

| Single-Family Lot Categories | Average Impervious SF* | Average Impervious % of Category | Impact Fee for Lot Category |
|---|---|---|---|
| ¼ acre and less | 4,281 | 39.3% | $916.68 |
| Greater than ¼ acre up to ½ acre | 6,108 | 28.0% | $1,307.89 |
| Greater than ½ acre up to 1 acre | 7,626 | 17.5% | $1,632.94 |
| Greater than 1 acre up to 2 acres | 8,962 | 10.3% | $1,919.01 |
| Greater than 2 acres up to 3 acres | 9,563 | 7.3% | $2,047.70 |
| Greater than 3 acres up to 4 acres | 11,454 | 6.6% | $2,452.61 |
| Greater than 4 acres | 13,027 | | $2,789.44 |
| *Amended IFFP July 2025 | | | |

All other development including multi-family housing will be charged $0.21 per impervious square foot.

## Certification

Zions Public Finance, Inc. certifies that the attached impact fee analysis:

1. includes only the cost of public facilities that are:
   a. allowed under the Impact Fees Act; and
   b. actually incurred; or
   c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;

2. does not include:
   a. costs of operation and maintenance of public facilities; or
   b. cost for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;

3. offset costs with grants or other alternate sources of payment; and

4. complies in each and every relevant respect with the Impact Fees Act.