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2026 Student-Led, Faculty- Guided Technical Assistance Project Report

Building Community Data
Tool Southwest Lansing

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Southwest Lansing Data & Investment Tool

Final Report

Prepared for: Center for Community and Economic Development (CCED), Michigan State University

Leveraging Higher Education as Anchors for Community Investment

July 2026

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Student Technical Assistant: Bibin Varghese (MS Data Science)

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1. Project Overview

The Southwest Lansing Data & Investment Tool is a community-facing, open-source platform developed in partnership between MSU's Center for Community and Economic Development (CCED) and a CMSE 495 Capstone team. The tool provides accessible visualizations of demographic, economic, housing, digital equity, food access, and health data for Southwest Lansing – serving approximately 18,000 residents across 7 census tracts.

The project was structured in two complementary workstreams: (1) a web application built by the capstone team enabling community partners to explore and filter block-group-level data interactively, and (2) a data pipeline built by the Student Technical Assistant pulling ACS 5-Year Estimates and generating enriched map layers for integration into the app.

Geographic focus: Southwest Lansing, Ingham County (Federal Information Processing Standard (FIPS) 26065). Eastern boundary: MLK Blvd connects to South Washington Rd through Jolly Rd, then down to Edgewood Blvd.

2. Team Members

CMSE 495 Capstone Team (Spring 2026)

Name	Major	Role
Mason Lee	Computational Data Science	Communication Liaison, Visualization Lead
Kyle Landolt	Data Science	Project Lead, GitHub Coordinator
Vibu Darshan	Computational Data Science	Communication Coordinator, Visualization Lead
William McNeilly	Data Science	Documentation and Modeling Lead

Student Technical Assistant

Bibin Varghese: MS in Data Science. Responsible for the data pipeline: extracting and cleaning ACS data, building interactive map layers, conducting correlation analysis, and digital equity assessment.

3. Web Application (Capstone Team)

3.1 Application Architecture

The capstone team built a functional prototype web application using FastAPI and MapLibre GL JS, deployed on Render.com. The application allows community partners to explore block-group-level data interactively across the Southwest Lansing region.

Tech Stack: FastAPI, MapLibre GL JS, ArcGIS Online, Python, JavaScript, CSS. Hosted on Render.com.

GitHub Repository: <https://github.com/landoltk/MSU-Southwest-Lansing-Project.git>

3.2 Map Functionality

The application presents 22 census block groups across 7 tracts. Users can select areas at the block group, block level, neighborhood, or radius levels. Data filters include: Population, Income, Race, Household Size, Food Access, and Health resources.

Food and health data are displayed as interactive map pins, categorizing grocery stores, farmers' markets, food pantries, community gardens, recreation centers, libraries, parks, and medical centers.

3.3 Data Hosting

Map data layers are hosted on ArcGIS Online under an MSU institutional account and pulled via public URL into the JavaScript application. This architecture allows future teams to expand layers without modifying core application logic.

3.4 Key Outcomes

- Multi-layered interactive map covering Population, Income, Race, Household, Food, and Health
- Flexible block group selection with neighborhood-level boundaries based on Lansing Neighborhood Organization definitions
- Radius selection tool for custom area analysis
- Foundation for future data layers with documented expansion pathway

4. Data Analysis Work (Student Technical Assistant)

4.1 Geographic Identification

Identified and verified 7 census tracts from the capstone team's block group file. Decoded 22 FIPS codes to extract unique tract identifiers within Ingham County (FIPS 26065).

Tract Code	Label	Coverage	Block Groups
001703	Tract 17.03	Full	1, 2, 3
003601	Tract 36.01	Full	1, 2, 3
003602	Tract 36.02	Full	1, 2, 3
003700	Tract 37	Partial	3, 4, 5 only
005100	Tract 51	Full	1, 2, 3
005201	Tract 52.01	Full	1, 2, 3, 4, 5
007000	Tract 70	Partial	4, 5 only

4.2 Income and Poverty Analysis

Michigan Benchmarks — Median Household Income: \$69,183. Poverty Rate: 13.5%. (Source: Michigan Center for Data & Analytics, 2023 ACS 1-Year)

Tract	Income	Population	Below Poverty	Poverty %	vs. State
17.03	\$68,500	4,197	391	9.3%	Near median
36.01	\$58,152	4,164	1,259	30.7%	11K below
36.02	\$46,418	3,360	969	28.9%	23K below
37*	\$35,713	4,351	1,044	24.0%	33K below
51	\$50,175	3,159	455	14.4%	19K below
52.01	\$52,835	5,382	1,098	20.4%	16K below
70*	\$70,284	6,148	535	8.7%	Near median

* Partial tract. ACS data reflects the full tract and may not precisely represent conditions within the project area.

4.3 Housing, Education, and Employment

Tract	Own %	Home Value	Rent Burden	Bachelor's	Unemploy.
17.03	72.4%	\$190,500	43.1%	21.0%	10.9%
36.01	81.2%	\$114,600	45.2%	9.8%	5.7%
36.02	59.6%	\$105,200	38.6%	12.6%	6.5%
37*	59.4%	\$108,600	37.8%	16.7%	5.7%
51	70.7%	\$102,300	26.9%	11.5%	19.9%
52.01	45.6%	\$87,700	23.7%	7.9%	13.0%
70*	71.7%	\$131,600	19.7%	18.2%	12.3%

Rent burden above 30% indicates cost-burdened households. All tracts have bachelor's degree rates well below Michigan's ~35% average.

4.4 Digital Equity and Internet Access

Internet access is critical for residents to access social services, job applications, healthcare portals, and educational resources. Census data on device ownership and internet subscriptions reveals a significant digital divide within Southwest Lansing.

Tract	Broadband	No Internet	Cellular Only	Phone Only	No Computer
17.03	86.3%	11.0%	7.2%	4.1%	10.0%
36.01	91.6%	7.4%	24.6%	16.9%	4.6%
36.02	82.3%	12.2%	21.6%	29.8%	7.7%
37*	87.4%	10.4%	9.0%	17.7%	8.3%
51	84.4%	11.2%	11.0%	22.6%	3.2%
52.01	81.9%	12.5%	9.2%	20.8%	12.3%

Tract	Broadband	No Internet	Cellular Only	Phone Only	No Computer
70*	93.3%	5.3%	12.2%	6.0%	3.9%

Source: ACS 5-Year Estimates (2019–2023), Tables B28001 (devices) and B28002 (internet subscriptions).

Key Finding: The Digital Divide is About Devices, Not Infrastructure

Broadband availability is 81–93% across all tracts. The infrastructure does exist, it is not an affordability issue. The divide is in how people access it. Tract 36.02 has 29.8% smartphone-only households (no computer). Tracts 36.01 and 36.02 have 21–25% cellular-only rates, meaning residents rely on expensive mobile data rather than home broadband.

4.5 Internet Access by Income Bracket

Breaking internet access down by household income reveals that the digital divide is fundamentally an affordability crisis. Low-income households in several tracts are nearly entirely disconnected.

Tract	Under \$20K: Broadband	Under \$20K: No Internet	\$20K-\$75K: Broadband	\$75K+: Broadband
17.03	100.0%	0.0%	67.0%	50.3%
36.01	79.5%	20.5%	100.0%	100.0%
36.02	59.5%	40.5%	68.8%	87.4%
37*	66.7%	33.3%	52.9%	100.0%
51	46.1%	53.9%	39.4%	86.5%
52.01	9.7%	90.3%	85.9%	81.9%
70*	100.0%	0.0%	89.1%	67.8%

Source: ACS Table B28004. Note: Income subgroups at tract level can have small sample sizes.



In Tract 52.01, 90.3% of households earning under \$20,000 have zero internet access — a near-total digital blackout for the lowest-income residents.

4.6 Correlation Analysis

- Poverty correlates strongly with smartphone-only households. As poverty increases, reliance on smartphones (no computer) climbs. Tract 36.02 is most affected at 29.8%.
- Poverty also correlates with cellular-only internet. Tracts 36.01 (24.6%) and 36.02 (21.6%) have the highest rates of households relying on expensive mobile data.
- Income vs. no-internet shows an unexpected pattern. Tract 17.03 has high income but 11% no-internet, possibly due to older homeowners choosing not to subscribe.

- Education does not independently predict device ownership. Tract 17.03 has the highest education rate (21%) but still 10% no-computer.

5. Priority Zones for Investment

Based on the combined analysis of income, poverty, housing, and digital access, the following classification identifies areas where CDFI and anchor institution investment should be prioritized:

HIGH PRIORITY

- Tract 52.01 — 90% of low-income households have no internet. Lowest homeownership (45.6%), lowest home values (\$87,700), highest no-computer rate (12.3%). Needs combined device, broadband and affordability intervention.
- Tract 36.01 — Highest poverty (30.7%), 24.6% cellular-only, 45.2% rent burden. Residents pay for expensive mobile data instead of home broadband.
- Tract 36.02 — 29.8% smartphone-only (highest in area), 28.9% poverty, 40.5% of under-\$20K households have no internet.
- Tract 37 — Lowest income (\$35,713), 33.3% of low-income households digitally disconnected.

MODERATE PRIORITY

- Tract 51 — 53.9% of under-\$20K households have no internet, 19.9% unemployment, 22.6% smartphone-only.

RELATIVELY STABLE

- Tract 17.03 — Income near state median, 0% low-income digital disconnection, low poverty.
- Tract 70 — Highest income, best digital connectivity across all metrics.

6. Central Insight

The digital divide in Southwest Lansing is primarily a device and affordability problem, not a broadband availability problem. Broadband infrastructure exists (81–93% coverage), but low-income residents cannot access it. Investment should target:

- Device distribution programs (computers/laptops) for Tracts 36.02, 51, and 52.01
- Affordable home broadband subsidies for Tracts 36.01, 36.02, and 52.01
- Combined device + broadband + digital literacy support for Tract 52.01 specifically

These interventions align directly with MSU's potential role as an anchor institution directing CDFI and program funds toward measurable community impact.

7. Deliverables Produced

Deliverable	Format	Description
Jupyter Notebook	.ipynb	Full data pipeline with documentation and analysis
Income/Poverty CSV	.csv	ACS income and poverty data for 7 tracts
Housing/Education CSV	.csv	Homeownership, rent burden, education, unemployment
Internet Access CSV	.csv	Broadband, cellular-only, smartphone-only, no-computer rates
Internet by Income CSV	.csv	Broadband and no-internet rates by income bracket
Interactive Map (11 layers)	.html	Toggle-able choropleth with all metrics, clickable popups
Correlation Charts	.png	4 scatter plots + income bracket bar chart
Web Application (Capstone)	Web	Live prototype on Render.com with multi-layer filters

8. Known Limitations

- Tracts 37 and 70 are only partially within the project boundary. ACS data reflects the full tract.
- ACS 5-Year Estimates represent averaged data over 2019–2023, not a single point in time.
- Income subgroups within a single tract (B28004) can have very small sample sizes. Percentages like 100% or 0% may reflect small denominators rather than absolute coverage.
- Census-defined geographic boundaries do not perfectly align with community-defined regions.
- FCC broadband availability data historically overstates actual access in Ingham County. ACS self-reported subscription data provides a more accurate picture of adoption.
- The web application’s data is hosted on an MSU ArcGIS account that will need to be transferred to a CCED-accessible email for long-term maintenance.

9. Next Steps

- Pull block group-level ACS data for more precise estimates within partial tracts (37 and 70)
- Add additional data layers: food access (USDA Food Access Research Atlas), health insurance coverage
- Integrate cleaned datasets and internet access layers into the capstone team’s FastAPI application
- Cross-reference ACS internet data with FCC Broadband Data Collection to identify availability-vs-adoption gaps
- Transfer ArcGIS data hosting from MSU institutional email to a CCED-managed account
- Explore permanent hosting solutions beyond free-tier Render.com for long-term reliability

10. Data Sources and Verification

- ACS 5-Year Estimates (2019–2023): api.census.gov/data/2023/acs/acs5
- ACS Variable Verification: api.census.gov/data/2023/acs/acs5/variables.html
- Cartographic Boundary Files (2023 fallback): [census.gov TIGER/GENZ2023](https://www.census.gov/tiger/geographies/2023)
- Michigan Benchmarks: michigan.gov/mcda — 2023 ACS 1-Year Highlights
- Census Tract Definition: MSU Libraries (libguides.lib.msu.edu/tracts)
- Internet/Device Tables: B28001 (computers), B28002 (subscriptions), B28004 (income x internet)
- Digital Equity Reference: Census Reporter (censusreporter.org/topics/computer-internet/)
- Food & Community Garden Data: Grace Densham, MSU Landscape Architecture Department
- ArcGIS Access: Provided by Michigan State University, with support from Amanda Tickner

11. Conclusion

This project represents a combined effort between the CMSE 495 Capstone Team and the Student Technical Assistant to deliver a meaningful, data-driven resource for Southwest Lansing. Census data was drawn from the U.S. Census Bureau's American Community Survey (ACS) 5-Year Estimates (2019–2023) via the official Census API, covering seven census tracts (Tracts 17.03, 36.01, 36.02, 37, 51, 52.01, and 70) in Ingham County, Michigan.

Together, the team has produced a functional web application enabling community partners to visualize and explore demographic, income, housing, and community resource data — alongside an enriched data pipeline with digital equity and poverty analysis at the tract level.

Priority Investment Areas for Southwest Lansing

The data consistently points to four tracts that warrant the most urgent attention from CDFI funds, anchor institutions, and community investment programs:

Priority	Tract	Primary Need
HIGH	Tract 52.01	Digital access crisis: 90% of low-income households offline. Lowest homeownership & home values.
HIGH	Tract 36.01	Highest poverty (30.7%). Residents forced onto expensive mobile data. High rent burden.
HIGH	Tract 36.02	Highest smartphone-only rate (29.8%). Severe digital exclusion among low-income residents.
HIGH	Tract 37	Lowest median income (\$35,713) in the study area. One-third of low-income residents offline.
MODERATE	Tract 51	High unemployment (19.9%). Over half of low-income households without internet.

What Southwest Lansing Should Focus On

The analysis reveals three clear, actionable investment themes for the area:

- **Device Access First:** Broadband infrastructure already reaches 81–93% of households. The gap is not pipes — it is devices. Targeted device distribution (computers, laptops) for Tracts 36.02, 51, and 52.01 would immediately expand digital participation.
- **Affordability Interventions:** Low-income households are disproportionately relying on cellular data — expensive and unsuitable for job applications, telehealth, or school. Subsidized home broadband programs in Tracts 36.01, 36.02, and 52.01 would address the root affordability barrier.
- **Comprehensive Support in Tract 52.01:** This tract requires the most intensive investment — combining device distribution, broadband subsidies, and digital literacy training. Its near-total digital exclusion among the lowest-income households makes it the clearest case for anchor institution leadership.

MSU, as an anchor institution, is positioned to direct CDFI resources and program investment toward these measurable, place-based outcomes. This tool — and the data behind it — provides the evidentiary foundation to make that case to funders, community partners, and policymakers at the July 2026 Summit.

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Food and community garden data was directly curated and provided by Grace Densham from the Landscape Architecture Department. ArcGIS access was provided by Michigan State University with special support from Amanda Tickner.

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