

# Smart City Strategy



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# Executive Summary

The City of Hillsboro has the vision to be a diverse, sustainable city known for its success in blending urban lifestyle, a world-class local economy, and agricultural heritage. The City currently incorporates state-of-the-art technologies and aims to evolve with new technologies, and it recognizes the opportunity to expand on existing efforts, examine City functions, and address the evolving needs of the community. The City embarked on creating a Smart City Strategy to enhance current efforts and plans to leverage data, technology, and innovative tools and processes. The Strategy seeks to define the following questions:

- What does smart city mean to the City of Hillsboro?
- What is the current state regarding the smart city framework?
- What is the desired future state and development of the smart city framework?

The Hillsboro Smart City Strategy has been developed with research and stakeholder engagement. Six primary categories organize departments, projects, and partnerships in this context.

| <b>Civic Engagement</b><br>Leverage of data and information access to increase two-way communication between users and to enhance civic engagement |   |  |  |   |
|--|---|--|--|---|
| Connectivity   | Mobility  | Public Safety  | Services Provision   | Environmental Resource Management   |
| Access to the high-speed information superhighway (Internet) and connected technologies  | Multi-modal transportation options that allow for goods and people to move freely in, out, and around the community | Prevention of and protection from harm for community members | Services provided to the community including infrastructure, utilities, and programs | Preservation and protection of natural resources for current and future community members |
| <b>Data Management</b><br>Investment, management, and governance of data and technology  |   |  |  |   |

Table 1: Hillsboro Smart City Categories

This draft Strategy provides an outline of the primary goals and desired outcomes, as well as the future elements of implementation to achieve a future smart Hillsboro. The Smart City platform provides the mechanism to improve alignment of operational performance, resource management, and service delivery to achieve the desired outcomes of Functionality, Livability, and Vitality.

## Background

### Why Smart Cities?

Throughout the world, cities are experiencing a population shift as more people move from rural to urban areas. In 2015, the U.S. Census Bureau estimated that 80% of the U.S. population was living within urban boundaries. Portland State University estimated 99,340 residents living in Hillsboro city limits in 2016. Hillsboro's population is projected to rise to 156,398 by 2045, roughly a 35% increase. As urban populations grow, cities like Hillsboro are facing new challenges, such as increased air pollution, traffic congestion, and resource scarcity. These challenges are not confined to city borders. Meanwhile, the rapid development of technology is changing how people live in cities. Government must adapt and innovate to enhance quality of life.

With urban development and technology advancements, cities are embarking on smart city efforts to harness the benefits of rapidly emerging technologies. The phrase "smart city" can be defined in a variety of ways. Fundamentally it means a city can effectively and efficiently process networked data to improve outcomes on any aspect of city operations. It means that a city deliberately operates as a complex ecosystem of services – including transportation, public safety, infrastructure, utilities, social services, healthcare, education, and others – in a smarter and more efficient way.

Smart city efforts aim broadly to improve quality of life through increased operational efficiency, enhanced economic vitality, and improved environmental sustainability. One tool that is becoming viable is the Internet of Things (IoT), which uses technology and data to leverage the Internet as an information hub. IoT technology can include the installation of sensors in cell phones, cars, buildings, street lights, and many other places. These sensors generate millions of gigabytes of data every day. With IoT technology, cities and their communities can access real-time data related to traffic, air pollution, energy and water usage, and many other areas. Additionally, Information and Communication Technology (ICT) can enhance contact between community members and government. By utilizing tools like IoT or ICT, cities are able to improve decision making through data gathering and information organizing. The smart city framework shifts away from decentralized city functions to a holistic approach that best leverages technologies, efficiencies, and data to create the biggest impact.

*"Citizens talk to their government with 21st Century technology, while their government listens with 20th Century technology and responds with 19th Century policies."*

– Madeline Albright

Today's world is changing rapidly with adapting technologies, strained resources, and an eco-system of overlapping sectors. Beginning to look at local government as an organism, rather than simply an organization comprised of a group of sub-organizations, we can better understand how all city functions are deeply interconnected, and how they can function optimally to adapt in unison and best address the needs of community members.

## Hillsboro Smart City Strategy

Hillsboro is the hub of the 'Silicon Forest' and is recognized as a city that fosters advanced technology. The City has successfully upheld the core values of providing visionary leadership, delivering responsive municipal services, and fostering collaborative partnerships that enhance Hillsboro's hometown livability.

Much of this visionary leadership has been realized by proactive future-oriented planning by community members, elected officials, and City staff. Examples include:

- A visionary water supply system that has supported the evolution of the Silicon Forest, which has driven the State economy for decades.
- Aggressive environmental goals to reduce consumption of natural resources and the generation of waste.
- Technologies to improve transportation efficiency, such as adaptive traffic signals.
- Building the technology infrastructure to support data capture, exchange, and analysis.



*"The City has recognized the need to develop a strategic approach to proactively harness changing technology and to improve internal efficiencies."*

As a forward-thinking city planning for the future, the City has identified technology, data, and system integration as a key next step. The City has recognized the need to develop a strategic approach to proactively harness changing technology and to improve internal efficiencies. The Strategy seeks to achieve improved operational performance through best practices and new, cutting edge approaches to service delivery.

When developing Hillsboro's Smart City Strategy, the City sought to address the following questions:

1. What does 'smart city' mean to the City and community?
2. What is the current state (or baseline) within the smart city context?
3. What is the desired future state within the smart city context?

The Hillsboro Smart City Strategy will enhance existing City efforts and plans by leveraging data, technology, and innovation, coordinated across the City's departments and with external partners.

# Hillsboro Smart City Vision, Mission, and Desired Outcomes

## Vision

Hillsboro is an exceptionally smart City that exceeds community expectations in the delivery of services.

## Mission

Hillsboro will continue growing great things today and for our future by leveraging technology and public-private partnerships to work collaboratively and efficiently through predictive, data-driven decision making.

## Desired Outcomes

|  <b>Functionality</b>  |  <b>Livability</b>   |  <b>Vitality</b>   |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Leverage internal and external partnerships</li> <li>• Ensure transparency, accountability, and equity in delivering City services</li> <li>• Focus on end use experience</li> <li>• Design and implement data governance</li> <li>• Promote data-informed decision making, utilizing real time data and predictive analytics</li> <li>• Create system integration and data sharing across departments to promote collaboration and efficiency</li> </ul> | <ul style="list-style-type: none"> <li>• Increase connectivity for all</li> <li>• Provide publicly accessible data that is digestible and easy to use</li> <li>• Provide open data platforms to improve transparency and engagement</li> <li>• Increase public access to services</li> <li>• Leverage technologies to enhance resiliency, safety, and environmental sustainability</li> <li>• Ensure equitable outcomes for all, including access and opportunities to engage</li> </ul> | <ul style="list-style-type: none"> <li>• Prioritize continuous improvement</li> <li>• Utilize and adopt technology that is technically and financially easy to scale and upgrade</li> <li>• Emphasize adaptive management of technology and investments</li> <li>• Promote an entrepreneurial ecosystem</li> <li>• Promote innovation and forward thinking</li> <li>• Provide equitable opportunity for all</li> </ul> |

Table 2: Hillsboro Smart City Desired Outcomes

## Strategy Development

The Hillsboro Smart City Strategy has been developed and informed by research, interviews with City staff and leadership, cross-departmental committee input and consideration of existing City operational plans. The Strategy also considers input and priorities from the Hillsboro 2035 Community Plan, and will complement the City's Comprehensive Plan. Figure 1 below provides a simplistic view of the relationship between the Smart City Strategy and existing operational plans. The Strategy is intended to be a living document and iterative as the City continues to make progress towards the vision.

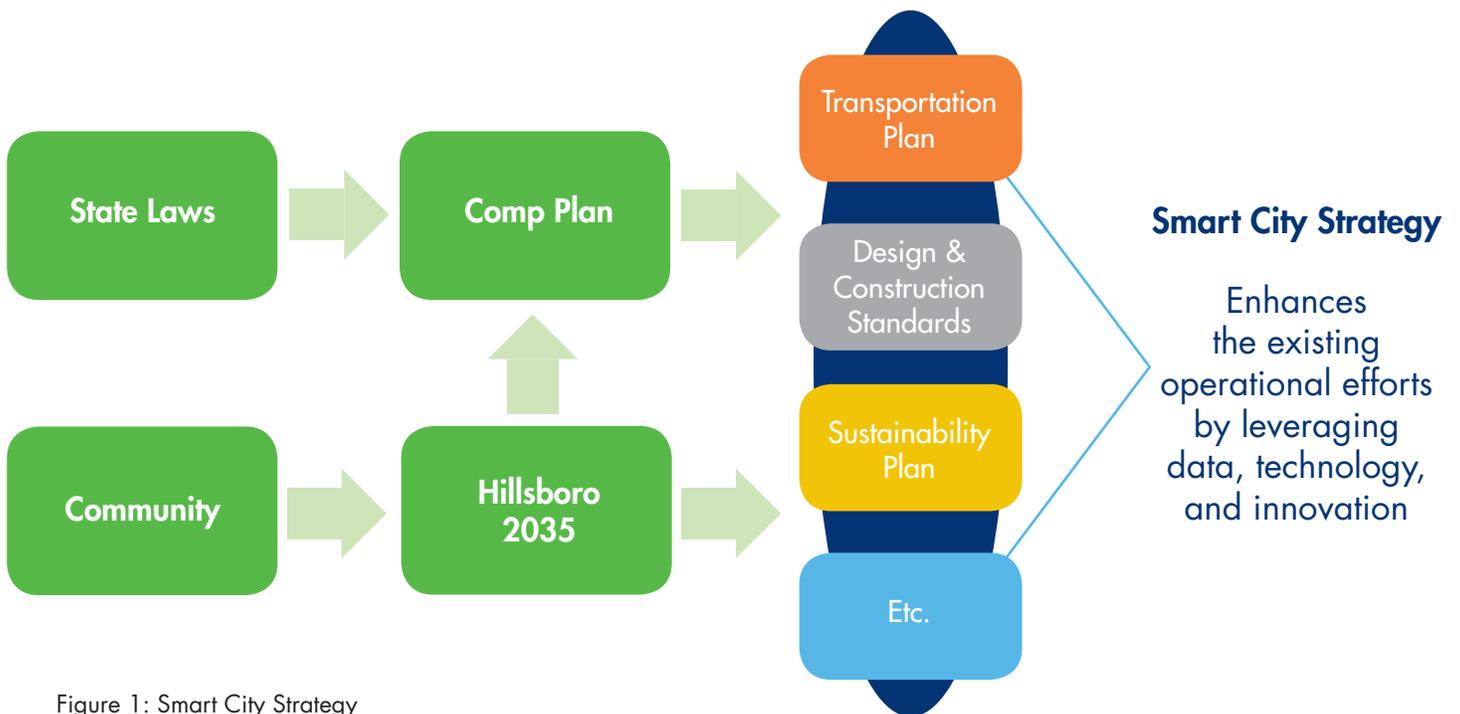


Figure 1: Smart City Strategy

## Alignment With Hillsboro 2035

The Hillsboro 2035 Community Plan has provided the foundation for community engagement and priorities related to community development for nearly 20 years. This foundation is a key asset to inform smart city investments and actions, and has been integral in the development of the Smart City Strategy. Table 3 below summarizes community priorities expressed in Hillsboro 2035 as they relate to some of the key Smart City imperatives. The listed imperatives have been further refined and summarized in the Smart City Strategy, in order to maximize alignments with City departments and operations.

## Alignment With Hillsboro 2035 - Continued

| Related Smart City Imperatives   | Selected Hillsboro 2035 Themes & Initiatives   |
|--|--|
| <p><b>Connectivity</b><br/>Ensure equity of digital connectivity among community members</p>   | <p>Develop a world-class, high speed communication system;</p> <p>Promote technology portals through which seniors can network and access information and services</p>   |
| <p><b>Mobility</b><br/>Develop a comprehensive multi-modal transportation system that is focused on safe, reliable, efficient, and accessible mobility</p>                   | <p>Implement efforts to ease traffic congestion in and around Hillsboro;</p> <p>Continue to enhance alternative transportation options, services, and facilities</p>   |
| <p><b>Public Safety</b><br/>Utilize data and smart city connectivity to improve public safety, emergency management, and event management</p>                                | <p>Keep Hillsboro safe through proactive community policing, fire prevention and emergency preparedness</p>  |
| <p><b>Services Provision</b><br/>Develop infrastructure that plans for the future of the community and that aligns with utility and water cycles</p>                         | <p>Protect and enhance environmental assets;</p> <p>Reduce waste stream elements for beneficial use;</p> <p>Pursue a “one-water” use and reuse strategy</p>  |
| <p><b>Environmental Resource Management</b><br/>Proactively manage natural resources through promotion of energy efficiency, water conservation, and pollution reduction</p> | <p>Expand the number of attractive, energy-efficient workforce housing options citywide;</p> <p>Hillsboro is a sustainable community that takes proactive steps to protect natural assets, minimize greenhouse gas emissions, and recover, recycle and renew resources</p> |
| <p><b>Civic Engagement</b><br/>Foster data and information sharing and community engagement to enhance Hillsboro’s livability</p>  | <p>Develop a world-class high-speed communication system</p>   |
| <p><b>Data Management</b><br/>Integrate and invest in data systems to improve internal processes of data-driven decision-making and predictive analyses</p>                  | <p>City of Hillsboro Strategic Plan: Leadership-Service-Collaboration;</p> <p>Create a technology-based innovation center to stimulate interest in and access to science, entrepreneurship and career pathway opportunities</p>  |

Table 3: Hillsboro 2035 Alignment

## Smart City Categories and Definitions

The concept of smart cities is relatively new, and smart city plans and strategies take many forms. A key element that is consistent across the strategies is organizing efforts and opportunities in categories versus municipal department functions. This allows the City to consider applications, projects, programs and activities as they relate to other areas, as well as to internal and external organizations. The category alignment may not correlate nicely with departmental operations, but horizontal alignments can be identified and considered through consistent coordination from all stakeholders.

### Connectivity

Access to the high-speed information superhighway (Internet) and connected technologies

### Mobility

Multi-modal transportation options that allow for people and goods to move freely in, out, and around the community

### Public Safety

Prevention of and protection from harm for community members

### Services Provision

Services provided to the community including infrastructure, utilities, and programs that are adaptable to new investments and technology

### Environmental Resource Management

Preservation and protection of natural resources for current and future community members

### Civic Engagement

Leverage data and information access to increase two-way communication between users and to enhance civic engagement

### Data Management

Services provided to the community including infrastructure, utilities, and programs that are adaptable to new investments and technology

Figure 2: Hillsboro Smart City Category Definitions

## Connectivity

Smart city efforts build on the development of communication technologies and Internet of Things, which all require connecting with the Internet and data collection devices. Connectivity is the foundation of a smart city, as well as essential to today's community members, businesses, and City operations. The Internet is a necessity in today's world. The digital divide, where some community members have little, slow, or no access to the Internet, is a critical barrier in our modern world. It creates social and economic inequality and fosters division between those who have and those who do not. One can argue now that adequate access to the Internet is as fundamental to quality of life as running water.



## Mobility



Technologies in mobility and transportation are quickly adapting to our urbanized landscapes. Cities face the implications of technologies such as autonomous vehicles, adaptive signals, climate change, changes in mode choices, along with shifting traffic patterns and awareness due to applications like Waze and Google Maps. Cities could not have predicted how these advancements would have changed the way we move about the city. The opportunities to predict and respond to mobility needs far supersede the planned transportation systems that we currently have. The City of Hillsboro sees an opportunity to better align itself to these advancements.

## Public Safety

Public safety is a fundamental service that the City provides the community. Public safety has historically been reactive to emergencies and initiated when 911 calls are received. However, there is a shift in public safety and management from reactive to proactive to predictive; with the shift crimes may be prevented before they occur and specific structures may be identified as higher risk for fire. Additionally, the City can plan and prepare for environmental concerns of public safety, such as natural disasters. By looking at public safety data and system integration, cities have the potential to use infrastructure, planning, utility and building data to provide a complete picture of public safety risks or points of intervention.



## Services Provision

The core function of local government is to deliver and sustain the many critical services that sustain a community. These services include underground infrastructure, streets, sidewalks and associated infrastructure, planning and zoning, regulation of the public right of way, public safety, water and wastewater, and many more. Services Provision considers how services are delivered, and opportunities to move toward a more interconnected, coordinated system. Core service delivery goes beyond City-provided services; smart cities must work collaboratively with public and private partners to not only understand the intersection of the services we all provide, but also to identify areas for increased efficiency, sustainability, and customer satisfaction.



## Environmental Resource Management

One of the primary goals across all smart city plans is to create efficiencies to reduce environmental impacts. Smart city plans recognize the role of data and technology in managing natural resources, monitoring environmental quality, and increasing efficiencies to eliminate waste, damage and deterioration of resources. Additionally, smart city strategies must understand the link between economic prosperity and environmental health.



## Civic Engagement

Once data is collected through smart city technology and department processes, it is crucial to share and invite community communication around data. Smart cities utilize communication technology to interact with their community members more actively and responsively. Smart city communication allows residents and businesses to provide their feedback in real-time. Digital Services provide the ability to actively engage with the community using 21st century technology, which includes Bluetooth, applications, and data dashboards.

The City must implement transparent processes for sharing data for public and private enterprises in an effort to provide appropriate public access while leveraging private partnerships for technological advancement.



## Data Management

At the foundation of smart city technologies is data—big data. Big data refers to a data hub that is collected from multiple sources and methods to provide a comprehensive look at a larger system. Through a comprehensive data hub we can identify trends, patterns, and correlations. The core of how smart city technologies interface is through data and system integration to have the data sources blend. Data is necessary to make policy decisions, allocate resources, and perform predictive analyses for proactive service delivery.

Additionally, data governance will be one of the core components of the Hillsboro Smart City Strategy to create internal information collaboration and policies. This will include clarifying who acquires, maintains, has access to, and utilizes the data, and which data will be open for access to the public. Processes should be put in place to determine whether and for what use data shall be collected at all.



## Smart City Challenge and Benefits

The smart city framework is an emerging field. Due to the newness of the concept, many cities are only now thinking about developing a strategy. There are a few cities that are further down the path and which provide models for implementation. Below are challenges and benefits to consider, as well as the smart city framework in general.

### CHALLENGES

**Few examples of municipal smart city plans.** Staff drew on the relatively few examples that exist to inform this approach.

**Technology and data cannot solve all issues.** It is necessary to have smart, human decision-makers on the other side of the data. Staff foresee a training component to the efforts to begin working with internal teams on how best to use the data that is being collected, as well as to identify gaps in data. Then in turn, to begin training how to utilize data in predictive and analytical decision-making.

**Time intensive and costly to begin.** There are initial costs and time demands in updating and integrating systems, as well as to implement sensor and node technology throughout the city.

### BENEFITS

**Saves time and money over time.** Once implemented, the City may save time and money as processes become more efficient and cost-effective. Also, the City will be able use the Smart City Strategy to guide the prioritization of technology projects to best leverage strategic investments.

**Leverages staff and resources more effectively.** By utilizing data and technology, systems can become more automated and require less staff oversight. Staff and resources will be leveraged efficiently and effectively by removing wasted time. Additionally, by having more centralized data collection and management, efforts are less likely to be duplicated and less time intensive to find needed information.

**More efficient decision-making.** Data is crucial to making informed decisions. Organized and meaningful data will lead to more efficient decision-making, which in turn will lead to policies and programs that achieve the desired impacts.

**Hillsboro is the right size in the right place.** As a medium-sized city, Hillsboro has the potential to leverage major key local partners in smart city efforts, and can do so more nimbly than larger cities.

**Enhance information sharing and civic engagement.** By providing easily accessible and digestible data, the City can foster enhanced community engagement around points of information. Departments are able to share performance metrics and data on open data platforms, while blending narrative and storytelling about the importance of the work being done every day. The City will be better prepared to share and receive information.

## Hillsboro Smart City Strategy Implementation

For each category, an internal cross-departmental stakeholder group has begun to define the current state, as well as an initial desired future 'smart' state. The group has begun to document both the existing and future potential smart actions and investments within each category, while also considering other categories and their overlap. This information will inform and shape an implementation plan that coordinates smart city efforts internal and external to the City organization.

A successful implementation of the Hillsboro Smart City Strategy will blend technology, best practices, and innovation to achieve the desired outcomes. If successful, the City will have improved operational performance, resource management, and service delivery. The outcomes of the improvements will in turn further improve quality of life in Hillsboro.

### Governance

Governance refers to the internal and external coordination, ongoing process, and engagement that will coordinate smart city efforts within and outside the City.

#### Internal Governance

Internal governance must address intra- and inter-department smart city coordination. It will fundamentally require oversight, regular, consistent and effective facilitation, and follow through. Internal data governance must be defined to deal with questions including: why data is collected and for what purpose, who owns the data, who maintains the data, and who can access and use it. Additionally, internal governance addresses data security, access, and storage standards.

#### External Governance

External governance must address how Hillsboro smart city efforts will intersect with other local government, nonprofit, and private business entities. Great opportunities exist in the smart city realm with these partners, but the interaction between the City and external partners must be defined and formalized. Some discussions and engagements already exist within the greater region, but there are more opportunities to coordinate and partner. Near term next steps include reaching to other entities and agencies to gauge related activities and groups, and to discuss how they might, if at all, fit with the City's efforts.

The City must continue to examine existing policies and how they might either enhance or hinder efforts. Policies to evaluate include data sharing, privacy standards, right-of-way activity, public-private partnerships, and more. A crucial component of smart cities is to ensure that policies are welcoming and fostering innovative technologies wherever possible.

## Hillsboro Smart City Partners and Stakeholders

The Hillsboro Smart City Strategy is not intended to be a City of Hillsboro effort alone. The smart city framework welcomes partnerships across departments, jurisdictions, and sectors. The City intends to invite the private sector to collaborate and explore methods that ensure Hillsboro remains a forward-thinking and acting city and community. Below are the initial list of potential stakeholders the City has identified.

### Internal Stakeholders

The City has created two primary internal teams to inform and guide the Hillsboro Smart City Strategy.

- **Steering Committee:** includes the Assistant City Manager (Community Development), Directors of Information Services, Economic Development, and Planning, as well as the Engineering Senior Project Manager, and Senior Project Manager over sustainability and solid waste. The role of the Steering Committee is to oversee the development and progress of the Smart City Strategy and implementation plan.
- **Technical Committee:** includes subject matter experts from each City department. Members gather and provide input and data, manage department-specific programs/projects, and oversee department- or City-wide processes. The Technical Committee will be a key coordinating group going forward in implementation.

### External Stakeholders

Staff have identified the following organizations as potential external partners.

- Intel
- IBM
- Panasonic
- Metro
- Neighboring jurisdictions
- Tech Oregon
- Smart city consultants
- Nonprofits
- Broadband and telecommunications providers
- Power utilities
- Local governments
- Education institutions (Hillsboro School District, Portland Community College, Portland State University)

The Steering Committee provides oversight for both internal and external efforts. The Steering Committee also oversees overall coordination and policy development. The Technical Committee is the point of contact and coordination for each of the City departments. Subject matter experts within each department will inform and coordinate individual and shared smart city investments and applications.

## Reporting and Progress Tracking

The Smart City Strategy shapes Hillsboro smart city efforts, organizes partnerships, and enables the use of emerging technologies. The Strategy is considered a living document and will be iterative as the City continues to make progress towards the established vision. As the City makes progress, the Strategy will incorporate metrics to track progress and to report out to stakeholders. The expected reporting format will look and function similarly to the Sustainability Annual Report.

Additionally, as City and partner efforts progress, a communication plan will be developed to share outcomes and points of engagement. The communication plan will include project updates, outcomes of the efforts, and ways for stakeholders to stay involved and engaged.

## Funding Sources

The City will seek grants and partnership funds to support implementation efforts. Potential funding sources include U.S. Housing and Urban Development Community Development Block Grants, Federal Communications Commission grants, and U.S. Department of Transportation Council of Governments Funds, among others.



*"The Smart City platform provides the mechanism to improve alignment of operational performance, resource management, and service delivery to achieve...Functionality, Livability and Vitality."*

- Hillsboro Smart City Strategy