Virginia Association of Telecommunications Officers and Advisors

June 10, 2016

ALL THINGS FIBER, THE NEXT WAVE

Matthew B. Arvay
Chief Information Officer , City of Virginia Beach

Master Technology Plan

- Released in 2014
- The first ever MTP for Virginia Beach
- 5 year plan
- 4 Strategic Pillars and 32 initiatives

Master Technology Plan

I-1. Implement a Next Generation Network (NGN)

Expand network fiber to connect off-campus locations to the municipal campus and implement network redundancy between super-site facilities. The proposed solution would provide improved services for Voice, Data, Video and Internet. This investment is expected to have a life expectancy of over 30 years and aligns well with the city's current strategies of

1) *Engage in Systems Thinking*
2) *Maintain a Long-Term View*
3) *Achieve Multiple Positive Outcomes*
4) *Be Proactive and Prevent Problems*
5) *Create Relationships and Partnerships*
6) *Ensure Sustainability*
7) *Create an Accurate, Positive Community Image*

In addition, this also aligns to the sociological factor of technology advancements within the *City's 2040 vision and may have a direct impact on a:*

1) *Connected Community*
2) *Learning Community*
3) *Diverse Community.*
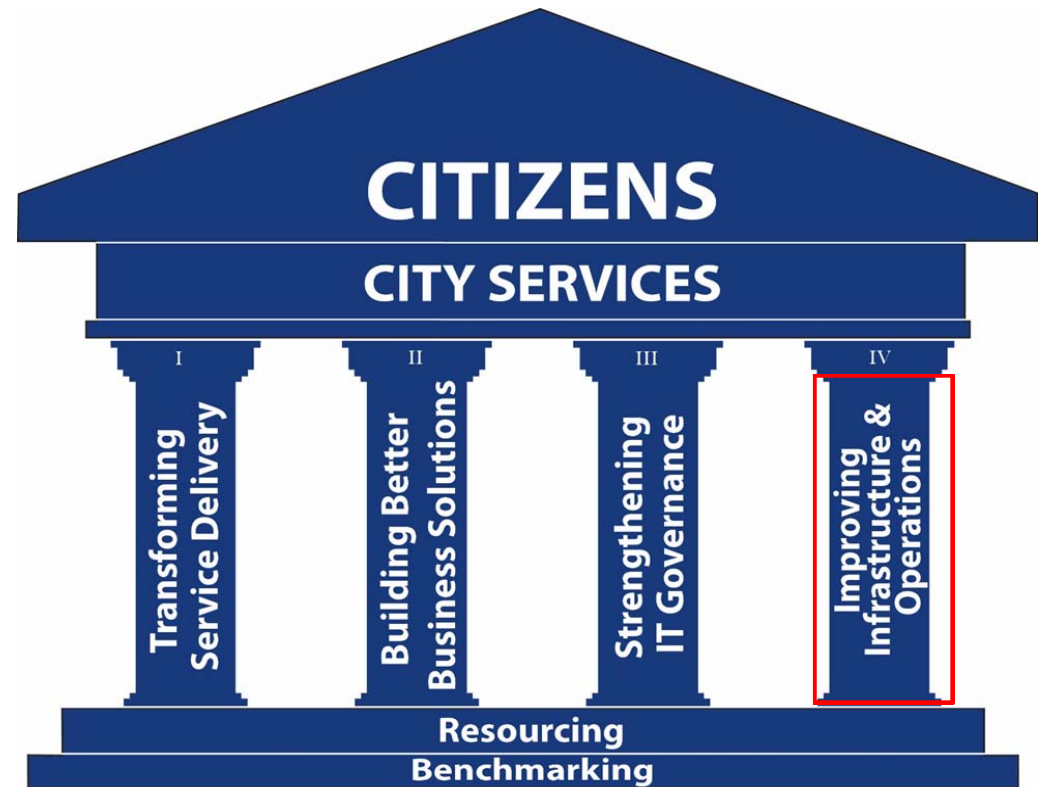
Broadband TF Mission

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF VIRGINIA BEACH, VIRGINIA, THAT:

The City Manager and staff are directed to promptly <u>explore</u> the creation of a Virginia Beach and/or a Southside Regional Broadband Authority in order to leverage the Next Generation Network investments made by the City of Virginia Beach and the Virginia Beach City Public Schools.

Strategy Options

- **Create an Authority:**
  - Example in the State of Virginia* (Eastern Shore)

- **Expand Network:**
  - Examples are Santa Monica, CA and Santa Fe, NM**

- **Form Public/Private Partnership:**
  - Examples are Kansas City, MO, and Raleigh, NC**

- **Contract out:**
  - Example is Los Angeles, CA**

- **"Put your head in the sand" (Do Nothing):**
 - Examples "too many to count"**

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*City of Virginia Beach High-Speed Broadband Working White Paper, August 25, 2015, ComIT
**The Next Generation Network Connectivity Handbook, Vol. 1.0, July 2015, Gig.U, Blair Levin and Denise Linn

Criteria for Strategy Selection

Understand or explore the following:

- Current Investment in Fiber

- Capacity of Current Network

- Coverage of Current Network

- Extent of Digital Divide

- Public/Private Partnership Opportunities

  - Lease, Operate, Maintain, Expand, Investments

- Broadband Demand
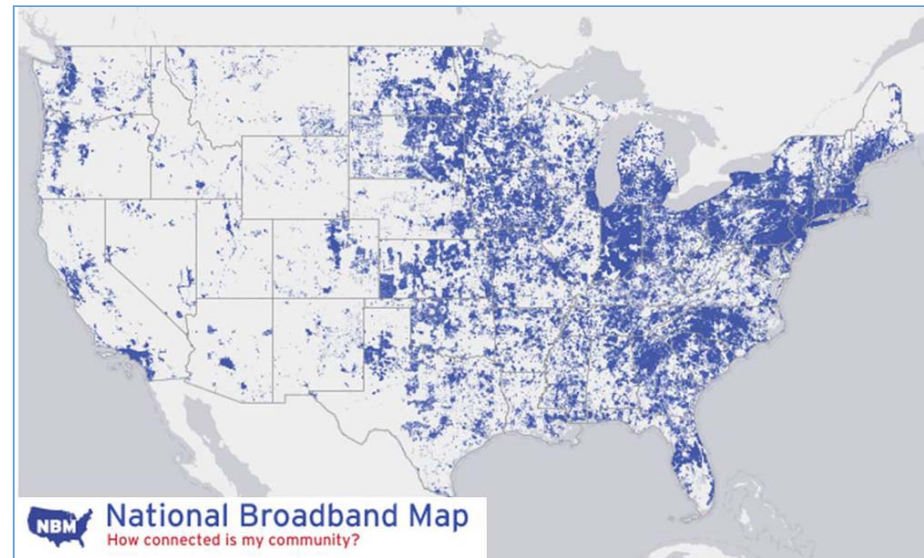
Broadband Demand in Virginia Beach
*Residential Study**

Overview:

- **Random Sample Survey of 900 Residents:**
  - **325 Cox subscribers**
  - **325 Verizon subscribers**
  - **250 non-subscribers to cable TV**
  - **Margin of error of ±3 points**

Finding: Broadband service in VB is divided between
Cox (49%), Verizon (47%), and Other (4%)

Respondents' Satisfaction with the Choice of Internet Providers:

Finding: 75% of respondents were either Very Satisfied or Satisfied

*Survey conducted in September/October 2015.

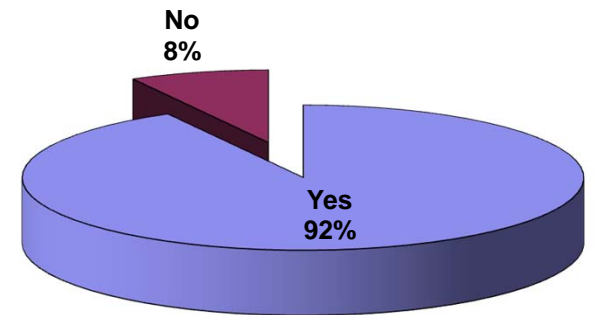# Broadband Demand in Virginia Beach
*Residential Study**

Residents Having Internet at Home:

- 92% of residents reported they have
  Internet access at home
- 8% of residents do not have Internet access

Finding: Virginia Beach's take rate for broadband/ high speed Internet access outpaces the national average by ~20% points
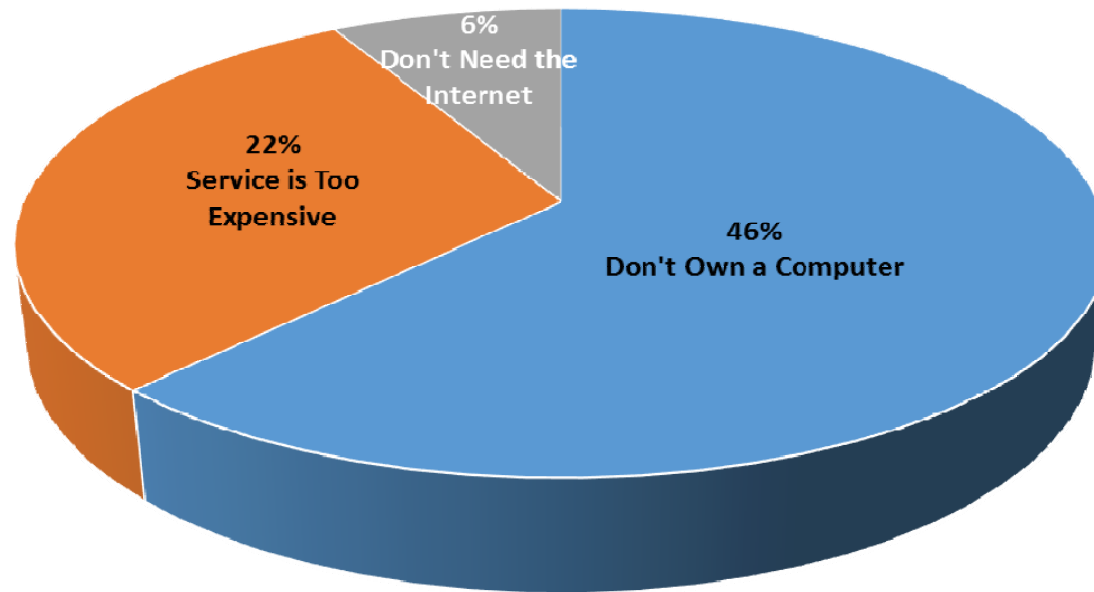
- National average of residents who have high speed Internet access at home is now ~67% (December 2015 Pew Research—down from ~70% in 2013)

Residents Having Internet at Home

No
8%

Yes
92%

Broadband Demand in Virginia Beach
Residential Study

Why 8% of Residents do not Have Internet Access at Home

6%
Don't Need the Internet

22%
Service is Too Expensive

46%
Don't Own a Computer

Finding: Demographic analysis determined that the 8% are likely to be older, without children in the home, renting, retired, disabled, or unemployed
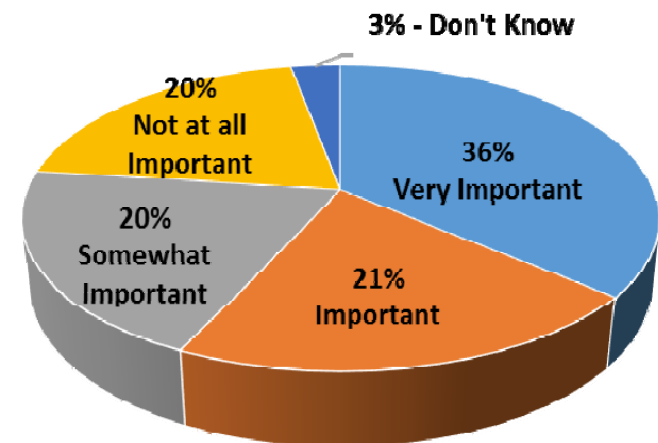
Broadband Demand in Virginia Beach
Residential Study

Awareness of Free Public Wi-Fi in Libraries:

- Of the 8% that did not have broadband at home, were they aware of free Wi-Fi in the libraries?
  - 61% Yes
  - 39% No

- Of the total respondents, were they aware of free Wi-Fi in the libraries?
  - 82% Yes
  - 16% No

Importance of Virginia Beach Providing Free Public Wi-Fi

- 3% - Don't Know
- 36% Very Important
- 21% Important
- 20% Somewhat Important
- 20% Not at all Important

Findings:

1. *The wide majority of residents are aware the City provides free Wi-Fi at the public libraries. Additional locations for Wi-Fi were identified by respondents and included public spaces, housing that services those on fixed incomes, and the future development of Virginia Beach as a desirable business location for tech-focused companies.*

2. *More than 77% of respondents indicated it was important, at some level, for the City of Virginia Beach to provide free Wi-Fi. 1 in 3 respondents indicated it was "very important" (36%).*

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Broadband Goals

1. Provide a level of excellence in city services

2. Leverage Next Generation Network (NGN) for educational opportunities

3. Explore opportunities to create a unified government network

4. Leverage NGN for economic development opportunities

5. Leverage NGN for regional opportunities

Goal #1: Provide a Level of Excellence in City Services
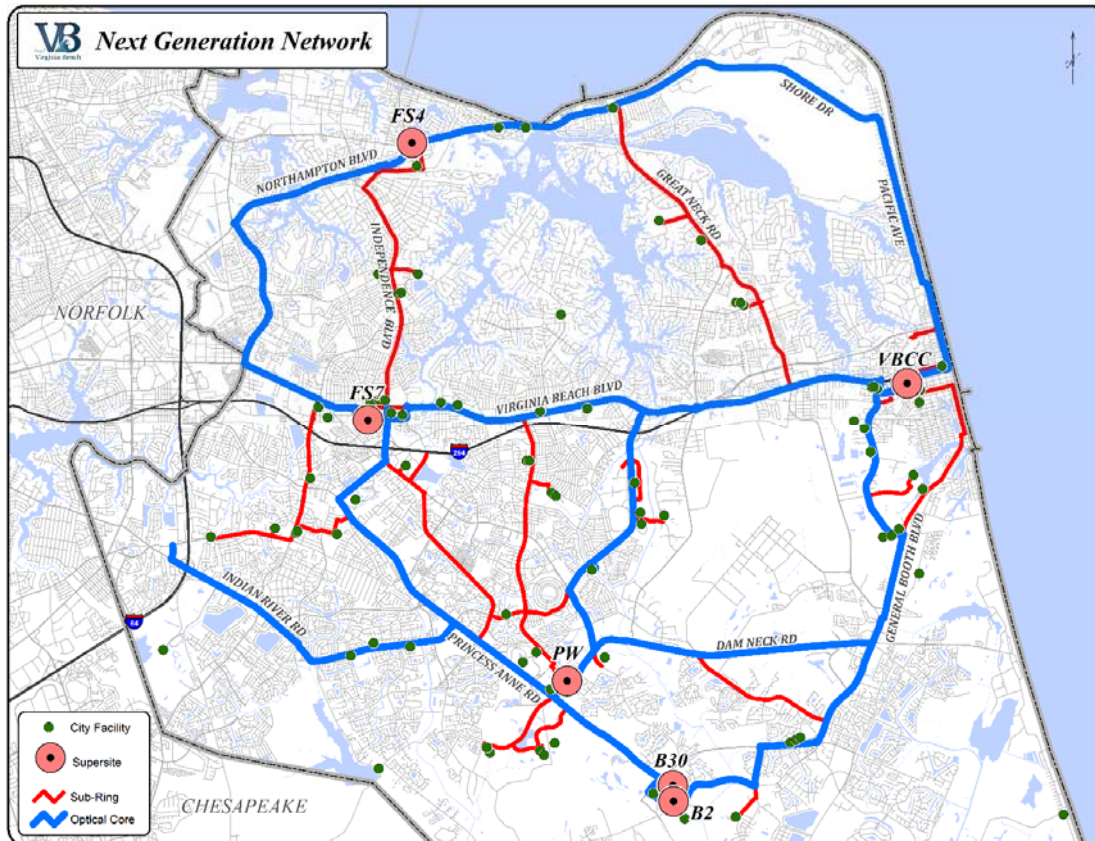
- **Purpose: Build a Next Generation Network that:**
  - **Provides excellent city services**
  - **Can be leveraged for additional benefits**

- **Objectives**
  1. **Expand fiber network to ~115 miles to connect additional 75 off-campus locations to municipal campus and create network redundancy**
  2. **Leverage NGN for the following:**
     - **Economic development opportunities**
     - **Educational opportunities**
     - **Regional opportunities**
  3. **Utilize "Dig Once" strategy for road and utility projects to include fiber and conduit**

Goal #2: Leverage NGN for Educational Opportunities
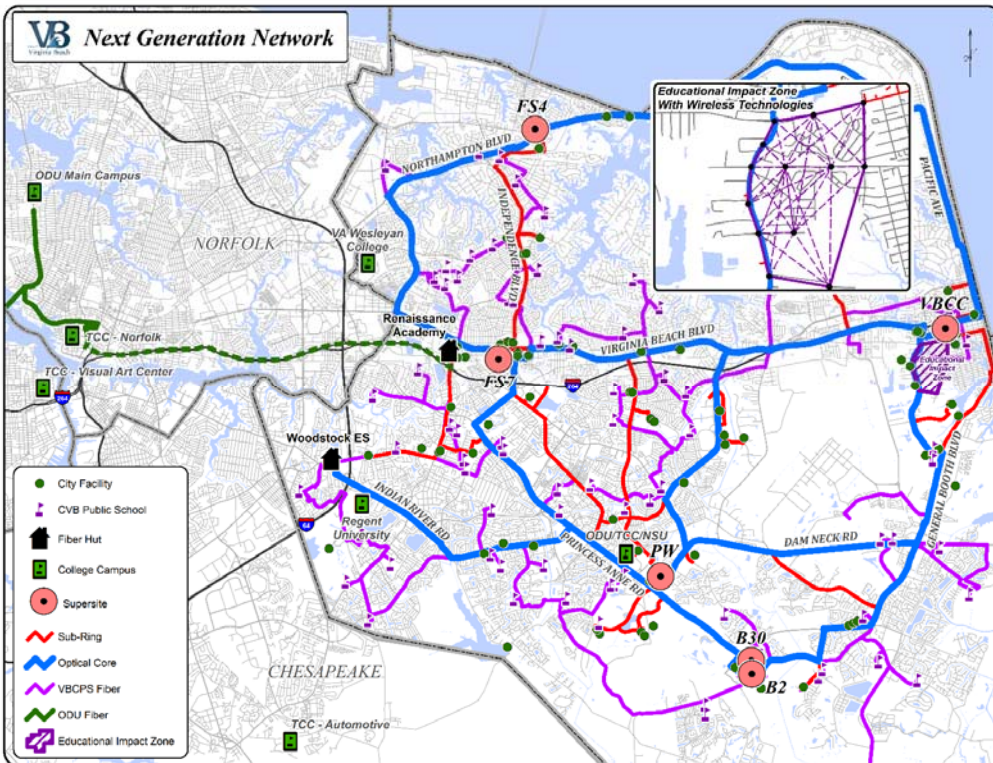
- **Purpose:** Expand connectivity to address educational needs and opportunities within the city

- **Objectives**

  1. **Provide connectivity to higher educational institutions such as ODU, TCC, Norfolk State University, Virginia Wesleyan College, and Regent University**

  2. **Define and connect Educational Impact Zones**

     - **Utilize wireless technologies**
     - **Leverage devices**
     - **Provide computer training**

Educational Scenario:
What if we connected the City, schools, and Higher Educational Institutions to further collaboration efforts and create new opportunities for students?

- **Connecting City schools with higher education would facilitate educational pathways in high-demand occupational career areas such as cyber security and entrepreneurship**

- **The many transitioning military members of the region would benefit from NGN education and training opportunities to move them readily into private sector demand occupations and to keep them in the region**

- **These connections would allow for greater public/private partnerships for research and technology transfer into educational pathways from high schools through college, thereby creating a pipeline for the biomedical research initiative of VB and the greater region**
- **By reducing annual operating expenses, dollars could be re-directed to student support and/or the development of educational pathways and training opportunities**

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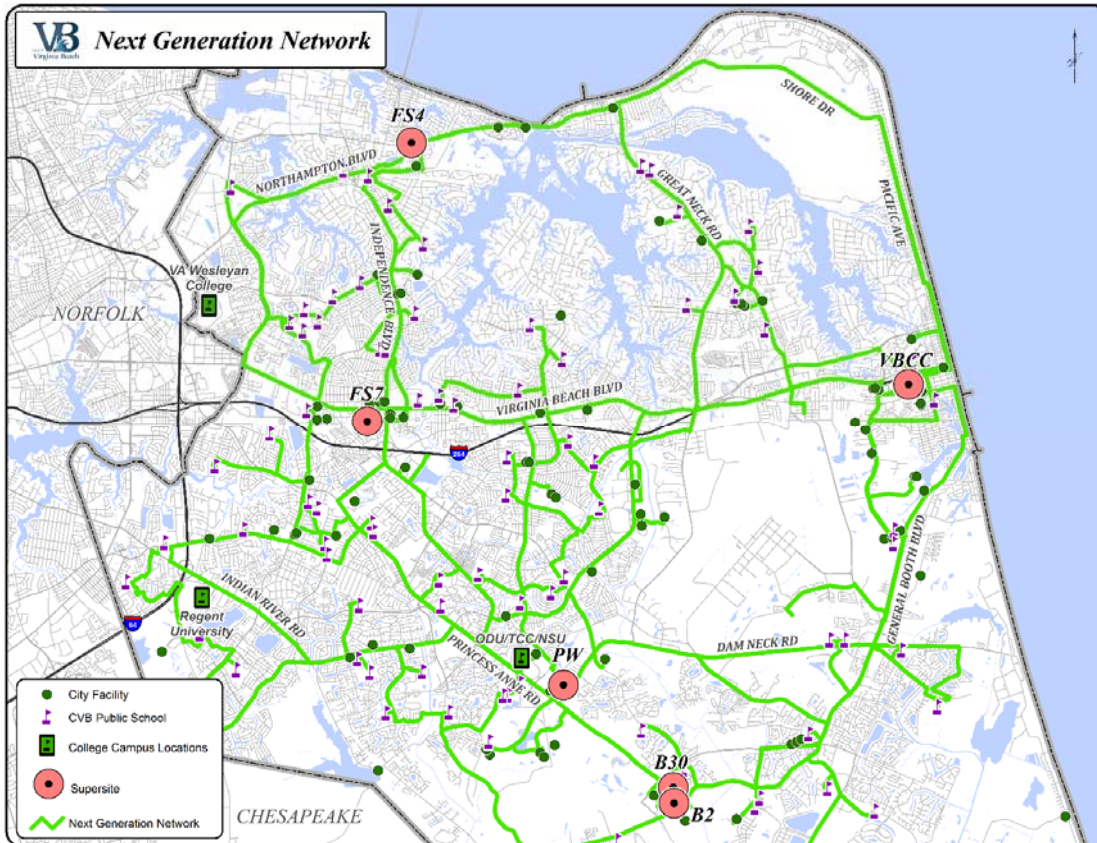# #2 Sub-Goal: Explore the Creation of an Educational Impact Zone

- **Purpose: Explore opportunities for the city and schools to share assets in order to create an Educational Impact Zone which would provide free public WiFi to specified areas.**

- **Objectives**

    Explore opportunities to:

    1. **Define the Digital Divide**

        a) **Families who receive free and reduced lunch**

        b) **Families who receive SNAP benefits**

        c) **Medicaid Recipients**

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Goal #3: Explore the Creation of a Unified Government Network
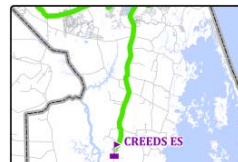

Creeds /Pungo – not to scale

- Purpose: Explore opportunities for City and schools to share assets in order to create efficiencies, lower investment costs, and reduce total cost of ownership
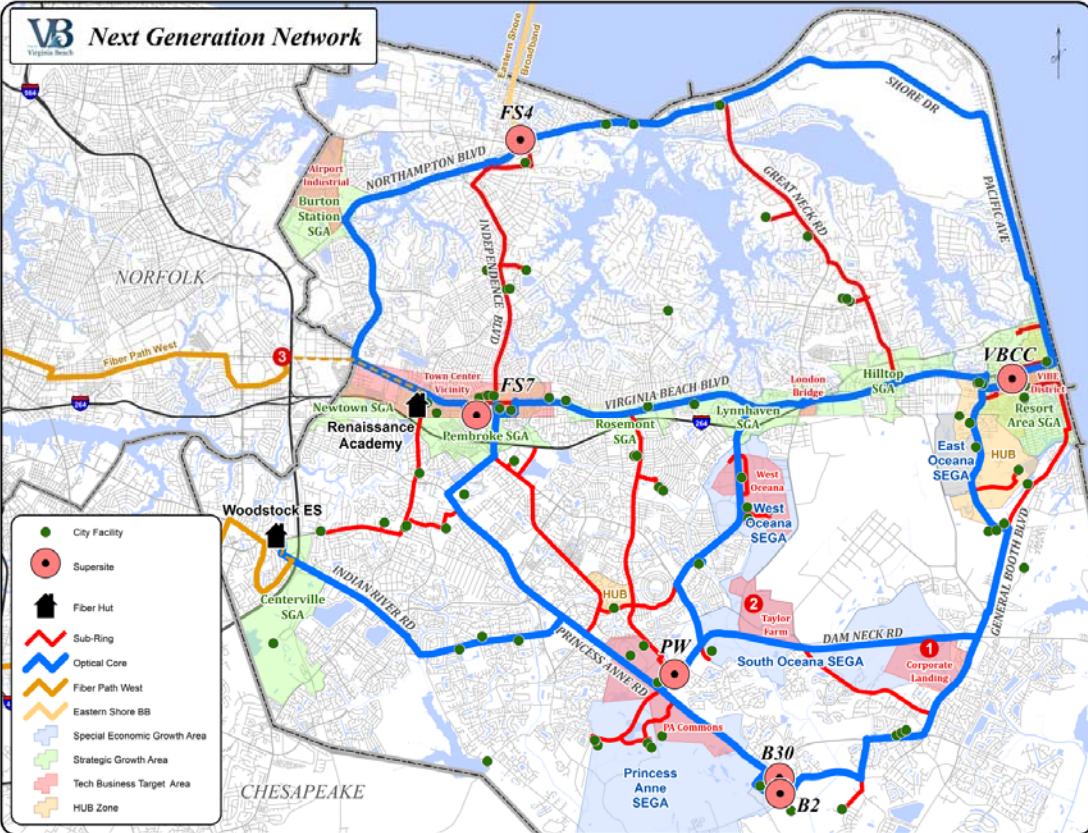
- **Objectives**

  Explore opportunities to:
  1. Establish common architectures
  2. Establish a shared services model
  3. Establish a unified maintenance contract
  4. Collaboratively plan for future requirements and capacity needs

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# Goal #4: Leverage NGN for Economic Development Opportunities

- **Purpose:** Provide business entities who locate within Strategic Growth Areas (SGAs), Special Economic Growth Areas (SEGAs), and Technology Business Target Areas the opportunity to obtain fiber connectivity

- **Objectives**
  1. Make all areas listed above fiber ready
     - Have direct access to dark fiber
     - Establish connection points close to borders of neighboring jurisdictions
  2. Develop business plan and financial model for Middle Mile services
  3. Lease conduit and fiber to business entities locating within areas listed above
  4. Develop trans-oceanic onboarding service delivery plan and long-term lease agreement with Camp Pendleton
  5. Partner to provide Middle Mile services
  6. Strengthen local service providers by offering a Middle Mile that they can leverage to serve new customers

➢ **Economic Development Opportunity Scenario (Middle Mile):**
- What if a company considers locating to VB within a target area?
- By being "fiber-ready" and having predefined areas, an opportunity exists to attract and retain businesses, provide additional job opportunities within the city, and potentially lower connectivity and Internet costs for the businesses

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Goal #5: Leverage NGN for Regional Opportunities

VB Next Generation Network map
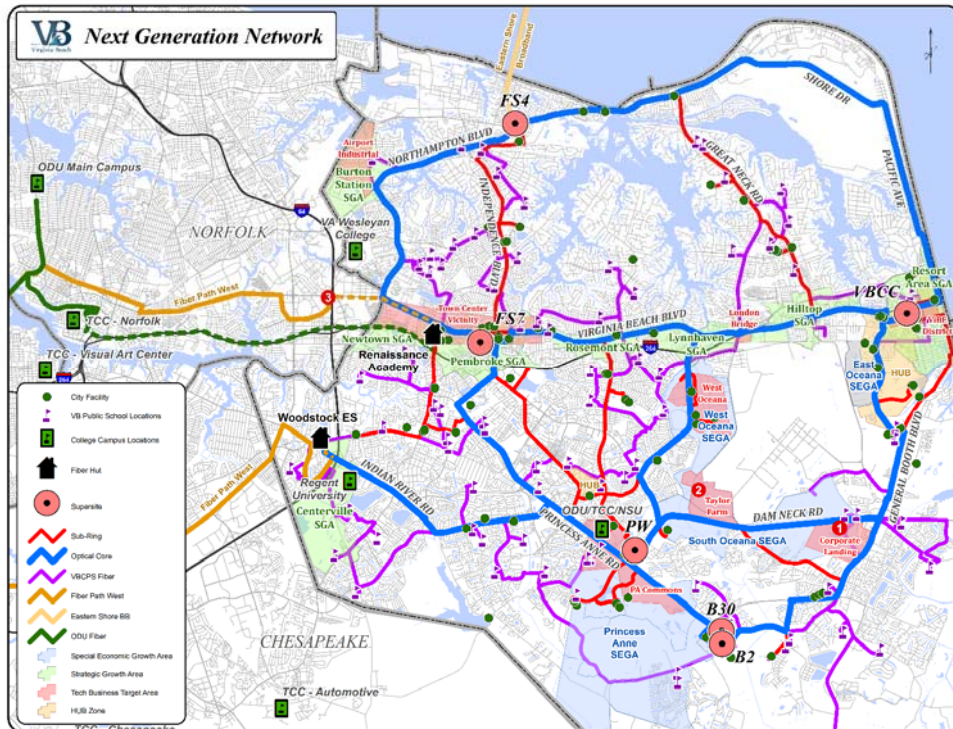
- **Purpose: Offer connectivity to adjacent jurisdictions and broadband authorities**

- **Objectives**
  1. **Establish connection points via:**
     - **e.g. huts or junction boxes**
  2. **Engage neighboring cities to explore ways to connect**
     - **Self-funding**
     - **Federal grants**
     - **Provider incentives**
  3. **Consider international opportunities**
     - **Trans-oceanic fiber**
  4. **Build and scale aggregation sites to transport data and create cost savings (e.g., VDOT traffic data)**
  5. **Commit to partnering with other cities to share lessons learned, architecture, business and financial plans, etc.**

Regional Scenario:
What if we connected educational services across jurisdictional boundaries to provide better communication and information sharing? This would improve communications between higher education and K-12, expanding pathways for student learning.
- **Connecting city schools with higher education across the region would facilitate educational pathways in high-demand occupational career areas such as cyber security and entrepreneurship**

- **Connections would allow for greater public/private partnerships for research and technology transfer into educational pathways from high schools through college, thereby creating a pipeline of educated people for the biomedical research initiative of VB and the greater region as far West as Richmond**
- **By reducing annual operating expenses, dollars could be re-directed to student support and to development of educational pathways and training opportunities**

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Broadband Initiative
"Enabling the Future Now"
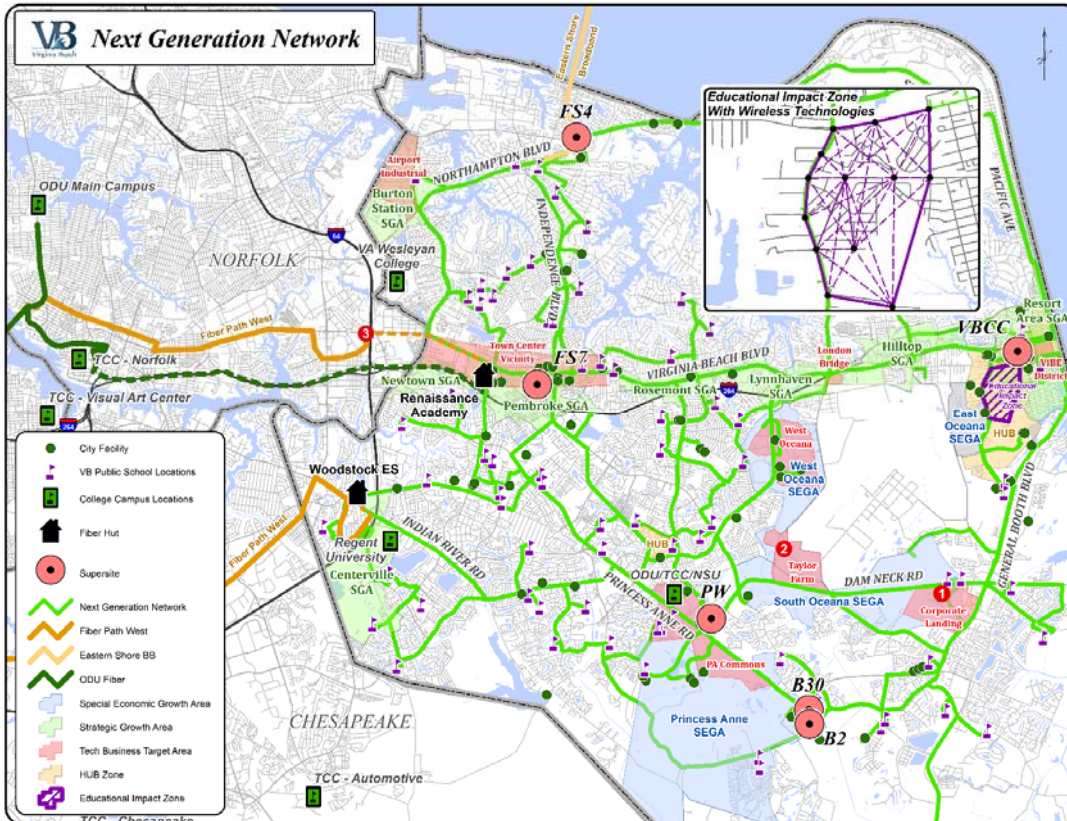
ENVISION 2040 Elements (Goals):

1) **Connected Community:** Citizens, businesses and visitors having access to advanced broadband technologies that efficiently and effectively supports regional interconnectivity as well as global commerce.

   Educators fully employ state of the art technology that provides greater accessibility to resources and teachers thereby maximizing the efficiency of our investment in education.

2) **Learning Community:** Educators fully employ state of the art technology that provides greater accessibility to resources and teachers thereby maximizing the efficiency of our investment in education.

   Partnerships and collaboration among the region's higher education institutions create nationally recognized centers of excellence.

Broadband Initiative
"Enabling the Future Now"

ENVISION 2040 Elements (Goals):

3) <u>Diverse Community:</u> **The community is a recognized international leader for being inclusive and celebrating diversity in all of its forms.**

   Minority student performance leads the nation.

4) <u>Thriving Community:</u> **Business, academic institutions and governments collaborate to develop and align the skills of the workforce to meet business needs.**

   We are renowned for medical science research.

   Businesses are innovative and create partnerships and entrepreneurial opportunities that sustain the economy.

   The synergy from the academic centers coordinating research results in a culture of entrepreneurship and a continuous flow of successful start-up companies.

ENVISION 2040 Bold Step of Regionalism: City Council leads the effort to build a strong, effective regional coalition to leverage the region's assets and creates a culture of collaboration for the success of the Southern Chesapeake Bay Region.

So . . . What is the VB Broadband Strategy?

➢ **Phase I (CY 2016 – CY 2018)**
  - **Expand network (currently appropriated via CIP 3.664)**
    - **City facilities**
    - **Jurisdictional boundaries**
    - **Strategic Growth, Special Economic Growth, and Technology Business Target Areas (Middle Mile)**
  - **Adhere to the "Dig Once" strategy for all horizontal projects**
  - **Develop a business and financial model in support of the strategy**
  - **Develop business relationships with neighboring authorities and providers**
  - **Assist with trans-oceanic landings and mini-data center initiative (Update: Microsoft, Facebook and Telefonica)**
  - **Create plan to address digital divide**
  - **Engage neighboring cities to explore ways to expand connectivity in region**
  - **Explore opportunities to connect with GO Virginia initiative**

- **Phase II**
  - **Explore opportunity to establish a common architecture between city and schools**
  - **Reinvest budgetary savings back into technology**
  - **Develop regional strategy**
  - **Explore other opportunities for technology collaboration for regional strategy**
  - **Expand opportunities with service providers**
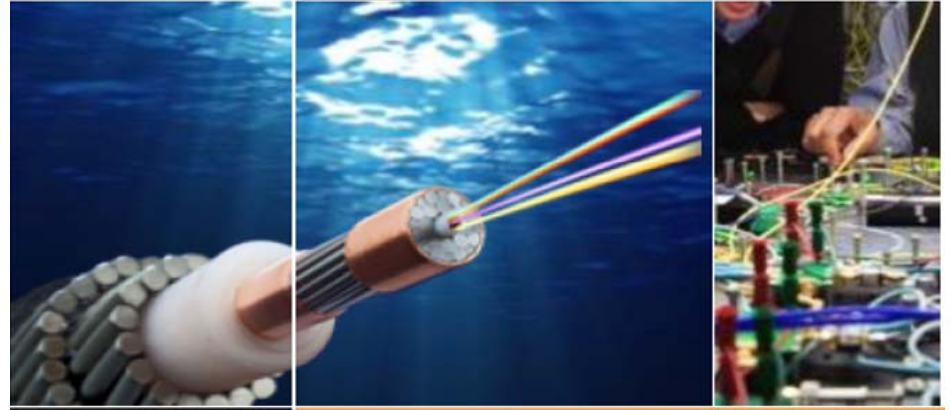
Transatlantic Sub-Oceanic Fiber

Transatlantic Sub-Oceanic Fiber Briefing:
Submarine Cable Map (East Coast View)
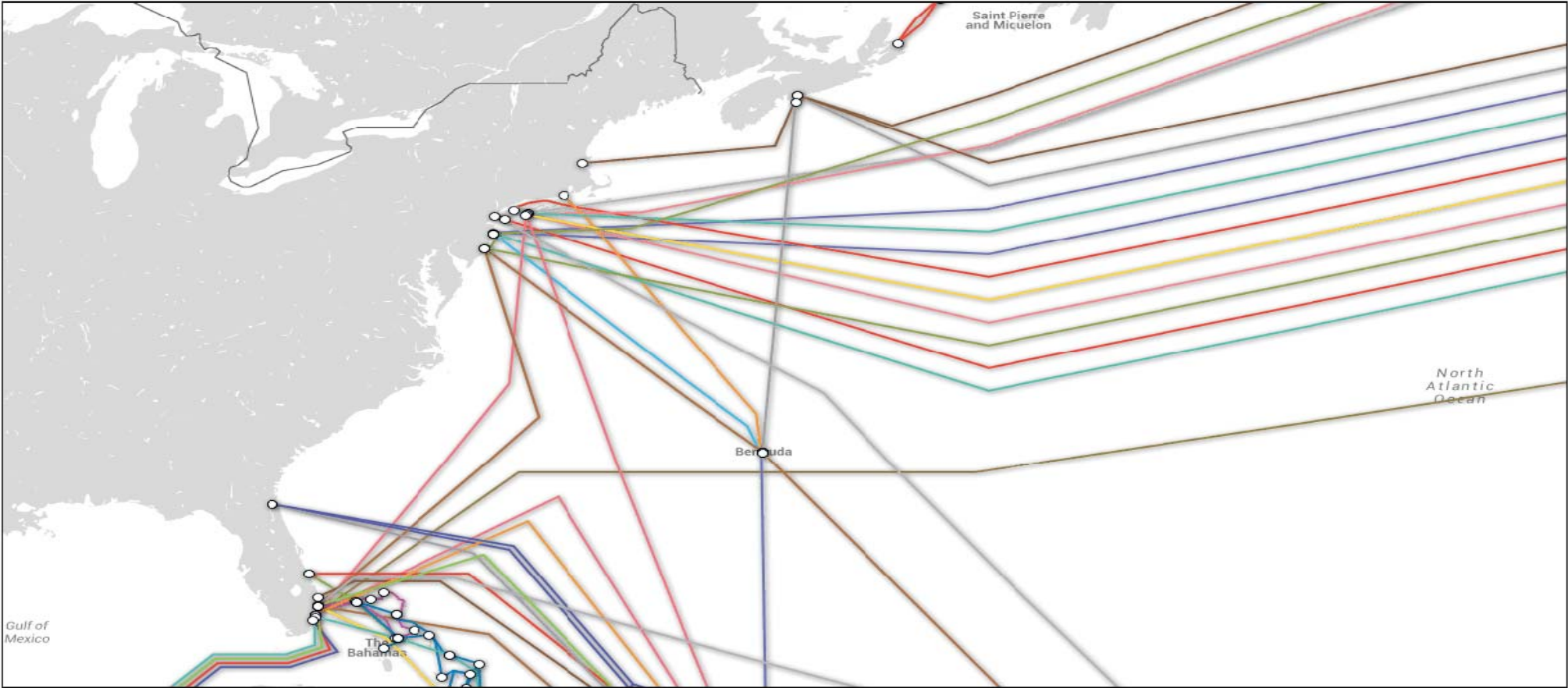
Transatlantic Sub-Oceanic Fiber Briefing:
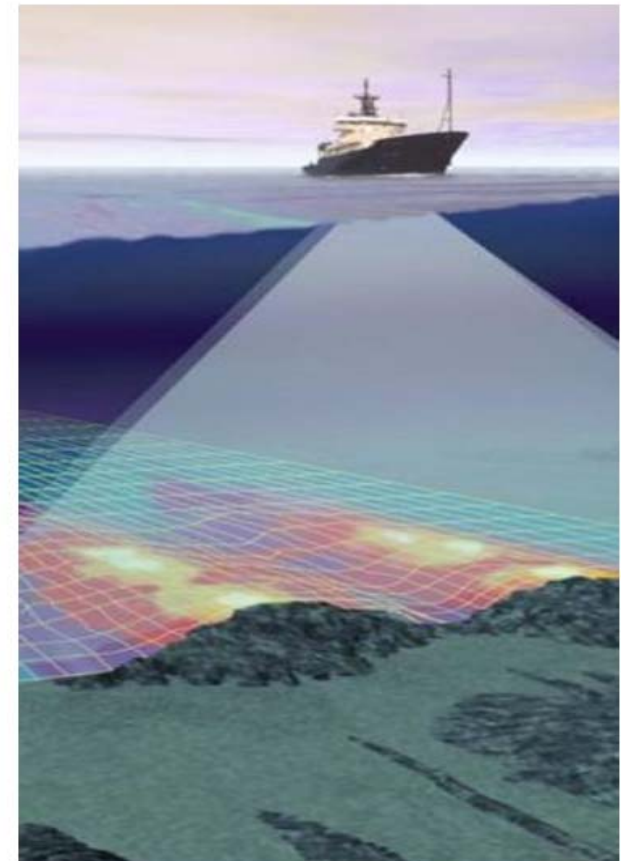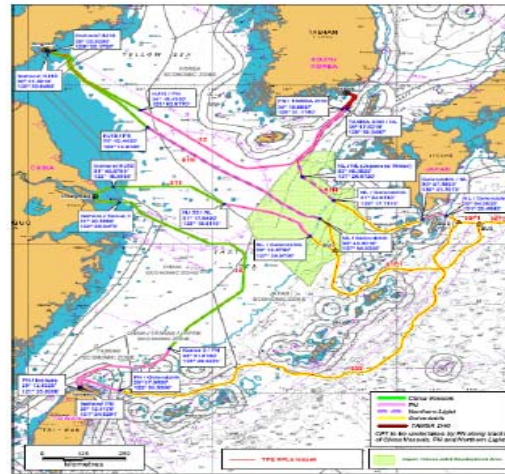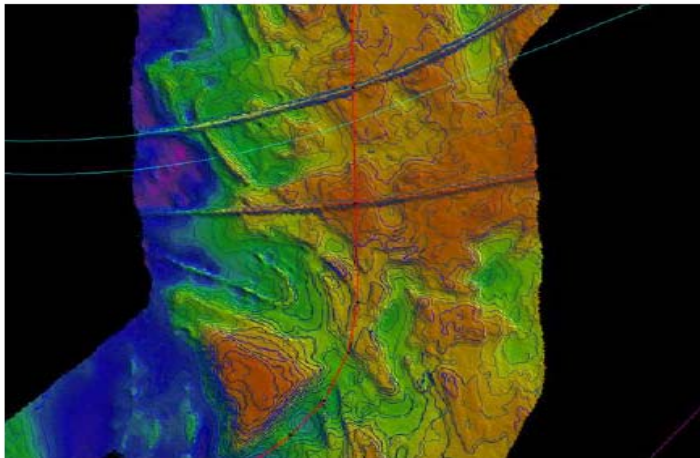## Route Planning, Engineering & Survey

Desktop Study - Initial Risk Identification

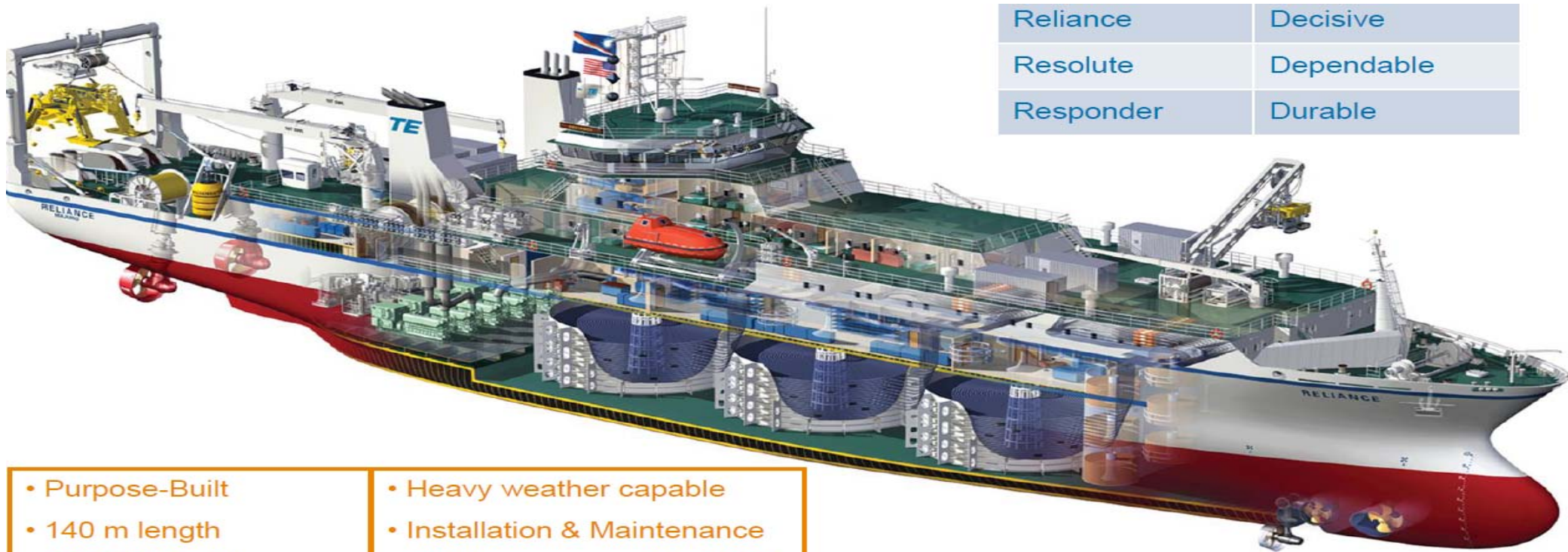**Permitting Assessment** - Regulatory Investigation

Data Collection - Surveys & Inspections

Analysis of Results - Verify Assumptions

Engineering - Methods of Procedure

Transatlantic Sub-Oceanic Fiber Briefing:
## Reliance Class Cable Ships

Reliance	Decisive
Resolute	Dependable
Responder	Durable

- Purpose-Built
- 140 m length
- 5,500 MT cable cap.
- 84 persons
- 60+ days endurance

- Heavy weather capable
- Installation & Maintenance
- Highly maneuverable (DP2)
- Plow & ROV equipped
- 60 MT A-Frame

Transatlantic Sub-Oceanic Fiber Briefing:
Various Burial Tools & Methodology
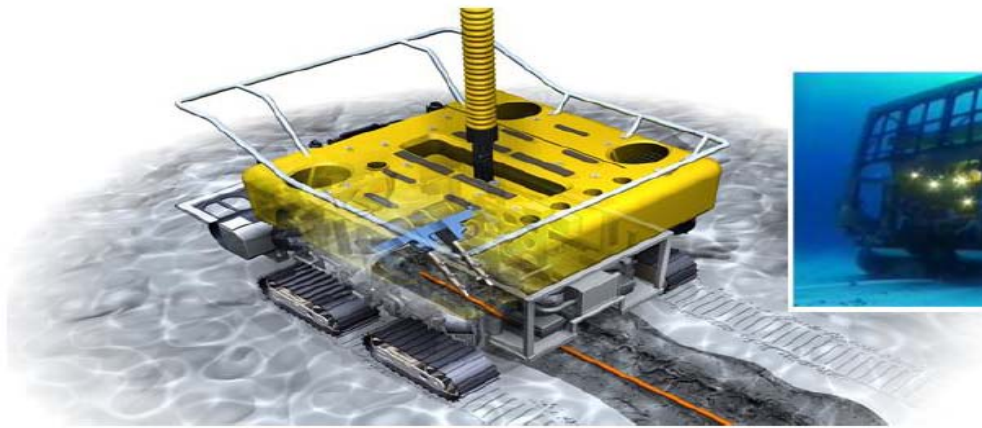
Transatlantic Sub-Oceanic Fiber Briefing:
Beach Manhole (BMH) Installation
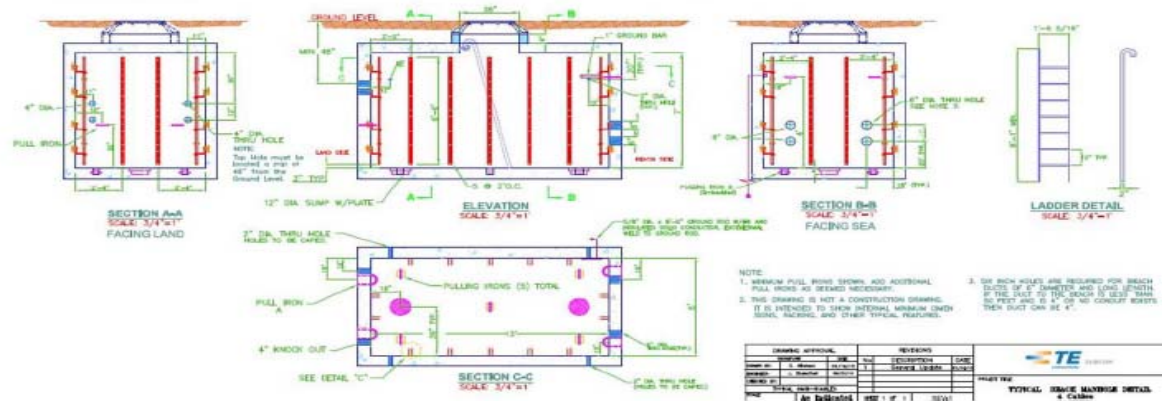
➢ 3 BMH's planned;

➢ Typical BMH Design: 12' L x 6' W x 7' H);

➢ Buried (below ground level) within the parking lot, with corresponding buried ocean ground bed anodes;

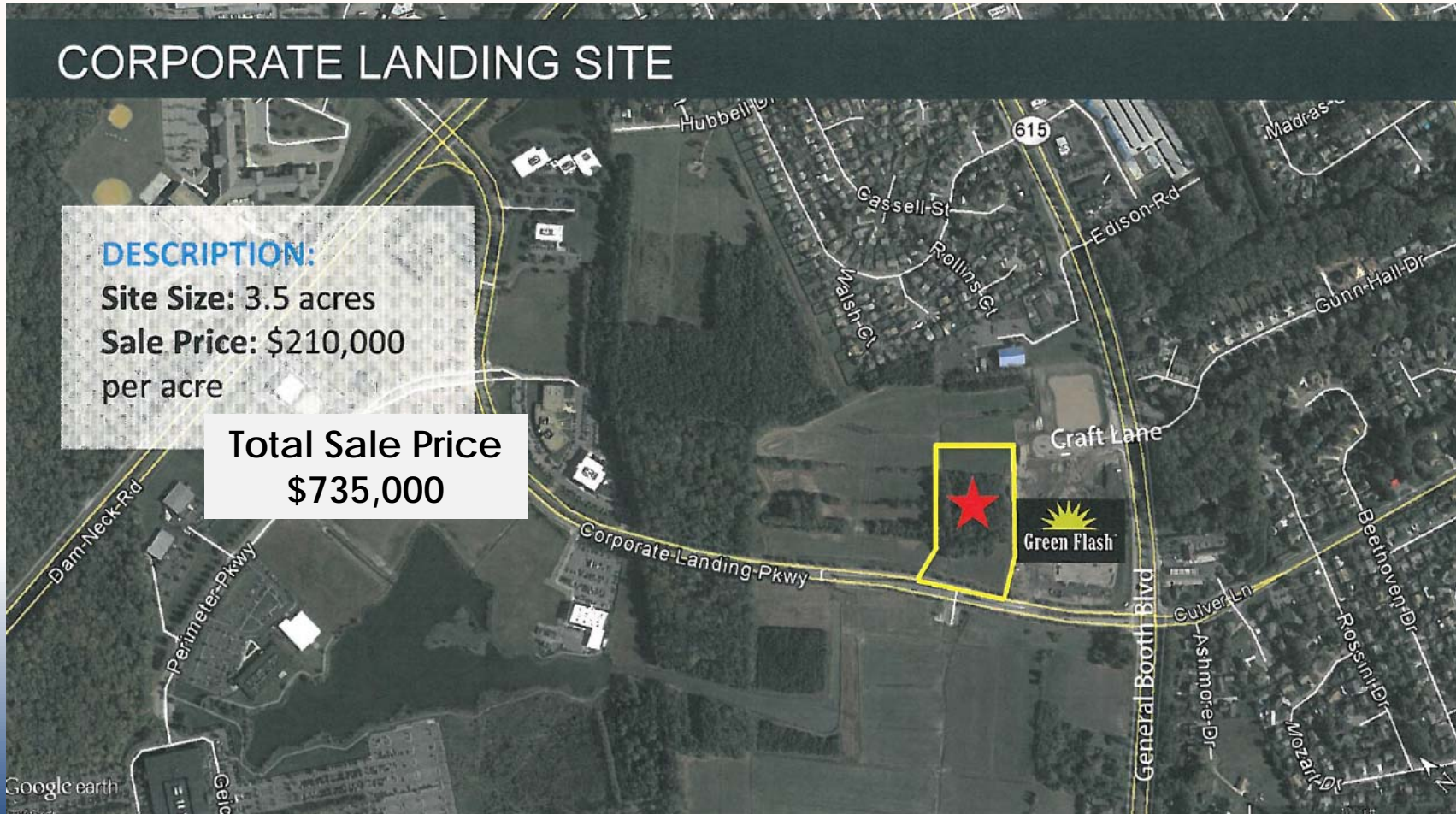➢ No significant impact to the long-term functionality of the parking lot.

VIRGINIA BEACH DEVELOPMENT AUTHORITY APPROVES
SALE OF LAND TO TELEFÓNICA FOR TRANSOCEANIC FIBER COMMUNICATIONS

Transatlantic Sub-Oceanic Fiber Briefing:
Virginia Beach Landing Overview

Telefonica

Microsoft and Facebook

Transatlantic Sub-Oceanic Fiber Briefing: Path to Datacenter

Discussion