Allston Campus Development
HUIT SLT Service Delivery Group

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Nov. 30, 2017    Thursday    9-10am    Smith 561
Purpose and Intended Outcome

• Provide an overview of Allston Campus Development – emphasis on scale and timeframe

• Provide an overview of associated regional IT infrastructure projects, and operational technologies

• Initiate the conversation about on-going HUIT service delivery to the new, growing community and physical campus in Allston
HUIT Service Delivery to the new Allston campus and community

Planning Questions / Topics to consider through this presentation

• How can we improve the Harvard community member experience in Allston and better support cross-school collaboration?
  – differences in HUIT and HBS networking and IAM services as a baseline issue
• What services will HUIT provide to the Allston Campus and Community?
• How, and what resources are needed?
• Where – what are the physical / location considerations?
• What additional collaboration is needed with other IT service provider groups (HBS IT, FAS MTS, FAS Research Computing, SEAS Computing, Wyss Institute IT, others)?
• How do we need to think about HUIT service delivery to the Allston community, given the longer term, planned expansion of the Allston campus (beyond 2020)?

Key Dates
• The Art Lab is scheduled to open in ~Jan-2019 (13 months away)
• Daycare to move in and open in 114 Western Avenue ~Dec-15-2019 (24 months away)
• Allston SEC to open Summer 2020. SEAS has an initial target to complete moving all occupants into SEC and 114 Western Avenue, at least 2 weeks before Fall 2020 classes start. (31 months to end June 2020)
Allston Campus Development:
Harvard Capital Projects
Property Ownership in Allston

The University owns approximately 240 acres of land in Cambridge, and 360 acres of land in Allston.
Allston’s Western Ave. is Boston’s latest hot neighborhood
Projects Underway
Projects Status

- Recently Completed
- Construction Underway
- Next Phase
- Later Phase
Building a 21st Century Academic Area
Science and Engineering Complex - Western Avenue

• Will house approximately two-thirds of the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) in approximately 500,000 SF when it opens in 2020

• Will be among the most cutting-edge teaching and research facilities in the country
Supporting Energy Needs for the District
District Energy Facility – supplying power to the SEC and other projects in Allston.
Adding Art as a Node of Innovation

Art Lab – Planning Underway

• A raw, flexible, and open space
• Permeable building, with activities that could spill outside while engaging the community
• Provide an unprecedented opportunity to cross boundaries of disciplines in pursuit of artistic innovation
Public Realm
Improving the I-90 Interchange
Future Projects
Preserving Land for Future Academic Growth

Future Academic Quads

- Site of the former Charlesview Apartments
- As per Work Team recommendations, preserved for future academic growth, including Gateway Building
Planning for Enterprise Real Estate Opportunities

The area south of Western Avenue and east of the Science and Engineering Complex (denoted by the red boundary) provides opportunity for mixed-use real estate development that could complement the academic pursuits in Allston.
Allston Campus Development:
HUIT IT Infrastructure
IT Infrastructure Approach is Regional

Given the extensive needs for the Allston campus, HUIT has taken a regional approach to IT infrastructure instead of a building by building approach, in order to reduce overall costs, and improve resiliency.

*Red lines reflects existing and planned IT infrastructure – network pathways*
## Regional IT Infrastructure: Near-Term Needs

<table>
<thead>
<tr>
<th>Project</th>
<th>Approval Status</th>
<th>Description</th>
<th>Key Benefits</th>
<th>Operating Tail*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Conduit and Fiber</strong></td>
<td>Construction (FY15-17). Rev. budget FY18 approved</td>
<td>Program Manager, Senior Technical Consultant (0.25 FTE), Project Manager (External Plant) and annual amount for regional conduit and fiber construction.</td>
<td>Establish physical foundation for building network connectivity.</td>
<td>Maintenance costs. Replacement: 40 year life for conduit, 15 year life for fiber.</td>
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<tr>
<td><strong>Regional Wireless Network Core</strong></td>
<td>FY18 approved</td>
<td>Assessment &amp; design (FY18) Implement wireless core (FY19) Incremental implementation of exterior wireless (FY20+)</td>
<td>Increase site and exterior Harvard wireless coverage as the Allston campus is developed.</td>
<td>Support – FTEs, hardware, software support. Replacement: 6 year lifecycle - hardware.</td>
</tr>
<tr>
<td><strong>Regional Network Core</strong></td>
<td>Term position approved. Approved.</td>
<td>Hardware and software for Allston regional network core. Design (FY18) Implement (FY19-20)</td>
<td>Establish redundant, major, data network traffic aggregation points for Allston campus</td>
<td>Support – FTEs, hardware, software support. Replacement: 6 year lifecycle - hardware.</td>
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<tr>
<td><strong>Cellular Enhancement Program</strong></td>
<td>Approved</td>
<td>Role to coordinate cellular enhancement activities with AT&amp;T and Verizon for SEC, DEF, 114 Western Ave and other Allston buildings.</td>
<td>Establish cellular (voice and data) coverage within buildings and sites. <strong>Carriers (AT&amp;T, VZ) have historically funded capital and operating costs.</strong></td>
<td></td>
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</tbody>
</table>

*These annual operating tail costs are **not** included in the project budgets.

** Oct-2017 update: The technology and funding models are changing dramatically. Carriers are shifting away from funding all capital and operating costs.
Network Conduit and Fiber – External Plant
Regional Network Core and Networking for the Art Lab, DEF, SEC and 114W
Allston Regional Network Core & Third Campus Core
Optical Back Bone – Allston

- Optical node
- One Summer
- 100Gb
- Border Gateway 2
- Leased Lightower fiber to ISS, 100Gb waves only. Transponder running in 10x10Gb to 100Gb muxponder mode

- 300 Bent Street
- Direct splice to 300 Bent via WJK cable
- Border Gateway 1
- 100Gb

- SEC Building
- Optical nodes
- Multiple SEC/Allston cables back to campus
- Passive per-channel cross-connect

- Campus
- Optical node

- 100Gb & 10Gb SR or LR handoff to central core device and other applications
Regional Wireless Networking
Regional Wireless RF RFP and Implementation

• RFP issued in July 2017. Dewberry Engineers selected.

• Two components. Outdoor design for wifi and Cellular Report as baseline this fall and again when building is enhanced for cellular service and substantially complete.
  
  – RF Study as baseline for researchers in SEC

• Wifi – 60’ radius in dense areas, 100’ in open/line sight areas

• Aruba AP 370 outdoor series as guidance for budget place holder for SEC outdoor spaces. Can be updated/changed.

• Wifi: Utilize existing or to be built infrastructure. Blue Phones as example of the former and the ArtLab building as the latter.
Cellular Enhancement Program
## Strategy for In Building Cellular Coverage

**Goal:** Improve cellular coverage within Harvard owned buildings

### Current State

- Use of mobile devices expanding across campus
- Students, faculty, and staff increasingly depend on cellular devices for instruction, research and administration
- Cellular network coverage for carriers is robust throughout Cambridge and Boston, however, coverage is inconsistent within Harvard buildings
- Complaints regarding poor coverage within Harvard buildings and tunnels are increasing
- Users want choice of cellular service provider

### Future Vision

- Improved in-building cellular coverage through partnership with service providers
- Provide access to multiple cellular service networks utilizing a system that ideally is carrier agnostic
- Reduce complaints and improve cellular, mobile device user experience
Likely Future Cellular Enhancement Deployment

• Enterprise Radio Access (E-RAN) – Spider Cloud
• Offers an alternative to legacy distributed antenna systems (DAS)
• Easier and quicker to deploy than DAS
• Operates at the Physical Layer
  – Is deployed over an Ethernet LAN, just like Wi-Fi - uses Harvard's Infrastructure
  – E-RAN can securely share the LAN with Wi-Fi
Operational Technology (OT) in Allston
The Harvard OT landscape

• Building access control
• Security cameras
• Building automation
  – Lighting, HVAC/temp., fire detection/suppression, boilers, refrigeration, chilled water, UPS
• Lab automation
  – Fumes, oxygen, toxic gas, lighting, etc.
  – Lab device automation
• Physical plants
  – Power, Steam, Chilled water
• Garages doors and gates
• Faculty/students experimentation with open hardware technologies (Arduino, etc.)
OT: Allston Science and Engineering Complex (SEC)

Total Cost of Ownership
### Numerous Low Voltage Systems

| Wireless Access Points (device, support, patch cord) | Room Reservation - EMS | electrical metering |
| AV Conduit/Box/Cable | Room Reservation - EMS | electrical metering |
| AV Cameras/Equipment | Room Reservation - EMS | electrical metering |
| AV Fittings (cabinets, podiums) | Room Reservation - EMS | electrical metering |
| Security Conduit/Box | Room Reservation - EMS | electrical metering |
| Security Cable | Room Reservation - EMS | electrical metering |
| Security Devices - Access Control (Proximity) | Room Reservation - EMS | electrical metering |
| Security Devices - Video (cameras, housings, NVR) | Room Reservation - EMS | electrical metering |
| IT End User Devices (workstations, mounts, monitors, printers, tablets) | Room Reservation - EMS | electrical metering |
| Wall mounted displays (non-AV, informational signage, room reservation) | Room Reservation - EMS | electrical metering |
| Distributed Antenna - Cellular | Room Reservation - EMS | electrical metering |
| Distributed Antenna (Emergency Radio) - Public Safety | Room Reservation - EMS | electrical metering |
| Video Intercom | Room Reservation - EMS | electrical metering |
| BAS/BMS with IT Requirements | Room Reservation - EMS | electrical metering |
| Fire Alarm System | Room Reservation - EMS | electrical metering |
| Physical Access Control C-Cure 9000 | Room Reservation - EMS | electrical metering |

**Not an exhaustive list**
NEW TO HARVARD (to be deployed or have been explored)

<table>
<thead>
<tr>
<th>System Description</th>
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<tbody>
<tr>
<td>New Building Management System – Schneider Electric BMS (ENE Systems)</td>
<td>High performance energy recovery system (Konvekta)</td>
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<td>Digital Irrigation control system</td>
<td>Digital lighting control system</td>
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<tr>
<td>Digital shade control system</td>
<td>Commissioning system (Clockworks)</td>
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<td>Green screen displays</td>
<td>Digital locker system</td>
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<tr>
<td>Bicycle parking access control</td>
<td>Wayfinding application</td>
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**Not an exhaustive list**