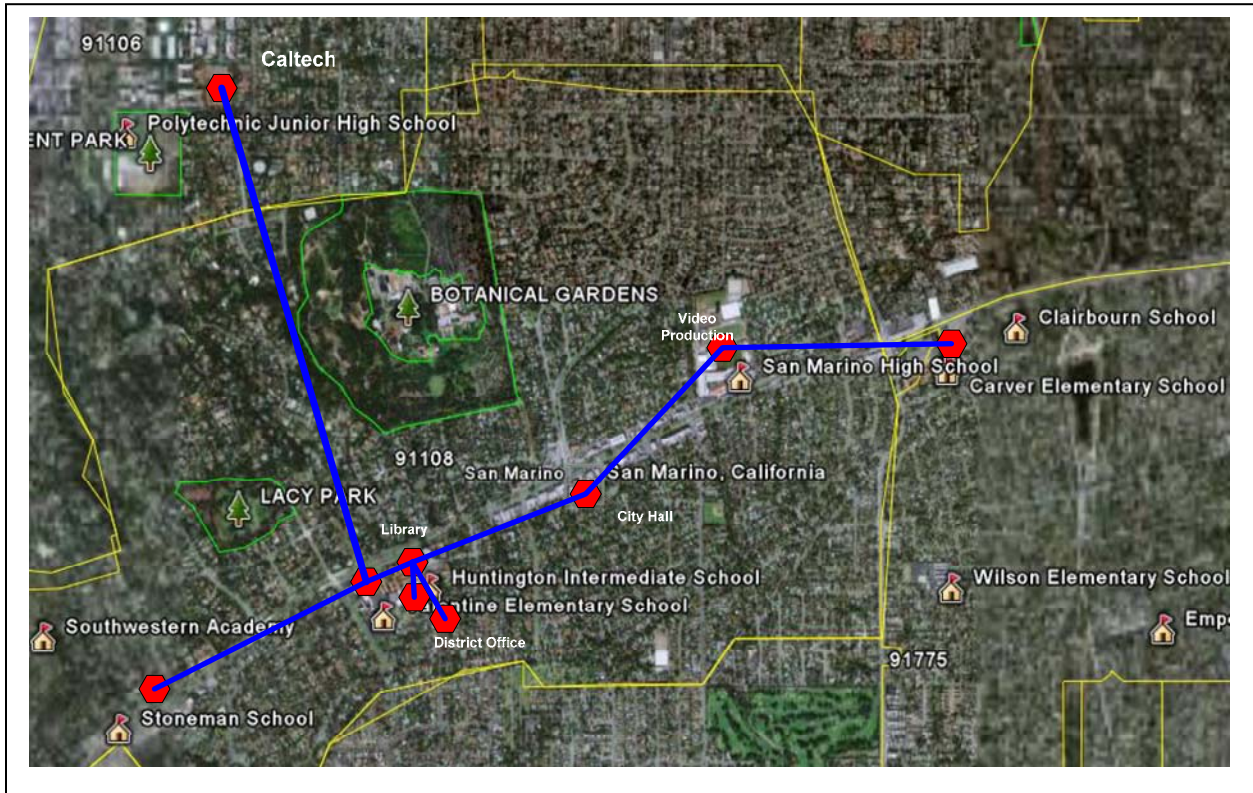


Next Efforts

1. Obtain Basic Agreement the core plan is worth
2. Determine the connection sites and associated functional requirements
3. Determine the best long term ISP solution
4. Determine the best methodology for site interconnection & cost estimate
5. Price system in logical phases
6. Present plan to administrative groups
7. Public Discussion
8. Funding
9. Implementation
10. Verification

DRAFT

Recommendation



Drawing 3: Fiber Links Down Huntington Drive and Up to Caltech

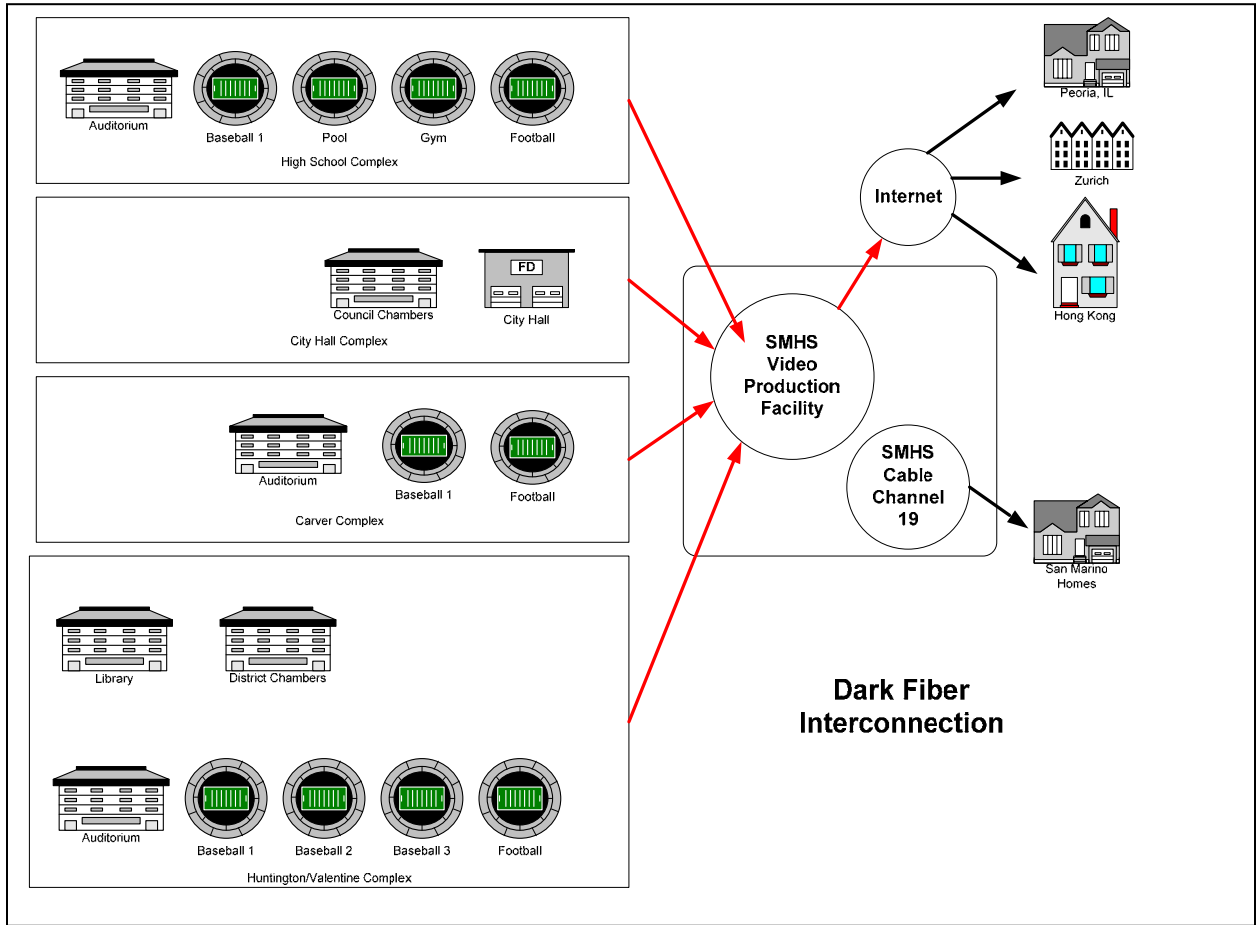
Wiring up the schools was the difficult part. To a large extent, this has already been completed. The proposed effort links the schools and associated city facilities together onto a common high speed backbone. Ultimately this will connect to Caltech's, AT&T's, or Time Warner's backbone. Caltech's is shown in Drawing 3 for simplicity.

The recommended effort involves connecting the schools and civic facilities shown above with multipair fiber optic cabling. This will likely involve a combination of pole mount and/or trenching efforts down Huntington Drive. An investigation into wireless interconnectivity is also warranted as part of this effort.

Benefits

The long term benefits to the school district and the city services are difficult to quantify, but are undoubtedly of great significance. (Expand)

Dark Fiber Interconnection



Drawing 2: Adding Video Features to the System

In addition to adding high speed Internet access to the schools, the further addition of “dark fiber” optic cables would allow for video and audio content to be shared with the world via the Internet and Cable Channel 19. This is shown in Drawing 2.

Adding the dark fibers and expanding the existing SMHS video production facility would allow the community (and world) to see our plays, ceremonies, games, and related productions stored on file servers for many years to come. Expanding the fiber plant to the City Hall, Library, and School District offices would allow for council meetings, district meetings, and related video productions to be shared to others both in and out of the community. The addition of file servers would allow this to be watched online at a more convenient time.

Current Status

The San Marino School District currently has all of its facilities wired internally with CAT5 based cabling infrastructure and 54 Mpbs WAP wireless interconnection. This provides for a variety of administrative services to be performed.

Interconnection between the facilities is limited to dual T1 bandwidth. Depending on how it is segmented, this allows for a maximum bandwidth of 3 Mbps. This is roughly the access speed a child in their home has access to via a Time Warner cable modem.

Simply put, this is insufficient to support a single channel of uncompressed standard definition video, let alone multiple high definition video permutations. It is presumed that future educational efforts will be highly dependent on video teaching and training via the Internet (See Drawing 1).

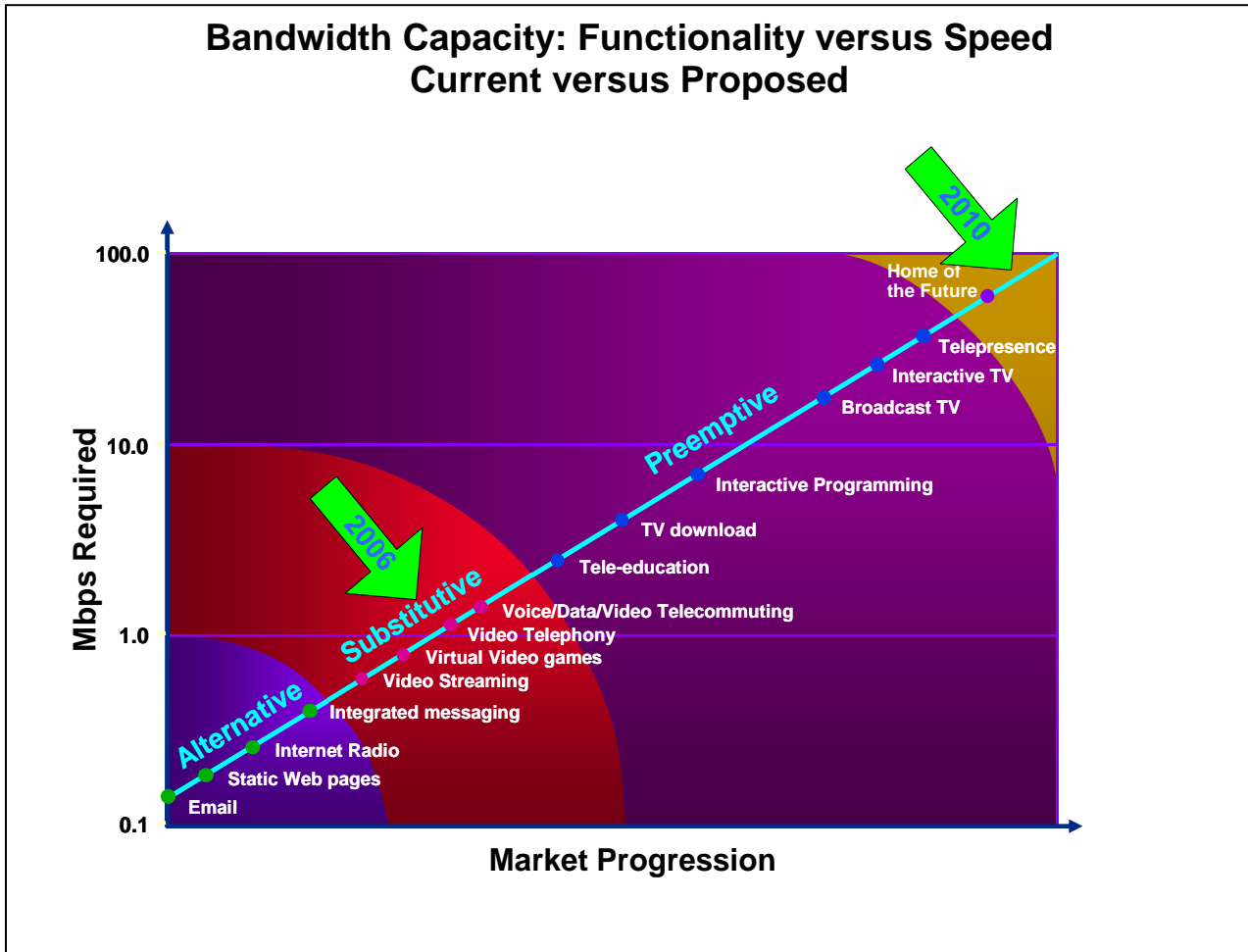
In addition to Internet linkage, there is no “dark fiber” backbone infrastructure to pump video content between the distributed facilities in town. This denies the ability to use the local cable channel to provide: high quality internal video production for the following:

- Video Production Facility at the High School
- Athletic contests from the High School fields.
- Athletic contests from the Huntington and Valentine fields
- City Hall Meetings & Stored Content
- Library (Multiple Requirements)
- Remote Archival

| Connection Type | Bandwidth | Description |
|--|----------------------|---------------------------------|
| T1 (\$500/month) | 1.544 Mbps | Current School Service |
| DS1C | 3.152 Mbps | Service |
| Time Warner Roadrunner (\$50/month) | 2.0-3.0 Mbps | Typical Home Cable Service |
| Standard Definition DVD/Windows Media 9 HD compression | 4-9 Mbps | 1 channel |
| Compressed High Definition Video | 16-45 Mbps | 1 channel |
| T3 (\$7,000/month) | 44.736 Mbps | Service |
| OC-1 | 51.84 Mbps | Optical Service |
| 802.11g | Up to 54 Mbps | Current Wireless Network |
| CAT 5 Cabling | 100 Mbps | Cabling |
| OC-3 (\$30,000/month) | 155.52 Mbps | Optical Service |
| Cat 5e Cabling | 1000 Mbps (Gigabit) | Cabling |
| Cat 6 Cabling | 1000 Mbps (Gigabit) | Cabling |
| Cat 6e | 10 Gigabit Ethernet | Cabling |
| Cat 7 | Full Motion Video | Cabling |
| OC-12 (Caltech's Service) | 622.08 Mbps | Optical Service |
| OC-48 | 9953.28 Mbps | Optical Service |

Table 1: Relative Bandwidths of Wire, Services, and ISP connections.

Where are We?



Drawing 1: Network functionality versus Bandwidth

Various system capabilities are possible dependent on the available bandwidth. San Marino’s school district’s capability to provide additional services is hampered by the relatively slow interconnection bandwidth connecting its major facilities. In order to addition more services, adding bandwidth is required. The green arrows in Drawing 1 detail the relationship between available bandwidth and service offerings possible.

Synopsis

The preliminary plan presented discusses the current bandwidth differential between how San Marino's schools are wired internally and how the schools are interconnected. A recommendation is made that will improve the bandwidth between the schools as well as to the Internet using fiber optic cable. The potential benefits include:

- Video teaching capability via Internet
- Video linkage of performing art centers and sports facilities
- High speed data connectivity for schools
- High speed data connectivity for the Library
- High speed data connectivity for the Civic Center
- Expansion of San Marino Cable Channel

Assumptions & Exclusions

For the purposes of this document, we are assuming that the San Marino School District consists of the following physical facilities:

- San Marino High School
- San Marino High School Video Production Facility (link to Time Warner)
- Carver Elementary School
- Stoneman School
- Valentine School
- Huntington Middle School
- San Marino Public Library
- District Offices
- San Marino City Hall

**San Marino Schools
Technology Infrastructure
Preliminary Plan**

May 30th, 2006

Submitted by:

Infrastructure Subcommittee

John Mayberry (Chair)

Jose Yong

Don Penn

Cynthia Chen

Jerry Wang