

Planning for SCADA – A lot of questions to start

- Who will use the system and where is it required to be implemented?
- What is the intent and what should be displayed to coordinate operations?
- Where is control needed?
- What kinds of communication are best and how do we secure our systems?

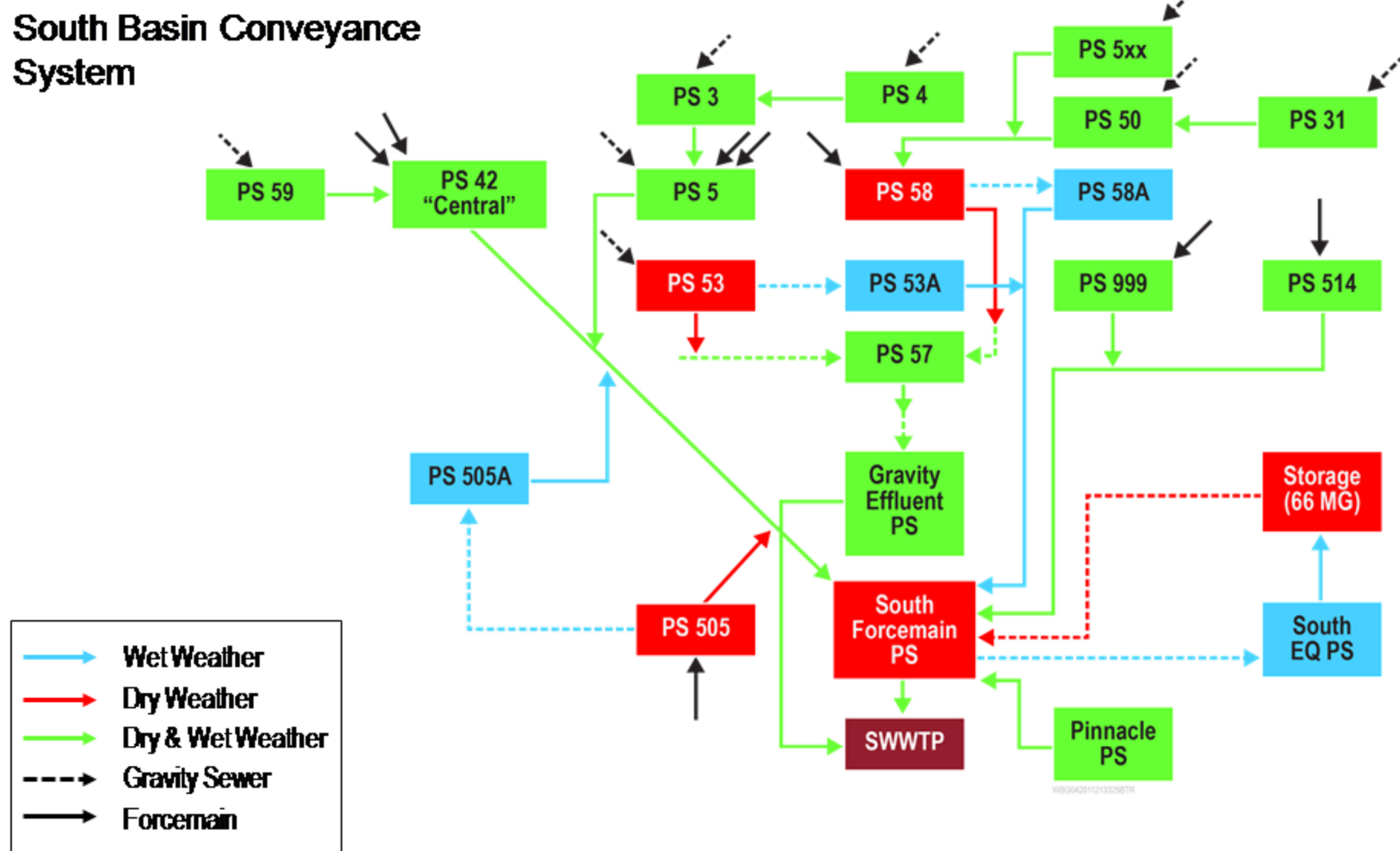


Central SCADA Control will direct the following activities by SOP:

- Solids processing operations at WWTPs
- Liquid flow decisions in collection and treatment
- Control flow from major pump stations
- Direct flow into storage or return to system

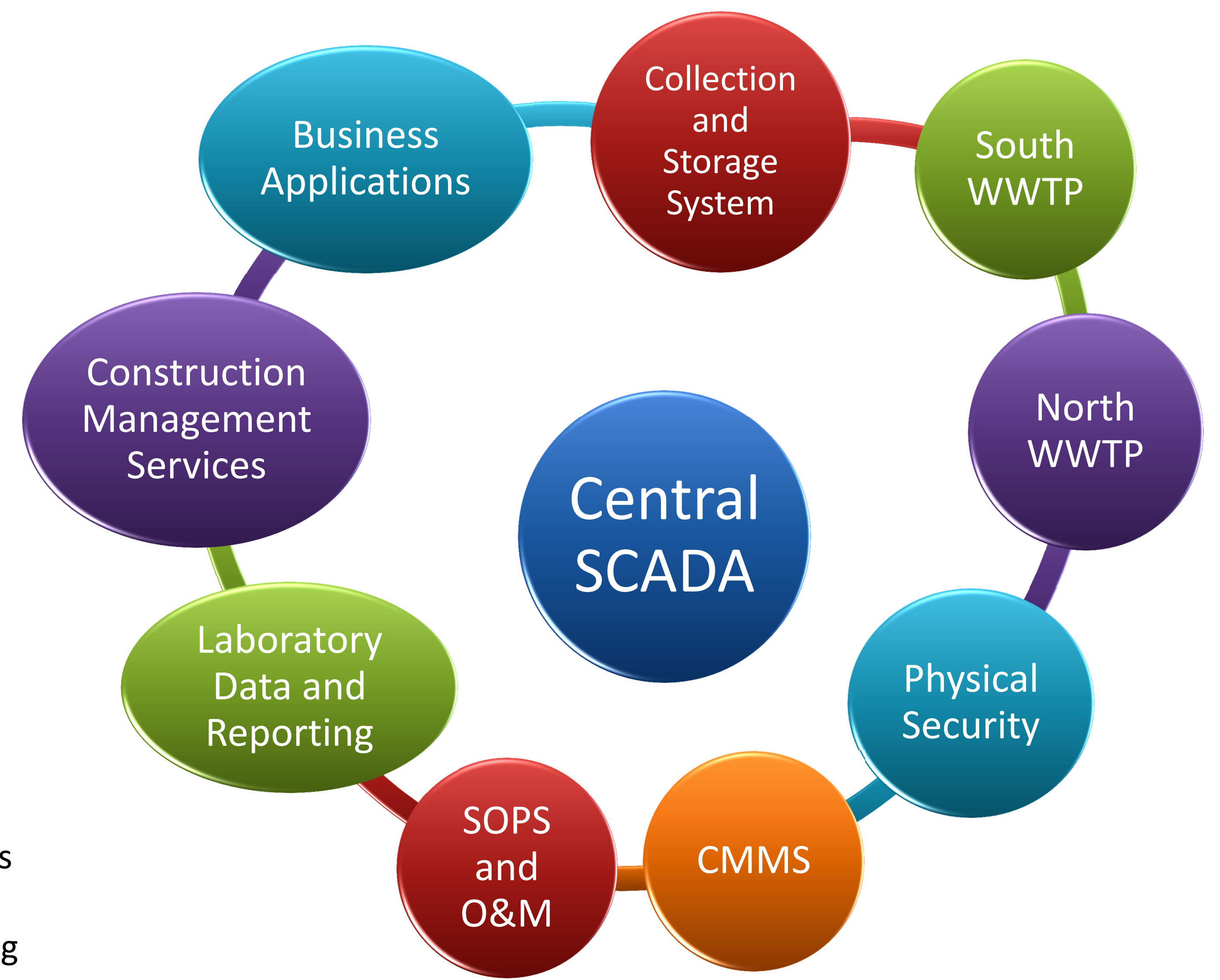
Coordination of Pumping and Storage Facilities

South Basin Conveyance System

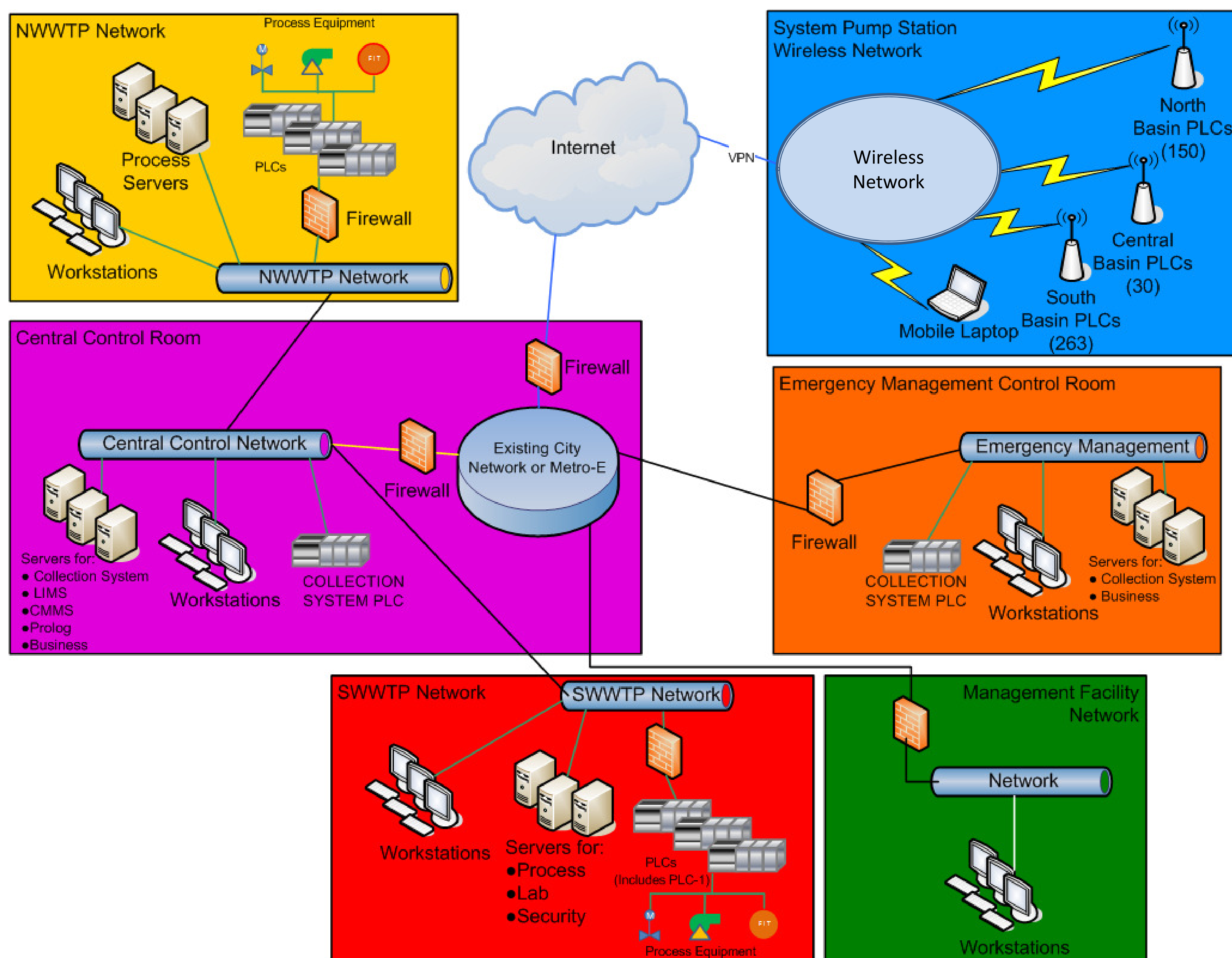


- See all facilities from a single central station
- Coordinate flows to major treatment facilities
- Monitor during major storm events
- Coordinate storage at pump stations and tanks
- Make decisions based on current weather
- Centrally store information for future modeling

SCADA Coordination Between Systems



Example SCADA Architecture



- Select communications for remote and major facilities based on cost, reliability, and security
- Determine control room locations and methods of redundancy to reduce single points of failure
- Provide a hierarchy for access to the control system and to data; define user accounts and access
- Provide mobile field access for to SOPs, O&Ms, and logging field reports
- Segregate SCADA and Business applications
- Provide high availability for SCADA and require scheduled upgrades that are "pushed"
- Limit access
- Provide access to business systems and continuous monitoring and updates using appropriate appliances and services

Remote Communications

- Ownership versus third party (cost versus maintenance).
- Ownership requires capital investment and a staff that can maintain. System should be completely private and Owner has control.
- Third party generally has lower cost for new installations but uptime and response time should be considered.
- Cellular is a good option as it is low cost and far reaching. Careful work needs to be done to ensure data costs are controlled including poll times and connection lifetimes.
- Security is key and can be handled by private networks or security devices.

Backbone Communications

- Similar to Remote in Ownership versus third party.
- Bandwidth is important and can be costly for third party providers. Options exist including leased fiber, metro-Ethernet, private Fiber, and MPLS.
- Proper planning can allow for deployment of fiber and radio systems during other upgrades.

Hardware

- PLCs for remote control and monitoring. Need to coordinate communication protocols.
- SCADA servers and historians. Redundancy in servers is important but not necessarily historians.
- An abundant number of client schemes are available such as full clients, thin client, and web clients to meet a multitude of needs and budgets.
- Security is important in limiting access to hardware using locks and secure rooms.

Control Rooms

- Location and layout important to operation and operator satisfaction.
- Number and type of displays are key. Need pertinent information readily available in a format that is easy to see and physically accurate.
- Number of displays, size, and location is critical in providing environment that is user friendly and functional. Care needs to be taken in coordinating resolutions, formats, and display feeds.