

## Narratives of Design

### Mechanical Systems:

Central Plant: The central plant will consist of a ground-source (geothermal) loop feeding individual water-source heat pumps throughout. Central water-source energy-recovery dedicated outdoor air (DOAS) units will provide ventilation air throughout. All geothermal pumping will be variable flow for energy management. The geothermal solution will be 30% propylene glycol to expand the performance envelope of the wellfield and minimize the number of wells required. A supplemental electric boiler may be provided for tempering of the loop in extreme conditions pending the results of the geothermal well field capacity.

Alternate Central Plant:

The alternate central plant will be based around a high efficiency air cooled heat-pump chiller for primary cooling and heating, with a supplemental electric boiler for heating in the coldest months. Variable-flow pumping will be used for all hydronic distribution. High efficiency direct outside air (DOAS) units with integral energy recovery will provide pre-treated ventilation air to the spaces.

Core Learning Spaces: General occupied areas such as classrooms, media center, teacher workrooms, community rooms, and computer labs are to be served by individually-zoned, concealed blower-coil style terminal units feeding supply and return air through acoustically-appropriate ductwork. Ventilation air shall be introduced directly through the units after precondition by the DOAS units.

Central Office Areas: Administrative and guidance office areas are to be served by individually-zoned units mounted in the ceilings. Ventilation and exhaust are to be achieved via indirect-coupled energy recovery DOAS units.

Group Areas: The cafeteria, gymnasium, auditorium and stage are to be conditioned by individually-zoned, packaged cooling / heat pump primary rooftop air handling units with hot-gas reheat for humidity control along with integral energy recovery. The HVAC equipment serving these areas are to utilize demand-controlled ventilation via CO<sub>2</sub> sensors mounted within the space and utilize economizers for free cooling.

Dedicated Shop / Construction Lab Areas: Shop areas and construction lab areas shall be served by dedicated heating and ventilation units with dedicated exhaust fans. Spaces shall be ventilated per code, and utilize economizers for free cooling.

IDF/MDF Rooms: IDF/MDF rooms will be served by dedicated wall or ceiling-mounted DX cooling systems.

Toilet Rooms and Locker Rooms: Toilet rooms and locker rooms shall be served by individual terminal units and ventilated via central energy recovery ventilation units.

Storage Rooms: Storage rooms will be ventilated as part of the central ERV system or via a dedicated exhaust fan, depending on the equipment being stored therein. Heat will be provided

via electric unit heaters or electric radiant heating, depending upon the size and location of the room.

A complete direct-digital control building automation system is to be installed to control the HVAC system in this facility.

Air handling units and energy recovery ventilators are to be provided with filters with a minimum rating of MERV 13.

### **Electrical Systems:**

**Power Distribution:** An outdoor, pad-mounted transformer and main switchboard are to be installed and sized to handle 100% of the power demand for the facility. A new, underground, 2500 Amp, 480V/ 3ph service is to be installed to power the main disconnect and subsequent distribution sections. Distribution panelboards and step-down transformers are to be installed throughout the facility as required to power all loads. New receptacles will be provided throughout the facility with new wire and conduit. The site will be prepped for the future installation of solar panels with a dedicated breaker space assigned for connection to the inverters.

**Generator:** A new gas fired generator will be provided to supply emergency power to the life safety systems, IT equipment, and walk-in coolers in the event of a power failure.

**Lighting:** All new classroom lighting and corridor lighting levels will be designed per the latest Illumination Engineering Society of North America's recommendations. In an attempt to conserve as much energy as possible all lighting fixtures will be LED. This reduces energy consumption and maintenance costs. All fixtures will have a CRI of 80 or greater, be RoHS compliant, maintain a minimum 70% of initial light output at 50,000 hours of operations, and have a minimum efficacy of 50 lumens/ watt.

- All rooms with windows will have photocell controls to reduce energy consumption.
- We are committed to minimum 25% reduction in lighting energy use under the ASHRAE baseline.

SPACE	LIGHTING CONCEPT	FIXTURE	CONTROLS CONCEPT
Breakout/ enrichment	Wall washers Recessed circular troffer	E/ M	Occupancy sensor, dimming
Back of house	Industrial strips or troffers	C/ F	Vacancy sensor
Cafeteria	Linear recessed troffers, Decorative pendants track lighting for platform	J/ P	Occupancy sensor Dimming for platform
Classrooms	1x4 LED direct lay-in panels	D	Vacancy sensor with override, Dimming
Corridor	2x2 direct/ indirect troffer Decorative pendants	D/ A/ N	Occupancy sensor. When no motion lights reduce to 20% consumption. Timeclock override to off.

Gymnasium	High Bay fixtures	B	Vacancy sensor
Learning commons	Linear recessed	J	Vacancy sensor. When no motion lights reduce to 20% consumption. Timeclock override to off. Dimming
Library	Linear recessed with decorative over the desk	J	Vacancy sensor Dimming
Offices	2x2 direct/ indirect troffers	A	Vacancy sensor
Restrooms	Linear wall slot Downlights	G	Occupancy sensor

Notes:

- Occupancy sensor: auto on/off
- Vacancy sensor: manual on/ auto off

Data/IT Systems:

- Definitions:
  - Furnish – To supply, deliver, unload, and inspect for damage
  - Install – To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
  - Supply – Same as Furnish
  - Provide – Turn furnish and install to include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the work.
  - ID – Intrusion Detection
- All new horizontal data and voice cabling and terminations shall be provided throughout the building. Category 6A cabling for data and voice; Terminations shall be based on ANSI/TIA/EIA-568-B and terminated on RJ45. WAP infrastructure shall also be CAT6A.
- For Wireless, place one WAP in each classroom. Owner to supply contractor to install. WAPs in hallways shall be spaced at 50 feet on center. At each Wireless location, run (2) Category 6A Data drops to the middle of the ceiling and terminate on biscuit jacks with a minimum of a 6-foot service loop
- For Classroom drops, at the Teacher location, need 2 Category 6A ports
- For the SmartBoard/IFP location, (1) Category 6A ports
- For each IP Video Surveillance camera, need (1) Category 6A drop terminated on RJ45
- All new vertical data cabling shall be multimode fiber with LC connectors capable of 10 GB of bandwidth. Fiber will be run from the MDF to all IDFs.
- All new vertical voice cabling shall be multimode fiber and part of data as phones are VOIP.
- All new data patch panels, cabling, infrastructure, etc. shall be Hubbell Premise or approved equal.
- All classrooms shall have the following either existing or new.
  - Teacher outlet
    - 2 data ports connected to the LAN
  - WIFI access points ceiling mounted.
  - One PA speakers in ceiling for each classroom.
  - New large-format touchscreen interactive flat panel(IFP) will be mounted in each classroom. IFPs will be Smart SPNL 6075 latest iteration. They will be mounted utilizing vertically adjustable wall mounts.
  - One Desk Mounted VOIP Phone per classroom. Owner provided.
- All offices shall have a data outlet with 2 data ports per workstation.

12. WAPs will be Owner supplied and Contractor installed.
13. WAPs will be installed in the following locations:
  - a. One in each classroom
  - b. One every 1,500 SF or larger spaces and office suites
  - c. Other areas as directed by Owner
  - d. In corridors spaced at 50 feet on center
14. UPSes – UPSes shall be Owner provided.
15. All CAT6A cabling shall be color coded as follows
  - a. Data: blue
  - b. WAP: yellow
  - c. Video surveillance: green
  - d. PA speakers: gray
  - e. Card Access: gray
16. Applicable patch cables shall match colors noted above.
17. Patch panels shall be dedicated system specific based on function:
  - a. Standard Data CAT6A
  - b. WAP CAT6A
  - c. Video Surveillance CAT6A
  - d. IP/PA speakers CAT6A, Analog PA speakers 18 gauge 2 conductor shielded
  - e. VOIP CAT6A
  - f. Any others to be confirmed by Owner
18. Patch panels shall have 1U space adjacent to them for 1U switches.
19. Switches for data, WAPs, and VOIP, etc. to be Owner supplied/configured and contractor installed.
20. The nominal IDF size should be 8'x6'6" minimum.
21. The nominal MDF size should be 8'x10' minimum.

Video Surveillance System:

1. Video surveillance system equipment (server(s), workstation(s), cameras, etc.) to be Owner provided. Contractor to provide infrastructure (outlets, cabling, and patch panels). Owner's camera vendor to provide locations of cameras to Architect/Engineer for inclusion of infrastructure in bidding document.

Clock System:

1. A bogen/sapling wireless clock system shall be the basis of design.
2. The master clock shall be programmable via a dedicated, web based application, and it shall synchronize time utilizing internet based NTP server(s).
3. The area clocks shall be battery powered.
4. Classroom clocks shall be analog, 12" round clocks.
5. Large areas will utilize 16" nominal analog, round clocks.
6. Clocks in gymnasium areas shall be provided with wire guards.

Intercom/PA System:

1. PA system shall be a hybrid IP/analog based system. The system will be broadcast/one way only. Two way communication is not desired. The basis of design for the PA system will be Bogen.

2. System may be interconnected with the phone system to allow for authorized announcements from the phone system as desired by Owner. Owner to provide information on Owner provided VOIP system to confirm feasibility of interconnection.

Intrusion Detection Systems:

1. Vendor and basic design parameters to be confirmed by Owner.
2. System will consist of motion detectors in select areas as well as door contacts on exterior doors.

Access Control:

1. Vendor and basic design parameters to be confirmed by Owner for access control requirements.
2. Scope of access control to be confirmed. Select exterior entry doors are to be hardwired for access control.

Phone System:

1. Phones will be VOIP type phone.
2. Phones and any other ancillary equipment will be Owner provided.

**Plumbing Systems:**

Domestic Water Piping and Fixtures: A new domestic water service will be provided All fixtures not pertaining to food service are to be low flow.

Domestic Water Heating: Geothermal water heaters will be utilized for the project with tank-type electric commercial water heaters as redundant back-ups to provide heated water, with thermostatic mixing valves and a new recirculation system to meet current plumbing codes. 120 degree temperature water will be provided throughout.

Fixture Valves and Controls: Flush valves and faucets are to be provided with motion sensors and self-generating power supplies or 10 year warranted batteries for power. Urinals shall be pint-flush rated or waterless.

Sanitary: A new sanitary tie-in to the existing municipal service will be installed during this project. A new grease interceptor will be installed to serve the food service areas.

**Life Safety and Fire Protection:**

Life Safety Systems: A new emergency voice and communications system (EVACS) complying with the provisions of NFPA 72 National Fire Alarm and Signaling Code (2019 Edition) will be installed in the building. Audible and visible notification will be provided by speakers, strobes, and combination speaker-strobe appliances throughout the building.

Manual pull stations will be provided within 60" of each exit. In accordance with the RILSC, smoke detectors will be provided in all corridors, lobbies, at the top of stairwells and on each stairwell landing, elevator machine rooms and machine spaces, and all elevator landings. A

smoke detector will also be provided in the immediate vicinity of each piece of fire alarm control equipment (i.e., remote power supply, amplifier, fire alarm control unit).

Emergency forces notification will be provided directly to the Newport Fire Department via a new radio master box.

The fire alarm system will be interfaced with the newly installed HVAC fans so that any fan with a capacity of 2,000 cfm or greater is automatically shut down upon fire alarm activation. The fire alarm system will also be interfaced with the elevator to provide primary and alternate level recall as well as the firefighter flashing hat function. Other interfaces (i.e., kitchen hood suppression system, theater A/V equipment, etc.) may be identified as the design progresses.

Fire Protection: A full coverage automatic sprinkler system complying with the provisions of NFPA 13 Standard for the Installation of Sprinkler Systems (2016 Edition) will be installed in the building. The underground fire service will enter the building through a first-floor mechanical space. A double check valve backflow preventer located in this space will protect the municipal water supply from contamination. A fire pump will be provided if required, pending results of flow testing.

A wet pipe sprinkler system will be provided throughout the building. All system piping will be located above the ceiling wherever it is practical. Sprinkler system risers will be located in interior exit stairwells as necessary, with a drain riser located next adjacent to each supply riser. A floor control assembly will be provided, at a minimum, for each floor level. Each floor control assembly will consist of a control valve, check valve, waterflow switch, and inspectors test and drain assembly. Air vents and pressure relief valves will be provided for each zone control assembly. All control valves will be electrically monitored and supervised by the fire alarm system.

Areas of the building that are not maintained above 40 °F or exterior areas identified as requiring automatic sprinkler protection will be protected by a dry sprinkler system in one of the following arrangements:

1. A dry pipe valve assembly located in the main sprinkler valve room.
2. A dry pipe valve assembly located remotely in the building.
3. Dry sidewall or dry pendent sprinklers connected to a wet pipe system.

A fire department connection will be provided on the exterior of the building at the closest point of fire department apparatus access. The final location and type of connection will be at the discretion of the Newport Fire Department.

An automatic wet standpipe system will be provided in the building. A standpipe riser will be provided in each interior exit stair. In one stair, the standpipe will be a combination sprinkler/standpipe riser. Class I (2 1/2") standpipe hose connections will be provided at each intermediate landing.