Example Networks

# Predicted WiFi coverage

Administration building, ground floor

PREPARED FOR
**Sample client**

PREPARED BY
**Example Networks**

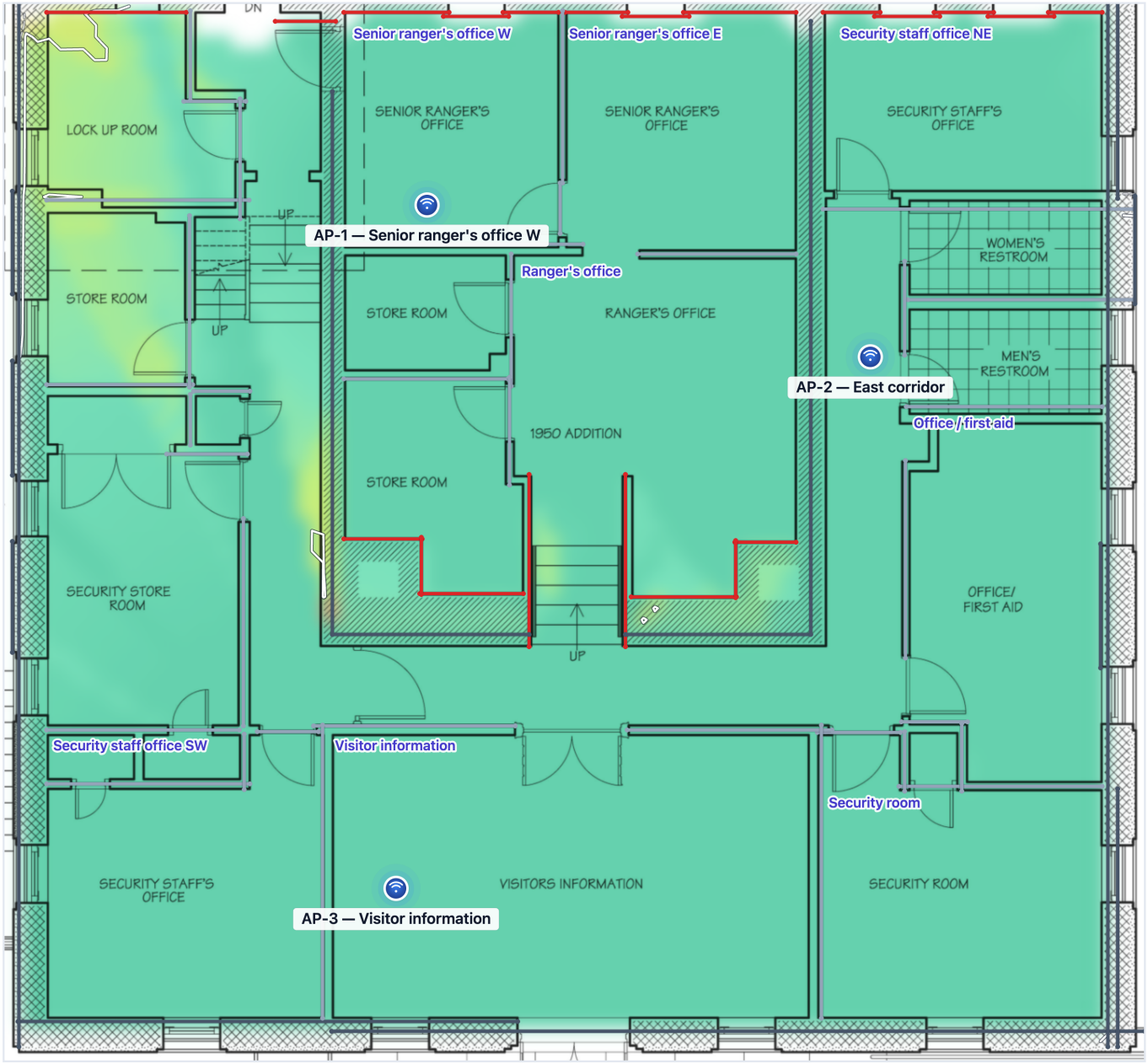
DATE
**9 November 2026**

| USABLE COVERAGE | ACCESS POINTS | FLOOR AREA | DESIGN STANDARD |
|---|---|---|---|
| **99.5%** | **3** | **276 m²** | **-67 dBm** |
| at -67 dBm or better | Ubiquiti UniFi U7 Pro | inside the outer walls | usable; -75 dBm fair |

NOTES

Three ceiling access points (UniFi U7 Pro): in the west senior ranger's office, in the east corridor and in the visitor information room. Every office reaches -67 dBm or better; the far corner of the lock-up room gets about -72 dBm, enough for a store room. The 1950 core's thick brick walls are modelled as concrete (20 dB), partitions as plasterboard. Plan: HAER, National Park Service, 2006, public domain.

**Example Networks**




USABLE COVERAGE

**99.5%**

-67 dBm or better

FAIR COVERAGE

**99.9%**

-75 dBm or better

ACCESS POINTS

**3**

71 walls, Walls only

FLOOR AREA

**276 m²**

17.8 × 16.1 m

SIGNAL (dBm)

-90 -75 -67 -50

**Usable** -67 dBm or better

**Fair** -75 dBm or better

SCALE

0 5 m

WALLS

Drywall Brick Concrete

## Equipment summary

| | |
|---|---|
| Ubiquiti UniFi U7 Pro | **3×** |

## What to buy and set

- Power and cabling: the 3 access points are powered over the network cable (PoE): plan 3 PoE switch ports or injectors, PoE+ (802.3at) for WiFi 6 and 7 models, which mostly ship without a power supply, and 3 Cat6 runs.
- Set-up: UniFi access points are adopted and set up in the UniFi Network application, on a UniFi gateway, a Cloud Key or a self-hosted server.
- Radio settings: set each access point's channel, width and EIRP as listed below; EIRP is the transmit power plus the antenna gain. Use one network name and password on every access point, and switch off the internet router's own WiFi, or move it off these channels.
- Channels 52 to 64 and 100 to 140 are shared with radar (DFS): an access point on one may pause for a minute at start-up, or move if it detects radar.
- 2.4 GHz is not part of this design: for older devices, run it at 20 MHz with power at low or medium: AP-1 on 1, AP-2 on 6, AP-3 on 11.
- 6 GHz: leave the 6 GHz radio on for newer devices; it reaches less far than 5 GHz, so this design does not count on it.

## Device schedule

Position: x, y in metres from the top-left corner of the plan (see the scale bar). Wall mounts face the angle given, clockwise from the top of the plan

| NAME | MODEL | MOUNT | BAND | WIDTH | CHANNEL | EIRP (dBm) | TX + GAIN | POSITION (m) |
|---|---|---|---|---|---|---|---|---|
| AP-1 — Senior ranger's office W | Ubiquiti UniFi U7 Pro | Ceiling | 5 GHz | 80 MHz | 36 | 23 | 17 + 6 dBi | 6.7, 3.2 |
| AP-2 — East corridor | Ubiquiti UniFi U7 Pro | Ceiling | 5 GHz | 80 MHz | 100 | 23 | 17 + 6 dBi | 13.7, 5.6 |
| AP-3 — Visitor information | Ubiquiti UniFi U7 Pro | Ceiling | 5 GHz | 80 MHz | 52 | 23 | 17 + 6 dBi | 6.2, 14.0 |

DEVICES AT BUSY HOUR

**46**

concurrent, this floor

THROUGHPUT DEMAND

**181 Mbps**

aggregate

ACCESS POINTS FOR CAPACITY

**1**

3 in this design

PER-RADIO ASSUMPTION

**320 Mbps**

50 clients max

| ROOM | USE | AREA | DEVICES/m² | DEVICES | DEMAND | WEAKEST |
|---|---|---|---|---|---|---|
| Visitor information | Reception / lobby | 35 m² | 0.40 | 14 | 57 Mbps | -41 dBm |
| Security staff office SW | Private office | 20 m² | 0.25 | 5 | 20 Mbps | -49 dBm |
| Ranger's office | Private office | 20 m² | 0.25 | 5 | 20 Mbps | -62 dBm |
| Office / first aid | Private office | 18 m² | 0.25 | 5 | 18 Mbps | -53 dBm |
| Security room | Private office | 17 m² | 0.25 | 4 | 16 Mbps | -49 dBm |
| Senior ranger's office E | Private office | 14 m² | 0.25 | 3 | 14 Mbps | -47 dBm |
| Security staff office NE | Private office | 12 m² | 0.25 | 3 | 12 Mbps | -52 dBm |
| Senior ranger's office W | Private office | 12 m² | 0.25 | 3 | 12 Mbps | -35 dBm |
| Rest of the floor | Corridor | 128 m² | 0.03 | 4 | 12 Mbps | |

## How to read this

- Device counts are busy-hour planning figures for each room use, not a measured inventory. These access points carry about 3.2 times this load, so signal coverage, not load, decided how many there are.
- Capacity assumes 50 concurrent clients and 320 Mbps of usable throughput per radio, which is well below the headline PHY rate because of 802.11 overhead and contention.
- Airtime fairness between fast and slow clients, band steering and application burstiness are not modelled. A deployment near these limits should be validated on site.
- The design takes whichever is greater: the access points needed for signal coverage, or the number needed for this load.

## Propagation model

Coverage is predicted with the COST-231 multi-wall model: free-space path loss plus the attenuation of every wall and floor slab on the straight line between transmitter and receiver, plus a loss for furniture, desks and people that grows with distance, set by each floor's environment. Predictions typically fall within 6–10 dB of a measured survey in comparable construction. This is a design tool, not a substitute for an on-site validation survey.

## Assumptions and limitations

- Coverage and floor area are measured inside the drawn walls (openings under 3 m, such as doorways, count as closed), or over the whole plan where none are drawn. Coverage is the share of grid points at or above -67 dBm.
- Antennas are modelled as omnidirectional; directional and down-tilt patterns are not simulated.
- Furniture, desks and people are modelled as a loss that grows with distance from each access point, set by the floor's environment, not object by object. A lift, metal racking or a row of filing cabinets counts only where it is drawn as a wall.
- Reflection, diffraction and multipath are not simulated — predictions are line-of-sight with wall losses.
- Transmit power and antenna gain are the values set per device in the plan; verify against the installed hardware.
- Channel conflicts are assessed on the frequency block each radio occupies at its configured width, not on channel number alone.

## Attenuation values used

| WALLS (dB per crossing) | 5 GHz |
|---|---|
| Drywall | 4 |
| Brick | 11 |
| Concrete | 20 |

| ENVIRONMENT (dB over free space) | 20 m | 40 m |
|---|---|---|
| Walls only | 0.0 | 0.0 |

Walls only: free space between the walls drawn. Furniture, desks and people are not counted, so open areas read as if they were empty.