NOTES:

1. REFERENCE SPECIFICATION 03700 FOR CONCRETE REBUILD INFORMATION NOT OTHERWISE SHOWN.
2. GALVANIC ANODE SIZES AND SHAPES MAY VARY.

INSTALL PROTECTIVE REBAR COATING. REFERENCE DETAIL #606 FOR TYPICAL REQUIREMENTS.

EXISTING CONCRETE TO REMAIN

NEW CONCRETE REBUILD MATERIAL

FINISHED SURFACE

INSTALL DISCRETE GALVANIC ANODES AT REBUILD PERIMETER OR AS OTHERWISE SPECIFIED. REFERENCE DETAIL #605 FOR TYPICAL ANODE LAYOUT

CONDUCTIVE EMBEDDED MORTAR AS REQUIRED. REFERENCE SECTION XX FOR TYPICAL REQUIREMENTS

2" MIN.

EXCAVATE AS REQUIRED TO OBTAIN MINIMUM CLEAR COVER

1" MIN. CLEAR

SEF DETAIL #604 FOR ENLARGEMENT SECTION

EXCAVATE AS REQUIRED TO OBTAIN MINIMUM CLEAR COVER

1" MIN. CLEAR

NOT TO SCALE

STANDARD DESIGN DETAIL

INSTALLATION OF DISCRETE GALVANIC ANODES
NOTES:
1. REFERENCE SPECIFICATION 03700 FOR CONCRETE REBUILD INFORMATION NOT OTHERWISE SHOWN.
2. CONDUCTIVE MORTAR NOT SHOWN. ENCAPSULATE ANODES IN CONDUCTIVE MORTAR AS REQUIRED BY MANUFACTURER.
3. GALVANIC ANODE SIZES AND SHAPES MAY VARY.

NOT TO SCALE
INSTALL DISTRIBUTED GALVANIC ANODES AT REBUILD PERIMETER OR AS OTHERWISE SPECIFIED

INSTALL PROTECTIVE REBAR COATING. REFERENCE DETAIL #606 FOR TYPICAL REQUIREMENTS

TOP OF WALL

NEW CONCRETE REBUILD MATERIAL

EXISTING CONCRETE WALL AND REINFORCEMENT

VARIES F.V.

NOTES:
1. REFERENCE SPECIFICATION 03700 FOR CONCRETE REBUILD INFORMATION NOT OTHERWISE SHOWN.
2. CONDUCTIVE MORTAR NOT SHOWN. ENCAPSULATE ANODES IN CONDUCTIVE MORTAR AS REQUIRED BY MANUFACTURER.
3. GALVANIC ANODE SIZES AND SHAPES MAY VARY.

NOT TO SCALE

STANDARD DESIGN DETAIL
DISTRIBUTED GALVANIC ANODES AT TOP OF WALL
INSTALL ANODE 4" MINIMUM FROM REINFORCEMENT, TYP.

NOT TO SCALE
NOTES:
1. CONDUCTIVE BEDDED MORTAR SHALL BE INSTALLED FOR ANODES WHEN NEW CONCRETE
   REBUILD MATERIAL ELECTRICAL RESISTIVITY IS GREATER THAN 15,000 OHM-CM.
2. GALVANIC ANODE SIZES AND SHAPES MAY VARY.

NOT TO SCALE

STANDARD DESIGN DETAIL

CONDUCTIVE MORTAR BRIDGE FOR USE WITH HIGH RESISTIVITY REPAIR MORTARS
NOTES:
1. REFERENCE SPECIFICATION 03700 FOR CONCRETE REBUILD INFORMATION NOT OTHERWISE SHOWN.
2. GALVANIC ANODE SPACING SHALL BE IN ACCORDANCE WITH SPECIFICATION REQUIREMENTS.
3. SEE DETAIL #806 FOR TYPICAL ANODE CONNECTION DETAILS.

NOT TO SCALE

STANDARD DESIGN DETAIL

TYPICAL GALVANIC ANODE LAYOUT
TYPICAL INSTALLATION TO SIDE REBAR

TYPICAL INSTALLATION ABOVE/BELLOW REBAR

TYPICAL INSTALLATION AT REBAR INTERSECTION

NOTES:
1. GALVANIC ANODE SIZES AND SHAPES MAY VARY.

NOT TO SCALE

STANDARD DESIGN DETAIL

TYPICAL GALVANIC ANODE CONNECTIONS
FINISH SURFACE OF CONCRETE MEMBER

ABRASIVE BLAST CLEAN EXPOSED SURFACES

REMOVE UNSOUND AND, AS NECESSARY, SOUND CONCRETE

SAWCUT PERIMETER 1" DEEP. AVOID DAMAGING REINFORCEMENT

EXISTING CONCRETE TO REMAIN

1" MIN. CLEAR

ABRASIVE BLAST CLEAN EXPOSED STEEL AND COAT WITH CORROSION-INHIBITING MATERIAL

VARIES

NOT TO SCALE

STANDARD DESIGN DETAIL

REMOVAL OF UNSOUND CONCRETE

TYPICAL SECTION
NOTES:
1. GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.
NOTES:
1. GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.
ABRASIVE BLAST CLEAN EXPOSED SURFACES

SAWCUT PERIMETER 1" DEEP
AVOID DAMAGING REINFORCEMENT

ABRASIVE BLAST CLEAN EXPOSED STEEL & COAT WITH CORROSION-INHIBITING MATERIAL

EXISTING CONCRETE TO BE REMOVED

1" MIN. CLEAR, TYP.

EXISTING REINFORCEMENT AND CONCRETE TO REMAIN

NOTES:
1. GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.

STANDARD DESIGN DETAIL

REMOVAL OF UNSOUND CONCRETE
TYPICAL CORNER SECTION
NOTES:
1. GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.
<table>
<thead>
<tr>
<th>BAR NO.</th>
<th>DIAMETER IN.</th>
<th>AREA IN.²</th>
<th>BAR DIAMETER WITH 10% SECTION LOSS (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CIRCUMFERENTIAL LOSS</td>
</tr>
<tr>
<td>3</td>
<td>0.375</td>
<td>0.110</td>
<td>0.356</td>
</tr>
<tr>
<td>4</td>
<td>0.500</td>
<td>0.196</td>
<td>0.474</td>
</tr>
<tr>
<td>5</td>
<td>0.625</td>
<td>0.307</td>
<td>0.593</td>
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<td>0.750</td>
<td>0.442</td>
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<td>0.875</td>
<td>0.601</td>
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<td>0.785</td>
<td>0.949</td>
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<td>0.999</td>
<td>1.070</td>
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<td>1.270</td>
<td>1.267</td>
<td>1.205</td>
</tr>
<tr>
<td>11</td>
<td>1.410</td>
<td>1.561</td>
<td>1.338</td>
</tr>
</tbody>
</table>

CIRCUMFERENTIAL LOSS

ONE - SIDED LOSS

STANDARD DESIGN DETAIL

REINFORCING SECTION LOSS TABLE
SUPPLEMENTAL REINFORCING BAR TO MATCH EXISTING

EXISTING REINFORCING BAR WITH 10% OR MORE SECTION LOSS OR DESIGNATED BY ENGINEER TO BE SUPPLEMENTED

LAP SPlice LENGTH SEE TABLE

PLAN OR ELEVATION

EXTENT OF CONCRETE REMOVAL AREA

NOT TO SCALE

STANDARD DESIGN DETAIL

LAP SPLICE - OPTION 1
## Tension Lap Length - Class B Splice - Top & Bottom Bars

(Grade 60 uncoated bars & normal weight concrete)

<table>
<thead>
<tr>
<th>BAR NO.</th>
<th>fc=4,000psi</th>
<th></th>
<th>fc=5,000psi</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOP</td>
<td>BOT</td>
<td>TOP</td>
<td>BOT</td>
</tr>
<tr>
<td>3</td>
<td>15”</td>
<td>12”</td>
<td>13”</td>
<td>12”</td>
</tr>
<tr>
<td>4</td>
<td>20”</td>
<td>15”</td>
<td>18”</td>
<td>14”</td>
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<tr>
<td>5</td>
<td>24”</td>
<td>19”</td>
<td>22”</td>
<td>17”</td>
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<td>6</td>
<td>29”</td>
<td>22”</td>
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<td>7</td>
<td>42”</td>
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<td>29”</td>
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<td>8</td>
<td>48”</td>
<td>37”</td>
<td>43”</td>
<td>33”</td>
</tr>
<tr>
<td>9</td>
<td>60”</td>
<td>46”</td>
<td>54”</td>
<td>41”</td>
</tr>
<tr>
<td>10</td>
<td>74”</td>
<td>57”</td>
<td>66”</td>
<td>51”</td>
</tr>
<tr>
<td>11</td>
<td>89”</td>
<td>68”</td>
<td>79”</td>
<td>61”</td>
</tr>
</tbody>
</table>

**NOTES:**

1. This table is based on ACI 318-11, Equation 12-1 with a minimum clear cover of 2 inches and minimum center-to-center bar spacing of 5 inches.

2. "Top" bars are horizontal reinforcing bars with more than 12 inches of fresh concrete cast below the bars at the development length. All other bars are considered "bot" bars.

3. For epoxy coated or zinc and epoxy dual coated bars, multiply the table values by 1.5 for bottom bars, or 1.3 for top bars. If the concrete cover is at least 3X the bar diameter and clear spacing at least 6X the bar diameter, multiply values by 1.2.

4. For class A splice, divide values by 1.3.

5. For lightweight concrete, multiply values by 1.33.
3" Minimum beyond section loss and/or corrosion, typ.

Existing reinforcing bar with 10% or more section loss or designated by engineer to be supplemented.

Existing reinforcing to remain.

Finished surface.

Not to scale.
NOTES:
1. GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.
SUPPLEMENTAL REINFORCING BAR TO MATCH EXISTING

EXISTING REINFORCING BAR WITH 10% OR MORE SECTION LOSS OR DESIGNATED BY ENGINEER TO BE SUPPLEMENTED

MIN. EFFECTIVE WELD LENGTH, SEE TABLE

CONCRETE REMOVAL AREA

MIN. EFFECTIVE WELD LENGTH, SEE TABLE

NOTE 1: CUT BAR 3 INCHES MINIMUM BEYOND SECTION LOSS AND/OR CORROSION AND REMOVE

NOTE 2: SEE DETAILS 637 & 638 FOR SECTIONS

NOTE 3: GALVANIC ANODES NOT SHOWN FOR CLARITY. REFER TO SPECIFICATION 03800 FOR REQUIREMENTS.

NOT TO SCALE

STANDARD DESIGN DETAIL

WELD SPLICE – OPTION 3
SECTION A - FLARE V - GROOVE WELD SPLICE

MINIMUM EFFECTIVE LENGTH. SEE TABLE

EXISTING BAR

SUPPLEMENTAL BAR

GRIND ALL EDGES SMOOTH AFTER WELDING, TYP

SUPPLEMENTAL BAR

SECTION B

WELD SPLICE LENGTHS

<table>
<thead>
<tr>
<th>BAR NO.</th>
<th>MINIMUM EFFECTIVE WELD LENGTH, in.</th>
<th>BAR RADIUS, S, in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3.5</td>
<td>0.188</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td>0.250</td>
</tr>
<tr>
<td>5</td>
<td>5.5</td>
<td>0.313</td>
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<td>7</td>
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<td>0.438</td>
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<td>8</td>
<td>9.0</td>
<td>0.500</td>
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<tr>
<td>9</td>
<td>10.0</td>
<td>0.563</td>
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<tr>
<td>10</td>
<td>11.5</td>
<td>0.625</td>
</tr>
<tr>
<td>11</td>
<td>12.5</td>
<td>0.688</td>
</tr>
</tbody>
</table>

EFFECTIVE THROAT, 0.65
BASED ON E70XX ELECTRODES

NOT TO SCALE

STANDARD DESIGN DETAIL

WELD SPLICE DETAILS - OPTION 3
SECTION C – SINGLE V – GROOVE WELD SPLICE

NOT TO SCALE
NOTES:
PROVIDE SUPPLEMENTAL REINFORCEMENT FOR EXISTING REINFORCEMENT THAT:

1. IS LOCATED 3" OR MORE BELOW NEW CONCRETE SURFACE; OR
2. HAS PROVIDED 2" MINIMUM CLEAR COVER, BUT SPACED GREATER THAN 12" O.C.
3. IS LOCATED 6" OR MORE FROM EXISTING CONCRETE TO REMAIN.
TYPICAL SECTION AT CONC. REMOVAL AREAS — VERTICAL AND OVERHEAD SURFACES

FINISHED SURFACE
NEW REBUILD MATERIAL
1/2" MIN. CONCRETE COVER
1" DIA. S.S. THREADED RODS, 12"X12" GRID AT LOCATIONS DESIGNATED BY ENGINEER

EXISTING CONCRETE TO REMAIN

FINISHED SURFACE
EDGE DISTANCE (SEE TABLE)
NEW CONCRETE REBUILD MATERIAL
EMBEDMENT DEPTH (SEE TABLE)
EXISTING CONCRETE TO REMAIN

ADHESIVE—GROUTED DOWEL LAYOUT DIMENSIONS

<table>
<thead>
<tr>
<th>DOWEL SIZE</th>
<th>ALLOWABLE TENSION LOAD PER ANCHOR, lbs</th>
<th>MINIMUM EMBEDMENT DEPTH, in.</th>
<th>MINIMUM CONCRETE THICKNESS, in.</th>
<th>MINIMUM EDGE DISTANCE, in.</th>
<th>MINIMUM SPACING, in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
<td>950</td>
<td>3</td>
<td>6</td>
<td>4.0</td>
<td>8.0</td>
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<tr>
<td>#3</td>
<td>2,100</td>
<td>4</td>
<td>6</td>
<td>6.0</td>
<td>12.0</td>
</tr>
<tr>
<td>#4</td>
<td>2,800</td>
<td>4</td>
<td>6</td>
<td>6.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

NOTES:
1. TABLE VALUES FOR SINGLE ANCHORS IN TENSION ONLY; REINFORCING STEEL YIELD STRENGTH OF 60 KSI; THREADED RODS A276, TYPE 316, YIELD STRENGTH OF 30 KSI; HILTI HIT–HY 200 OR HILTI HIT–RE 500 V3 ADHESIVE, 4,000 PSI CONCRETE.

2. IF CONDITIONS ARE DIFFERENT THAN THOSE LISTED ABOVE, TABLE VALUES SHALL BE ADJUSTED BY A LICENSED PROFESSIONAL ENGINEER BASED ON ACTUAL DOWEL SYSTEM USED AND REQUIRED DOWEL CAPACITY.

NOT TO SCALE

STANDARD DESIGN DETAIL

ADHESIVE—GROUTED DOWEL LAYOUT
DO NOT EXTEND DEMOLITION BEHIND EMBED PLATE GREATER THAN 1" WITHOUT APPROVAL OF ENGINEER

EXISTING CONCRETE TO REMAIN

NEW CONCRETE REBUILD MATERIAL

1" MIN.

FINISHED SURFACE

EXISTING EMBED PLATE

EXTEND DEMOLITION & REBUILD 1" BEHIND EMBED PLATE; CLEAN PLATE SURFACES & COAT W/ CORROSION-INHIBITING MATERIAL

REINF. NOT SHOWN FOR CLARITY, REF. DETAILS 626 – 628 FOR REQUIREMENTS NOT OTHERWISE SHOWN

NOT TO SCALE

STANDARD DESIGN DETAIL

TYPICAL CONCRETE REBUILD SECTION
AT EMBED PLATE

HRSD

DRAWING NO. 641
SHEET 1 OF 1
DATE 1/2020
DEMOlITION IS TYP. AT HORIZ. & VERT. LOCATIONS

SAWCUT CONC. 3/8" DEEP AT PERIMETER, CHIP BACK & REMOVE CONC.; IF REINF. IS EXPOSED, REF. DETAILS 626 - 628 FOR TYP. CONCRETE REBUILD REQUIREMENTS

T.O. CONC. EL.=VARIES

FINISHED SURFACE

EXISTING CONCRETE TO REMAIN

EXISTING CONCRETE TO BE REMOVED

12" MIN. EA. WAY, TYP.

1" (MIN.); 2" (MAX)

SHALLOW CONCRETE REBUILD - HORIZONTAL

1/4" DIA. S.S. CONCRETE SCREWS OR 3/8" DIA. BENT S.S. HELICAL ANCHORS, 6" O.C., MAX. EA. WAY W/ 2" MIN. EMBED INTO EXISTING CONC., TYP.

T.O. CONC. EL.=VARIES

3" TYP.

6" TYP.

3" TYP.

16 GA. S.S. WIRE REINF. WRAPPED AROUND CONCRETE SCREWS OR HELICAL ANCHORS, TYP.

NEW CONCRETE REBUILD MATERIAL

1" (MIN.); 2" (MAX)

2" MIN.

NOT TO SCALE

STANDARD DESIGN DETAIL

SHALLOW DEPTH (2" MAX) CONCRETE REBUILD HORIZONTAL
REF. DETAIL #642 FOR TYPICAL DEMOLITION REQUIREMENTS

EXISTING CONCRETE TO REMAIN

1/4" DIA. S.S. CONCRETE SCREWS OR
3/8" DIA. BENT S.S. HELICAL ANCHORS,
6" O.C., MAX. EA. WAY W/ 2" MIN.
EMBED INTO EXISTING CONC., TYP.

16 GA. S.S. WIRE REINF. WRAPPED
AROUND CONCRETE SCREWS
OR HELICAL ANCHORS, TYP.

NEW CONCRETE REBUILD MATERIAL

T.O. CONC.
EL.=VARIERS

SHALLOW CONCRETE REBUILD – VERTICAL

NOT TO SCALE

STANDARD DESIGN DETAIL
SHALLOW DEPTH (2” MAX) CONCRETE REBUILD
VERTICAL
REBUILD SECTION

INSTALL ANCHORS AROUND PERIMETER OF CORED HOLE PER FIGURE BELOW, TYP.

REBUILD ELEVATION

POSITION ANCHORS AROUND PERIMETER OF CORED HOLE 90° FROM ADJACENT ANCHOR

1" MIN. COUNTERSINK, FILL HOLE W/ SPECIFIED EPOXY REBUILD MATERIAL

NOT TO SCALE

STANDARD DESIGN DETAIL

PARTIAL-DEPTH CORE HOLE

CONCRETE REBUILD
**REBUILD SECTION**

- Install anchors around perimeter of cored hole per figure below, typ.

**REBUILD ELEVATION**

- Anchor installed at wall face beyond, typ.
- Install anchors at wall face beyond at opposite positions, typ.
- Position anchors around perimeter of cored hole 90° from adjacent anchor
- 0.5" min. countersink, fill hole w/ specified epoxy rebuild material

**HOLE DEPTH VARIES, F.V.**

- 30' min. - 45' max.
- 2" min.
- 3" min.

**EXISTING CONCRETE**

- Existing full-depth cored hole, roughen & clean interior surfaces by wire brushing, then flushing w/ water, typ.

**EXISTING FULL-DEPTH CORED HOLE**

- 0.5" min. countersink, fill hole w/ specified epoxy rebuild material

**SPECIFIED CONCRETE REBUILD MATERIAL; INSTALL LIFTS PER MANUFACTURER REQUIREMENTS**

**NOTE TO SCALE**

**STANDARD DESIGN DETAIL**

- Full-depth core hole
- Concrete rebuild
CONCRETE SURFACE

CHIP BACK TO SOUND CONCRETE

EXPOSED REINFORCING (TYP.)

APPLY CORROSION INHIBITOR TO EXPOSED SURFACES OF REINFORCING

SPALLED AREA

WATER BLAST OR SAND BLAST EXISTING CONCRETE AND REINFORCING TO SSPC5 (WHITE METAL BLAST)

SEE DETAIL 646B FOR SECTION VIEW AND NOTES

NOT TO SCALE

STANDARD DESIGN DETAIL

TYPICAL SPALL REPAIR WITH EXPOSED REINFORCING STEEL
NOTES:

1. IF SECTION LOSS OF REBAR IN A MEMBER (SLAB AREA, BEAM OR COLUMN) EXCEEDS 25% THIS REPAIR SHALL BE REVIEWED BY A STRUCTURAL ENGINEER.

2. WATER BLAST OR SAND BLAST EXPOSED CONCRETE AND REBAR (SSPC5 WHITE METAL BLAST) IN SPALLED AREA.

3. CHIP OUT CONCRETE AROUND EXISTING REBAR TO LEAVE A ONE INCH SPACE (MIN.) BETWEEN REBAR AND CONCRETE. CHIP BACK FURTHER IF NECESSARY TO ACHIEVE SOUND CONCRETE.

4. ROUGHEN CONCRETE SURFACE, CLEAN DEBRIS AND DIRT FROM REPAIR AREA, COAT REBAR WITH CORROSION INHIBITOR. WET CONCRETE SURFACE PRIOR TO PLACING NEW CONCRETE.

5. CORROSION INHIBITOR SHALL MEET REQUIREMENT OF ASTM C1582.

6. CONCRETE SHALL HAVE A MINIMUM COMPRRESSIVE STRENGTH OF (f’c) 5000 psi AT AN AGE OF 28 DAYS. MAXIMUM WATER–CEMENT RATIO (W/C) SHALL BE 40% BY WEIGHT. CEMENT SHALL BE ASTM C150 TYPE II WITH A MAXIMUM OF 0.6% ALKALIS BY WEIGHT. CONCRETE SHALL CONTAIN 7% SILICA FUME OR 15% FLYASH AS WEIGHT PERCENT OF CEMENTITIOUS MATERIALS.
1. IF W<1/2"; D=W; 1/2" MIN.
2. IF W>1/2" TO 1"; D=(3/4)W
3. IF W>1"; D=1"
4. ENSURE BACKER ROD DIA.
   IS 25%± LARGER THAN WIDTH
   OF THE JOINT, TYP.

NOT TO SCALE

STANDARD DESIGN DETAIL

TYPICAL SEALANT DETAILS